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S. HRG. 112–980

OUR NATION'S WATER INFRASTRUCTURE: CHALLENGES AND OPPORTUNITIES

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND WILDLIFE

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

DECEMBER 13, 2011

Printed for the use of the Committee on Environment and Public Works

Available via the World Wide Web: http://www.fdsys.gov

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U.S. GOVERNMENT PUBLISHING OFFICE

26–626 PDF WASHINGTON : 2017

For sale by the Superintendent of Documents, U.S. Government Publishing Office
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ONE HUNDRED TWELFTH CONGRESS
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C O N T E N T S

OUR NATION'S WATER INFRASTRUCTURE: CHALLENGES AND OPPORTUNITIES

TUESDAY, DECEMBER 13, 2011

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER AND WILDLIFE,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Benjamin L. Cardin (Chairman of the Subcommittee), presiding.

Present: Senators Cardin, Sessions, Barrasso, Gillibrand, Inhofe, Merkley, Udall, and Whitehouse.

OPENING STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. I want to welcome you all to the Subcommittee on Water and Wildlife of the Environment and Public Works Committee. Today's hearing is involving our nation's water infrastructure challenges and opportunities.

I first want to acknowledge and thank Senator Sessions and Senator Inhofe and Senator Boxer. The panels that we brought together for today's hearings were mutually agreed panels. Normally you have the Democrats will select some witnesses, the Republicans will select some witnesses. But we did it differently for this hearing. In true bipartisan cooperation, we came together as to what witnesses we thought collectively would be the best to point out the importance of this subject, which is that Americans' depending upon turning on their faucets and getting clean water. They almost take that for granted today. We are concerned as to whether the status of our water infrastructure in this country is one that will guarantee in the future that that in fact will be the case.

We know that those who have rated our nation's water infrastructure have determined that it is sub-par and that it is in need of significant attention. We know that in my own State of Maryland, how many times we have had episodes of water main breaks, where River Road in Montgomery County literally became a river, where people had to be rescued by helicopter, where in Baltimore we found in Dundalk thousands of homes were flooded because of a water main break. And then most recently in Prince Georges County where we had a water main break that closed the beltway for a period of time.

So we need to pay attention to our nation's water infrastructure for the sake of preserving the confidence of the American people that in fact, when they do turn their faucets on, that they will get clean, safe drinking water, and that we are taking care of our wastewater in an appropriate manner.

The good news here is that in doing that, we also can create jobs. I think we will find during the course of this hearing how investment in water infrastructure will return big dividends to our economy as far as job growth is concerned. I am very pleased, again, at the witnesses that we have that will, I think, add to this debate. And without objection, I will put my entire opening statement into the record and turn to the Ranking Republican on the Subcommittee, Senator Sessions.

[The prepared statement of Senator Cardin was not received at time of print.]

OPENING STATEMENT OF HON. JEFF SESSIONS, U.S. SENATOR FROM THE STATE OF ALABAMA

Senator SESSIONS. Thank you, Mr. Chairman, for your leadership. Whatever you do has always been the most fair and courteous that I could ever ask for, and it is a pleasure to work for you on this Committee. I think working for you is a good way to say it.

[Laughter.]

Senator SESSIONS. We do have great needs on our water and sewer infrastructure. There is no doubt about that. I agree with you, we have an excellent panel to discuss those issues. I am especially pleased to have Mr. Van Richey of the Alabama Cast Iron Pipe Company. They have plants in Oklahoma, Minnesota, Texas, and around the country.

But typical of the good companies that provide good jobs, Mr. Chairman, when we were able to utilize them, and I know the commercial work that these companies have been doing is way down, commercial construction is way down. So it is a fact that well constructed governmental expansions of our water and sewer systems can help keep good companies busy and good workers busy.

So we will be looking for ways to do this more smartly to try to see how the Federal Government, which is not the primary responsible entity for water and sewer systems throughout the country, but how it can use its resources effectively. And I am of the view that if we are going to attempt to stimulate the economy it is better to do it in ways that create real jobs in the United States, producing something that provides a long-term infrastructure benefit to America. I really do feel strongly about that.

I remember President Bush sent out the checks. That was sending out $600 checks or whatever. And it didn't, history showed, do a lot to stimulate the economy. Likewise, I am a bit uneasy with this holiday, withholding tax holiday. But I guess I am more intrigued in creating jobs, in a program that would be infrastructure improving over a long period of time.

So we also maybe can look at the way, Mr. Chairman, to ensure that our American manufacturers have a fair chance and are not unfairly competed against by foreign manufacturers in the course of trying to create jobs in America. Those are some issues that will come up.

Thank you for your leadership, and I look forward to the fine panel, and thank you for what you have done.

Senator CARDIN. Thank you, Senator Sessions, very much.

The Ranking Republican on the full Committee, Senator Inhofe.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Mr. Chairman. Let me first say, remind my colleagues here that the Chairman and I were both of the same class in the House of Representatives. And I have never had an occasion to, while we have had disagreements on policy issues, he has always kept his word, and I really appreciate the work he is doing on this water issue. Nationwide investment in water infrastructure projects will increase jobs, repairs to crumbling infrastructure, and protect public health and the environment.

I can remember when they used to consider us, out in Oklahoma and some of the newer States, as not having the problems with infrastructure that the more mature States like Maryland had. But that is not true anymore. We have gone beyond a time where it is necessary to start working on our infrastructure. I are pleased that we have our chief, Joe Freeman, from the Oklahoma Water Resources Board. I will not comment on him now, because I will do that before the second panel so I can introduce him.

I also want to mention to my friend from Alabama that yes, I am very thankful for Mr. Richey. He and I have had a chance to talk. His operation actually is in Pryor, Oklahoma, which is kind of the gateway to our lake area. Not many people realize that the State of Oklahoma has more miles of freshwater shoreline than any of the 50 States. In Pryor is where it all starts. So I appreciate the contribution he had made.

In fact, he has been the salvation of that town. We have lost—he and I have talked about this—a lot of the industries from there. I appreciate his involvement there.

The U.S. Conference of Mayors notes that the public dollar invested in water infrastructure increases private long-term GDP output by $6.35; the National Association of Utility Contractors estimates that $1 billion invested in water infrastructure can create over 26,000 jobs. I only wish that back when we opposed it, several of us did, but they passed it, the $800 billion stimulus, that we had had more stimulus for things we are talking about here today and roads and highways. So I am looking forward to this hearing, and I appreciate our witnesses being here.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

I would like to make a note about EPA's recent study of groundwater in Pavillion, Wyoming. I continue to have many questions and concerns about this study and its implications for the natural gas industry in America, but I believe those questions are best addressed by those who are involved, and I will be withholding any questions on that today to Mr. Hanlon.

I first want to state for the record how tirelessly Senator Cardin has worked to continue the Federal investment in water infrastructure. I have appreciated working with him, and although we have not always agreed, there is no doubt in my mind that we share the same goal of maintaining clean water and safe drinking water. I look forward to continuing to work with him and other members of the Subcommittee next year. As this Committee is well aware, a nationwide investment in water infrastructure projects creates jobs, repairs crumbling infrastructure, and protects public health and the environment. I am grateful that the Water and Wildlife

Subcommittee is tackling this issue which is so important to Maryland, Alabama, California, Oklahoma, and to the rest of the U.S. I am especially pleased that we can hear a State perspective on water infrastructure needs today from Joe Freeman, Chief of the Oklahoma Water Resources Board's Financial Assistance Division.

Joe has worked on water infrastructure financing issues both in Oklahoma and at a national level, and will be able to provide us with a valuable perspective today. I would like to mention that Oklahoma is nearing completion of a State water plan. I know the Oklahoma Water Resources Board has done tremendous work in putting this 50 year plan for water use in Oklahoma in place. While the decisions have been challenging and sometimes painful, I know that there is one thing Oklahomans agree on: we need to invest in our water infrastructure.

I am also looking forward to hearing more about the jobs that are created as a result of water infrastructure investments from Mr. Richey. I understand that the American Cast Iron Pipe Company has a presence in Oklahoma and that they employ approximately 215 people at their American Castings plant in Pryor, Oklahoma.

Funding for water infrastructure is greatly needed. Each day, the condition of our water infrastructure results in significant losses and damages from broken water and sewer mains, sewage overflows, and other symptoms of water infrastructure that is reaching the end of its useful life cycle.

Investments in water infrastructure provide significant economic benefits as well. The U.S. Conference of Mayors notes that each public dollar invested in water infrastructure increases private long-term GDP output by $6.35. The National Association of Utility Contractors estimates that $1 billion invested in water infrastructure can create over 26,000 jobs. In addition, the Department of Commerce estimates that each job created in the local water and sewer industry creates 3.68 jobs in the national economy, and each public dollar spent yields $2.62 in economic output in other industries.

Considering the importance of water infrastructure to the well-being of the American people and to our economy, I will continue to support investment in water infrastructure and am looking forward to hearing the testimony of all of our witnesses on this important topic.

Thank you.

Senator CARDIN. Thank you very much.

Senator Barrasso.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM THE STATE OF WYOMING

Senator BARRASSO. Thank you, Mr. Chairman.

As everyone in this room knows, water is the most fundamental issue in my home State of Wyoming. The need to provide a clean, abundant supply of water is essential to the survival of the intermountain West.

As I have stated before in this Committee, as well as the Senate Energy Committee, on which I serve, the infrastructure that we have today in our home State and across the nation is aging. For example, repairs that are needed to our irrigation districts include concrete structures, such as canals and sub-canals, that divert needed water to farmers and ranchers. The price tag, Mr. Chairman, for these repairs, will only get higher. The longer we wait, the more irrigation districts will fall into disrepair. This will impact the economic livelihood of ranchers and farmers in Wyoming, and across the entire country.

Funding for water infrastructure is essential. It is only a part of the solution. We must remove the regulatory red tape and give States the flexibility to provide a clean, abundant supply of water for the future.

The EPA's one size fits all approach to water quality issues is not always in our State's best interest. Often, solutions that come out of Washington and are imposed upon rural communities that can't afford them end up providing very little benefit to the community, given their scarce resources. We all recognize the need to upgrade wastewater treatment facilities, sewer lines, wastewater collection systems, and public drinking water systems. However, bureaucrats in Washington need to know that a solution for a water quality problem in Chicago, Illinois, doesn't necessarily work for Sheridan, Cheyenne, or Casper, Wyoming.

So let's work to ensure that the regulatory decisions that we make are based on sound science and that we achieve a balance with the community and environmental needs. Let's empower our States and our local communities and give them the tools and the flexibility that they need to provide clean water.

With that, Mr. Chairman, thank you for holding the hearing, and I look forward to the testimony.

Senator CARDIN. Thank you, Senator Barrasso.

Now I am pleased to call on Jim Hanlon, I welcome you to the Committee, the Director of the Office of Wastewater Management in EPA's Office of Water.

Mr. Hanlon has served as the Office Director since April 2002. The Office of Wastewater Management has oversight responsibility and provides technical assistance supporting EPA's regional water programs. The Office also administers Federal financial and technical assistance for publicly owned treatment works, including municipal sewage collection systems and treatment plans.

Mr. Hanlon, we welcome you and would be glad to hear from you.

STATEMENT OF JAMES A. HANLON, DIRECTOR, OFFICE OF WASTEWATER MANAGEMENT, OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. HANLON. Senator Cardin, Ranking Member Sessions, and members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the state of our nation's water infrastructure and the progress that EPA has made in the implementation of the Clean Water Act and Safe Drinking Water Act and new opportunities that we believe will help bridge the divide between our nation's water infrastructure needs and the ability to pay.

We have come a long way in improving the protection of public health, water quality, and the environment over the last 40 years. Our nation's drinking water meets standards as protective as any in the world, and we have improved water quality in streams, rivers, lakes, and bays nationwide.

However, significant challenges remain. To tackle these challenges, we believe that new tools and techniques will be necessary to continue to meet America's water infrastructure needs, needs that are critical for protecting the nation's communities, creating jobs and strengthening our economy.

Based on our most recent water infrastructure needs surveys, communities across the country identify the need for $300 billion in wastewater and $335 billion in drinking water capital expenditures over the next 20 years. Recognizing these needs and sustaining our nation's water infrastructure will remain a significant challenge in the years ahead.

Despite the progress made since the passage of the Clean Water Act in constructing and operating wastewater treatment facilities, the nation will continue to face water pollution challenges related to water infrastructure. The Census Bureau tells us that there will be a 35 percent increase in the U.S. population by 2050. By 2025 this increasing trend in population growth, combined with other factors, will result in a projected rate of biochemical oxygen demand, or BOD, being discharged by publicly owned treatment works at a level about equal to the rate experienced in 1968, the year when the discharge of oxygen demanding material from POTWs had reached its historical peak. This projection underscores the importance of investing in wastewater infrastructure, treatment infrastructure to maintain and improve pollutant removal efficiencies.

These trends also have implications for drinking water utilities with respect to the quality of their source waters. In addition to the population growth challenge noted above, demographic trends will further impact infrastructure decisions affecting our large and growing urban centers as well as rural America.

The complexity of the challenges facing water utilities also continues to increase. Advancements in measurement and toxicological capability are producing questions concerning pharmaceuticals, personal care products, and other contaminants that were not previously part of the national conversation.

Two of the nation's most important sources of water infrastructure financing are the Clean Water and Drinking Water State Revolving Funds. These two programs have provided financing of over $111 billion to 39,000 projects since their beginnings in 1987 and 1996, respectively. The State Revolving Funds have been widely recognized as technically and financially sound designs that have resulted in a return on the Federal investment of more than 2 and a half to 1.

As the nation's largest water quality financing program, the Clean Water Fund supports the overarching goal of protecting public health and aquatic systems throughout the country. The Drinking Water Fund helps ensure that the nation's drinking water remains safe. At their discretion, States may also use a portion of their capitalization grants to fund a range of programs designed in part to help small systems in disadvantaged communities.

One of the keys to the success of the SRFs is the flexibility that States have to decide how funds are used under varying State-specific circumstances. This flexibility allows States to provide financial assistance to local governments in a timely manner, allowing funds to benefit local economies quickly.

EPA is working with partners across the water sector and beyond to provide the knowledge and tools to ensure that the investments we make in our water infrastructure move us toward a more sustainable footing. We are targeting our efforts toward assisting systems to achieve results by promoting the use of asset management frameworks, water and energy efficiency improvements, and innovation through the use of alternative technologies. We are committed to promoting sustainable practices that will help assure that communities continue to enjoy the benefits of clean and safe water.

In October of last year we issued a Clean and Safe Drinking Water Infrastructure Sustainability Policy. The policy represents the next step in our efforts to increase the sustainability of water infrastructure. We will also continue to work with utilities to ensure they have the technical, financial, and managerial capacity to effectively manage all aspects of their operations.

In conclusion, our nation is confronted with significant water infrastructure challenges. Addressing these challenges will require the participation of EPA, the States, communities, and other partners, and will require us to leverage more innovative and sustainable tools. We look forward to working with the Subcommittee and our many partners and stakeholders to continue our progress toward protecting and providing clean water to all Americans.

Thank you again for inviting me to testify, and I would be happy to respond to any questions you have.

[The prepared statement of Mr. Hanlon follows:]

TESTIMONY OF JAMES A. HANLON
DIRECTOR,
OFFICE OF WASTEWATER MANAGEMENT
OFFICE OF WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE
SUBCOMMITTEE ON WATER AND WILDLIFE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

DECEMBER 13, 2011

Chairman Cardin, Ranking Member Sessions, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the state of our nation's drinking water and wastewater infrastructure, progress and accomplishments that the U.S. Environmental Protection Agency (EPA) has made in the implementation of the Clean Water Act (CWA) and Safe Drinking Water Act (SDWA), and new opportunities that we believe will help bridge the divide between our nation's water infrastructure needs and the ability to pay for such needs.

Current State of Our Drinking Water and Wastewater Infrastructure

We have certainly come a long way in improving protection for public health, water quality, and the environment under the CWA and SDWA since the creation of the EPA over 40 years ago. Our nation's drinking water meets standards as protective as any in the world and we have improved water quality and increased public health protection in streams, lakes, bays, and other waters nationwide. However, significant challenges remain. To tackle these challenges, we believe that new tools and techniques will be necessary to continue to meet America's drinking water and wastewater needs – needs that are critical for protecting the nation's communities, creating jobs, and strengthening our economy.

Based on the most recent clean water and drinking water needs assessment surveys conducted by the EPA, communities across the country identified the need for $300 billion in wastewater and $335 billion in drinking water infrastructure improvements for capital expenditures over the next 20 years. Sustaining the nation's infrastructure will remain a significant challenge in the years ahead.

Future Challenges

Despite the progress made since passage of the CWA in constructing and operating wastewater treatment facilities, the nation will continue to face water pollution challenges related to water infrastructure in the years ahead. The Census Bureau projects a 35% increase in U.S. population by 2050. By 2025, this increasing trend in population growth, combined with other factors, will result in a projected rate of biochemical oxygen demand (BOD), a conventional pollutant under the CWA, being discharged by Publicly Owned Treatment Works (POTWs) at a level about equal to the rate experienced in 1968 (21,280 metric tons per day), the year when the discharge of oxygen-demanding material from POTWs had reached its historical peak. This projection underscores the importance of investing in wastewater treatment infrastructure to maintain and improve pollutant removal efficiencies. Many of the environmental successes of the past three decades may be overwhelmed by future demands. These trends also have implications for drinking water utilities with respect to the quality of their source waters. These water and wastewater infrastructure challenges will be faced by systems across the country, both in our large and growing urban centers as well as our rural towns.

The complexity of the challenges facing water utilities also continues to increase. Advancements in measurement and toxicological capability are producing questions concerning the human health and ecological impacts of low levels of contaminants associated with pharmaceuticals and personal care products that were not previously part of the national conversation.

Stormwater pollution is one of our nation's most challenging water quality problems and is a significant contributor to the impairment of the country's streams, rivers, and watersheds. Unlike pollution from industry or sewage treatment facilities, which is caused by a discrete number of specific sources, stormwater pollution comes from a very large number of both point and nonpoint sources. Rainwater and snowmelt runs off landscaping, parking lots, streets, buildings, farms, and construction and industrial sites. This water picks up fertilizers, soil and sediments, pesticides, oil and grease, heavy metals and many other pollutants on the way to our rivers, lakes, and coastal waters. The impermeable surfaces of our traditional urban and suburban landscapes also result in increased stormwater volume. In addition to these problems, many older cities (including many of our nation's largest cities), have combined sewage and stormwater pipes which periodically—and in some cases frequently—overflow due to precipitation events.

Finally, as described earlier, implementing the projects that are needed to maintain and upgrade our existing water and wastewater infrastructure will be a critical challenge in the years ahead to ensure that our infrastructure continues to provide us with clean drinking water and healthy rivers, lakes, and streams.

Tools for Protecting Public Health and the Environment

Financing

Two of the nation's most important sources of water infrastructure financing are the Clean Water and Drinking Water State Revolving Fund programs. These two programs have financed over $111 billion of infrastructure projects and 39,000 loans since their inceptions in 1987 and 1996, respectively. The State Revolving Funds have been widely recognized as technically and financially sound designs that have resulted in a return on the federal investment of more than 2.5 to 1.

As the nation's largest water quality financing program, the Clean Water State Revolving Fund (CWSRF) program supports the overarching goal of protecting public health and aquatic systems throughout the country. The CWSRF program was established by Congress in 1987 to provide capitalization grants to states, which in turn provide low-cost financing to communities to finance the cost of much-needed infrastructure. Since 1987, the CWSRF program has provided approximately $89.5 billion through more than 30,000 individual loans. Projects include wastewater treatment, nonpoint source pollution control, and watershed and estuary management.

The DWSRF program helps to ensure that the nation's drinking water remains safe. The DWSRF program was established by Congress in 1996, and similar to the CWSRF program, provides capitalization grants to states, which in turn are authorized to provide low-cost loans and other types of assistance to public water systems to finance the costs of infrastructure projects needed to achieve or maintain compliance with SDWA requirements. At their discretion, states may also use a portion of their capitalization grants to fund a range of programs designed in part to help small systems and disadvantaged communities. Since its inception, the DWSRF program has provided approximately $21.7 billion dollars in assistance through more than 9,000 loans that have improved public health protection for millions of people.

One of the keys to the success of the SRFs is the considerable flexibility that states have to decide how funds are used under varying state-specific circumstances. This flexibility allows both programs to make these much-needed funds available to local governments in a timely manner, allowing funds to enter local economies quickly.

In 2009, Congress passed the American Recovery and Reinvestment Act (ARRA). EPA and its state partners have succeeded in placing 100 percent of available ARRA SRF funding into construction contracts and into local economies. 3,214 SRF projects were funded in all 50 states and Puerto Rico, totaling nearly $6 billion. More than $1.6 billion of these funds went toward green infrastructure projects, exceeding the 20% Green Project Reserve requirement. As of today, over 90% of all SRF ARRA funds have been spent and we estimate that approximately 65,000 jobs have been created.[1]

Research

The EPA established the Aging Water Infrastructure (AWI) Research Program to generate scientific and engineering solutions to water infrastructure problems. The goal is to evaluate, advance, and rehabilitate water infrastructure though innovative technologies and techniques that reduce the cost and improve the effectiveness of operation, maintenance, and replacement of aging and failing drinking water and wastewater facilities. In addition to innovative techniques on gray infrastructure, EPA is also developing a green infrastructure approach to improve stormwater management. The results will provide much needed design and

[1] Based on the May 2009 President's Council of Economic Advisers (CEA) guidance for American Recovery and Reinvestment Act reporting

performance information on green and gray technologies to the regulated community to enable better decisions.

Sustainability

The EPA is working with partners across the water sector and beyond to provide the knowledge and tools to ensure that the investments we make in our water infrastructure move us toward a more sustainable footing. The goal can be achieved through strong infrastructure planning and management practices at water utilities. We are targeting our resources to help systems achieve results in the following areas:

- Promoting an asset management framework that ensures that the right investments are made at the right time.
- Promoting water and energy efficiency to ensure that water sector systems adopt sustainable practices and technologies for improving their efficiency, reducing costs and addressing future needs.
- Promoting infrastructure financing and providing options to pay for water infrastructure needs, including through full cost pricing.
- Promoting alternative technologies and assessment to ensure that systems are using the best and most innovative solutions when investing in water infrastructure.

We are committed to promoting sustainable practices that will help assure that communities continue to enjoy the benefits of clean and safe water. In October 2010, we issued a Clean Water and Safe Drinking Water Infrastructure Sustainability Policy. The Policy represents the next step in our efforts to increase the sustainability of water infrastructure. The

Policy informs our water infrastructure activities funded through the SRF programs but is also intended to guide our efforts more broadly. Based on the principles laid out in the Policy, we will promote sustainability on three interrelated fronts—the sustainability of water infrastructure, the broader sustainability of water and wastewater utilities, and the role these play in fostering the overall sustainability of communities. We will also work closely with the states to promote the use of SRF funds to support all of these fronts.

The Policy places significant emphasis on the promotion of planning by utilities that result in infrastructure investments that also support other relevant community goals. The Policy encourages a robust analysis of various infrastructure options, including green and decentralized approaches; and encourages utilities to implement management strategies and rate structures that support a systems' water infrastructure investments and operations and maintenance. We will also continue to work with utilities to ensure they have the technical, financial, and managerial capacity to effectively manage all aspects of their operations. Finally, under the umbrella of the HUD-DOT-EPA Partnership on Sustainable Communities, we will work to help coordinate federal infrastructure investments with these other federal partners.

Flexibility

Increases in impervious surfaces, population growth, aging infrastructure, regulatory requirements, complex water quality issues and our contemporary economic challenges are stressing the implementation of CWA programs. The EPA recently issued a memo entitled, "Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans." Through this new policy, we will work with states and municipalities to improve how we implement CWA programs to ensure continued progress in public health and environmental protection. We believe that integrated planning, to meet the various requirements of the CWA, offers municipalities an approach that will meet water quality goals in a more timely and cost-effective manner.

Under an integrated approach, the EPA and states will use the flexibility of the EPA's existing regulations and policies to evaluate a given municipality's CWA requirements and their financial capability to better allow innovative solutions, such as green infrastructure, and sequencing wastewater and stormwater projects in a way that allows the highest priority projects to be started first. We are not suggesting that existing regulatory standards be lowered. Nor do we suggest that projects be stopped while a municipality is developing plans.

Consistent with the recently released memo, the agency is developing a framework document that will identify guiding principles for the development of integrated plans. In early 2012, we will hold a series of public meetings around the country to discuss a draft of the integrated framework.

Innovations and Benefits

Green infrastructure is a promising approach for reducing stormwater pollution from its diverse sources and can help catalyze significant improvements to our nation's water quality. Green infrastructure techniques utilize natural systems, or engineered systems that mimic natural landscapes, to capture, cleanse and reduce stormwater discharges using plants, soils and microbes. Green infrastructure can also support the reuse of rainfall, which also reduces the volume and impacts of stormwater discharges to water quality.

On a regional scale, green infrastructure consists of a network of open spaces and natural areas (such as forested areas, floodplains and wetlands) that improve water quality while providing recreational opportunities and wildlife habitat. When discussing green infrastructure at large geographic scales, it is also important to consider the value of open space preservation and natural resource protection for purposes of wildlife habitat and other ecological functions. On the local scale, green infrastructure consists of site-specific management practices, such as rain gardens, porous pavements, green roofs and cisterns, that are designed to maintain natural hydrologic functions by absorbing and infiltrating precipitation where it falls, and by returning it to the atmosphere via plants.

Green infrastructure has a number of other environmental and economic benefits in addition to improving water quality, including recharge of ground water and surface water supplies; cleaner air; reduced urban temperatures; reduced energy demand; carbon sequestration; reduced flooding; and community benefits, such as improved aesthetics; improved human health; additional recreational and wildlife areas; and potential cost savings associated with lower capital costs compared to building large stormwater collection and conveyance systems.

EPA recognizes the tremendous opportunities that green infrastructure presents and has created an internal green infrastructure steering committee to coordinate various EPA efforts in this area and to further encourage and support the implementation of green infrastructure solutions. EPA is working with other federal agencies, state and local governments, tribes, municipalities, and the private sector to identify opportunities and provide technical assistance to communities implementing green approaches to control wet weather.

The water-energy nexus is another area ripe for innovation that will drive economic growth. Three percent of our nation's energy is used to pump and treat water. Water and energy consumption in the U.S. are interdependent – the more water we use, the more energy we need. The less energy we use, the less water we need – and reducing energy and water use can have great financial benefits for industry and communities. New treatment technologies and design concepts are playing an important role in helping communities deal with their water infrastructure challenges. For example, in many cases, energy can be captured from wastewater. Capitalizing on this opportunity can yield financial benefits and maximize the sustainability of our existing systems. Industry is continuing to innovate in the construction and operation of wastewater treatment facilities, particularly in energy efficiency, such as in the use of anaerobic digestion to produce methane gas for energy. There is potential for a large payoff in turning waste into energy by using biosolids, manure, or other waste products as energy sources. It is smart business to save on energy costs, increase energy security, and benefit the environment, and the EPA strongly supports these innovative efforts.

Conclusion

Our nation is confronted with significant water infrastructure challenges. Addressing these challenges will take effort from the EPA, states, communities, and other partners, and will require us to use more innovative and sustainable tools to solve these significant challenges. We look forward to working with Members of the Subcommittee, our federal and state colleagues, and our many partners, stakeholders, and citizens who are committed to continuing our progress in providing clean water to all Americans. Thank you again for inviting me to testify and I would be happy to respond to any questions you may have.

Questions for the Record

This document contains answers to questions for the record from James A. Hanlon, Director, Office of Wastewater Management, U.S. Environmental Protection Agency from the hearing held on December 13, 2011 by the Subcommittee on Water and Wildlife entitled, "Our Nation's Water Infrastructure: Challenges and Opportunities."

Senator Barbara Boxer

1. Please describe the economic and environmental benefits of using green infrastructure? Can these practices help to reduce costs for wastewater and drinking water utilities? How is EPA working with local communities to promote these practices?

Green infrastructure is a demonstrated approach that many cities are using as a cost-effective means for reducing the volume of wet weather discharges and the pollutants contained within stormwater. By managing rain near to where it falls, green infrastructure can prevent polluted stormwater from entering local waterways and degrading water quality. In addition, green infrastructure can improve air quality by capturing pollutants, reduce the urban heat island effect, decrease energy use, and provide many community benefits associated with increased vegetation.

By helping to prevent stormwater from entering sewer systems, green infrastructure can reduce the capital investment and operational expenses needed for managing and treating these discharges. In cities with combined sewer systems, the reduced sewer inflows can also reduce the volume of combined sewer overflows (CSOs). The use of green infrastructure practices that capture and use rainwater for beneficial uses reduces the amount of potable water treated and delivered by drinking water utilities, reducing operational costs and environmental impacts. Examples where green infrastructure is being used for enhanced environmental and economic outcomes include:

- Onondaga County, New York is investing approximately $80 million in green infrastructure practices as a part of its program to reduce CSOs. This investment is anticipated to save up to $20 million when compared to a grey infrastructure only remedy.
- Portland, Oregon is investing $86 million in both green and grey infrastructure to improve the performance of the combined sewer system in its Brooklyn Creek Basin. Using green streets, trees and restoring natural vegetated areas as part of the solution is anticipated to save the city $58 million compared to the grey infrastructure only approach.
- Kansas City, Missouri is investing in a green and grey infrastructure improvement within the 100-acre Middle Blue River Basin to reduce CSOs. The green/grey solution is projected to provide 500,000 gallons of additional stormwater capacity when compared to the grey infrastructure only option and is anticipated to cost $10 million less to construct.

A large emphasis of the EPA's green infrastructure program has been outreach and technical support. In 2011, the agency initiated a green infrastructure partnership program with 10 communities across the U.S. to recognize successful applications of green infrastructure and provide technical resources and support to these communities for further development of their green infrastructure programs. The EPA intends to expand this effort during 2012 to include up to 20 additional communities.

2. Please describe the key components of EPA's efforts to promote sustainability of the nation's water infrastructure. What are the primary benefits of this approach? Can improved sustainability help to reduce the gap in infrastructure funding needed?

Based on the principles laid out in the agency's *Clean Water and Safe Drinking Water Infrastructure Sustainability Policy*, issued in September 2010, the EPA is working with a broad group of stakeholders to promote sustainability across the water sector on three interrelated fronts:

- Sustainable Water Infrastructure—To help address the mounting need to renew and replace our aging water infrastructure, the EPA is promoting up-front planning to ensure that utilities' water infrastructure investments support community sustainability goals; are based on the consideration of a range of alternatives, including green infrastructure; and are supported by a financial strategy, including adequate rates, to construct, operate, maintain, and replace the alternatives chosen.

- Sustainable Water Sector Systems—While infrastructure is a core component of water sector sustainability, wastewater and drinking water systems need to be effectively managing all aspects of their operations. The EPA will continue to support our partnership with several professional associations to promote effective utility management based on a series of *Attributes of Effectively Managed Utilities*, including smaller utilities that often face daunting management challenges. Similarly, we are working to enhance the Capacity Development Program under the Safe Drinking Water Act to help build the technical, managerial, and financial capacity of drinking water systems.

- Sustainable Communities— Investments in water infrastructure and water sector systems can have a profound impact on the overall character and sustainability of our communities. The EPA is promoting the coordinated targeting of investments from various infrastructure sectors, such as housing, transportation and water, to locations within a community that support its goals for livability and sustainable growth.

We believe this approach will provide an array of benefits to the public by ensuring that investments in water infrastructure are cost-effective over their life-cycle, efficient, and support the long-term sustainability of the communities this infrastructure serves.

3. Please describe how the use of additional subsidization authorities in the State Revolving Fund programs helps small communities access funding for needed water infrastructure upgrades.

Additional subsidization is a tool that further reduces the effective interest rate of a State Revolving Fund (SRF) loan. The reduction may come in the form of a grant, principal forgiveness, or negative interest rates. In each instance, the recipient community will pay back less than the cost of the project, or in some cases, nothing. Though not a requirement, the EPA recommends that this authority be used for those communities that could not otherwise afford a traditional SRF loan.

Senator Benjamin L. Cardin

1. EPA has estimated a required investment of over $500 billion dollars in our wastewater and drinking water infrastructure over the next two decades. What are the likely impacts if we fail to commit ourselves to this level of investment?

As a nation, we have invested billions of dollars over the years to build an extensive network of drinking water, wastewater and stormwater infrastructure to provide the public with safe and clean water. While some of that infrastructure is now 100 years old or older, much of our network of water treatment plants, distribution lines, sewer lines and storage facilities was built after World War II. The renewal and replacement of the assets that make up our nation's water infrastructure is a constant and ongoing task. Deferral of renewal and replacement can negatively impact levels of service in the long run.

The future investment required for sustaining this drinking water and wastewater infrastructure will largely be borne by the municipalities that depend on these vital public services. Federal programs such as the State Revolving Funds can help provide subsidized assistance to states and communities in making water infrastructure investments, but these programs have never served as the primary source of funding. The construction of new infrastructure and maintenance of existing infrastructure will continue to be largely a local responsibility.

The EPA is committed to do its part toward promoting sustainable practices, providing technical assistance to communities, and supporting community infrastructure investments in order to help ensure that citizens of these communities continue to enjoy the benefits of clean and safe water.

2. A variety of proposed water infrastructure financing approaches involve private sector partnership. For example, proposed legislation here in the Senate would lift the existing cap on private activity bonds for water infrastructure projects. In your opinion, what is the appropriate role of the private sector in funding these types of projects? What potential challenges should we keep in mind as we determine how best to incorporate private sector funding?

Currently, the private sector is significantly involved in the ownership and operation of drinking water facilities. According to 2011 data, 47 percent of the 51,226 community water systems are privately owned. This includes investor-owned utilities that serve very large and small communities, as well as manufactured home communities and homeowner associations. Under the Drinking Water State Revolving Fund (DWSRF), states can already make financing available to private community systems, except in states in which state law prohibits this practice.

Private sector involvement in wastewater treatment facilities is less significant than drinking water facilities due to a variety of economic and regulatory factors. However, contract operations where a private entity operates and maintains a publicly owned treatment works have been increasingly common and we expect that this trend will continue.

With privatization involving private equity in a public-purpose wastewater treatment facility, the primary challenge is for the privately owned facility to achieve and maintain a level of service equal to or better than a publicly owned facility. At the same time, the privately owned facility would need to keep user rates affordable to consumers at a level comparable to a publicly owned facility. There are also other considerations that must be taken into account, including public and political opposition to a facility changing ownership from a public entity to a private entity.

<u>Senator James M. Inhofe</u>

1. At the hearing, you mentioned within ARRA, the FY10 budget, and the CR FY11 budget, Congress has tried to encourage green infrastructure by dictating states use 20% of their capitalization grant money for these green, water efficiency, and energy efficiency projects, if such projects are available.

a. How many states are using the full 20% of their capitalization grant money for "green" projects?

All states and Puerto Rico used at least 20% of their ARRA capitalization grants for "green" projects. All states and Puerto Rico plan to use at least 20% of their FY 2010 and FY 2011 capitalization grants for "green" projects. Several states have already reached the 20% goal for FY 2010 and FY 2011.

b. How many of these projects are energy efficient or water efficient rather than low impact development or "green" design?

SRF Green Project Reserve (GPR) projects are classified into four categories: energy efficiency, water efficiency, green infrastructure, and other environmentally innovative projects. Below are the percentages of funding provided to projects classified as "energy efficiency" and "water efficiency" projects (note that a single project may be classified into multiple categories if, for example, it includes both energy efficiency and water efficiency elements).

Clean Water State Revolving Fund (as of January 2012)

	Energy Efficiency	Percent of Total GPR Funding	Water Efficiency	Percent of Total GPR Funding
ARRA	$606 million	54%	$153 million	14%
FY 2010	$69 million	35%	$37 million	19%
FY 2011	Not enough information reported to date.			

Drinking Water State Revolving Fund (as of January 2012)

	Energy Efficiency	Percent of Total GPR Funding	Water Efficiency	Percent of Total GPR Funding
ARRA	$142 million	26%	$356 million	66%
FY 2010	$20 million	16%	$76 million	62%
FY 2011	Not enough information reported to date.			

c. Is EPA concerned that the "Green Project Reserve" can lead to higher priority water projects being by-passed by the SRF program to meet the 20% green goal?

For the Clean Water SRF, the Green Project Reserve represents a very small percentage of overall SRF annual funding. FY 2012 Appropriations Act language requires at least 10% of the amount appropriated to be used for the GPR. The annual appropriations only represent approximately 20% of the total SRF funding volume when including repayments, interest, bond proceeds, etc. Therefore, the effective requirement for GPR is only approximately 2% of all SRF annual funding. It is highly unlikely that this requirement will impact a state's ability to fund high priority water projects. Furthermore, GPR funds can be used to pay for energy- or water-efficient portions of high priority projects.

For drinking water projects, the picture is different. For the American Recovery and Reinvestment Act, and 2010 and 2011 appropriations, at least 20 percent of the amount appropriated was to be for GPR. Some states raised concerns that it was challenging to identify GPR projects to meet the 20 percent requirement and that doing so could impact projects with greater public health significance. The FY 2012 appropriation does not require GPR for the DWSRF but, at the discretion of each state, the capitalization grants may be used for addressing green infrastructure, water or energy efficiency, or other environmentally innovative activities.

2. Can you further describe the sustainability handbook you mentioned during the hearing that is supposed to come out early this year?

a. What will it contain and will there be any new requirements for state managers of the SRF program?
b. What is the definition of sustainability used in the handbook?

As part of the agency's ongoing efforts to promote sustainable water infrastructure, the agency recently issued *Planning for Sustainability: A Handbook for Water and Wastewater Utilities*. The Handbook is designed to help utilities enhance their current planning processes to ensure that infrastructure investments are cost-effective over their life cycle, resource efficient, and support other relevant community goals. The Handbook is organized around a series of Core Elements including:

- Setting utility sustainability goals and objectives that also support relevant community goals;
- Analyzing a range of alternatives, including green infrastructure and other innovative approaches, based on full life-cycle costs; and
- Implementing a financial strategy, including adequate rate structures, to ensure the alternatives chosen are sufficiently funded, operated, maintained, and replaced over time.

The Handbook does not include any new requirements for state managers of the SRF program. The Handbook also does not include a definition of sustainability but instead is organized around the Core Elements described above. Each element also includes a series of steps utilities can take to implement the element as well as numerous examples from other communities.

3. As was noted in the hearing, the SRF program is designed to give communities access to low interest loans for infrastructure in order to meet water quality and public health goals. How is EPA ensuring that the sustainability policy does not interfere with the core goals of the SRF program?

The sustainability policy is a tool for planning and does not require any particular action on the part of state SRF programs. State programs are encouraged to follow the principles outlined in the policy and report on its use in the state's annual report. Furthermore, the EPA believes that by following the principles of the policy, states are furthering the core goals of the SRF program by ensuring that investments in water infrastructure are cost-effective over their life-cycle, efficient, and support the long-term sustainability of the communities the infrastructure serves.

4. Because the term "sustainability" in the sustainability policy refers both to system sustainability - management of systems for long term financial and physical viability, and community sustainability -smart growth, low impact development, and green infrastructure, and these are not necessarily clearly separated in the policy document, how are the EPA regions ensuring they are consistently applying this policy?

As mentioned above, the sustainability policy is a tool for water utilities to engage in a collaborative process to ensure water infrastructure investments meet community and utility goals. The regions are not enforcing any aspects of the policy, but they are encouraging its use. As described in our response to Question 2 above, we believe that the Core Elements of a sustainable water and wastewater utility can include both system sustainability and community sustainability, not simply one or the other.

5. Considering that the SRF is only a portion of the water infrastructure investments made in the US each year, why is EPA using the SRF program and not the wider regulatory program to try and achieve these sustainability goals?

The sustainability policy is a tool for helping to ensure that federal investments, policies, and actions support water infrastructure in efficient and sustainable locations to best aid existing communities, enhance economic competitiveness, and promote affordable neighborhoods. As the policy emphasizes, federal SRF capitalization funds currently finance a relatively small portion of the capital projects undertaken across the water sector – and none of the operations and maintenance. For this reason, the EPA recognizes that achieving sustainability goals will require more than simply targeting SRF funding. Under the Policy, the EPA will work with all stakeholders, including states, local governments, and their communities, to provide guidance and technical assistance to support increasing the sustainability of water infrastructure in the U.S.

The EPA is promoting the use of flexible approaches within its regulatory programs to encourage the adoption of practices by water and wastewater utilities that will help these utilities plan and effectively manage their infrastructure and operations to ensure sustainability and to develop and maintain the necessary technical, financial and managerial capacity to conduct effective planning. Over the past several years, we have been working closely with state and local governments to incorporate flexibility for sustainable measures, like green infrastructure approaches, within permits and enforcement actions. We have many successful examples of cities that will utilize green infrastructure to meet regulatory requirements in a way that also yields jobs, enhances neighborhoods, and promotes more sustainable communities.

On April 20, 2011, the EPA issued a memorandum entitled *"Protecting Water Quality with Green Infrastructure in EPA Water Permitting and Enforcement Programs"* to encourage the incorporation of green infrastructure approaches into National Pollutant Discharge Elimination System (NPDES) permits, as well as remedies designed to address non-compliance with the Clean Water Act (CWA), to the maximum extent possible. The EPA further committed to work with states and communities to implement and utilize integrated planning approaches to municipal wastewater and stormwater management in its October 27, 2011 memorandum entitled *"Achieving Water Quality Through Intergrated Municipal Stormwater and Wastewater Plans."* Integrated planning will assist municipalities on their critical paths to achieving the human health and water quality objectives of the CWA by identifying efficiencies in implementing the sometimes overlapping and competing requirements that arise from distinct wastewater and stormwater programs, including how best to make capital investments. Integrated planning can also facilitate the use of sustainable and comprehensive solutions, including green infrastructure, that protect human health, improve water quality, manage stormwater as a resource, and support other economic benefits and quality of life attributes that enhance the vitality of communities. The integrated planning approach does not remove obligations to comply with the CWA, but rather recognizes the flexibilities in the CWA for the appropriate sequencing of work.

6. Do you think that the additional subsidization requirements in the FY10 and FY11 appropriations bills are reducing states' leveraging capacity?

For the Clean Water SRF, over $3.6 billion was appropriated to the states in FY10 and FY11. States were required to provide at least $433 million of this amount as additional subsidization, but were also given the ability to provide up to $1.44 billion for such purposes.

For the Drinking Water SRF, $2.3 billion was appropriated for those years. States were required to provide at least $690 million of that amount as additional subsidization, but could provide as much as $1.61 billion.

Requiring that a portion of the federal appropriation be directed as additional subsidization can negatively impact the states' leveraging capacity in several ways. There is less capital available to the states to secure a bond issuance through a debt service reserve, which helps ensure that the bonds receive a favorable credit rating. In addition, providing assistance in the form of additional subsidization reduces interest earnings that would have come from recycled loan payments and future investment opportunities. States may compensate for this by reducing the size of future bond issues, charging a higher interest rate to Clean Water SRF assistance recipients, or both.

For the Clean Water SRF, given the relatively small amount of the FY10 and FY11 federal appropriations that is required to be provided as additional subsidization (approximately 12%), the impact on the states' leverage capacity is estimated to be minor. Even with the additional subsidization requirement, the amount available to the states as permanent federal capitalization greatly exceeds the amounts provided prior to 2009.

For the Drinking Water SRF in 2010 and 2011, the amount of required subsidy was significantly higher, with a minimum of 30% of the grant required to be used for subsidy. The impact on states' ability to leverage will be greater than for the Clean Water SRF. The amount available for permanent capitalization is likely to be only slightly higher than the amount available from the 2009 appropriations, despite larger amounts available in 2010 and 2011, due to the additional subsidization.

7. Please provide for the record the guidance EPA issues to the states to interpret the SRF directives in this year's FY 12 appropriations bill.

FY 2012 SRF procedures are currently being finalized. We will provide you a copy after it's released.

Senator CARDIN. Mr. Hanlon, thank you for your testimony.

I want to talk a little bit more about the potential risks to health in regard to the status of our water infrastructure. The Baltimore Sun recently ran an article—and without objection I will include it in the record—pointing out that sewer lines are leaking that go into the Inner Harbor of Baltimore. But they are directly next to leaking drinking water lines, and raising the question as to whether there is potential risk to the public health as a result of the leakage, not only directly because of the quality of the Bay, but also as it relates to the safe drinking water.

[The referenced information was not received at time of print.]

Senator CARDIN. Can you just comment as to the risk factors related to the infrastructure needs on public health?

Mr. HANLON. The exposure routes for leaking stormwater or wastewater collection lines or through normal leaks on a day to day basis, as was pointed out in that Baltimore Sun article, or overflows during wet weather episodes, either from separate sewers or combined sewers like Baltimore has, the typical route of exposure would be to individuals either entering the Inner Harbor or local creeks or waterways where recreation occurs.

Because drinking water lines are under pressure, it is not likely that that sort of an underground water leak from a sewer would enter a drinking water line. Because basically the drinking water lines are under pressure, and the water sort of leaks out under pressure at that point.

But the other sort of potential, as I had mentioned in my statement, is that where there are overflows or combination of source waters, where the drinking water intakes are, especially if there are substantial peaks, that could very much complicate the drinking water treatment process on a site by site basis.

Senator CARDIN. Of course, the fact that it is under pressure is one of the reasons why we have so much leakage, which adds to the efficiency issues of our systems.

Mr. HANLON. Yes.

Senator CARDIN. So there are tradeoffs, I guess, in all the issues. If we have more modern water infrastructure, we wouldn't have the leaks, we wouldn't have these problems to start off with.

And of course, we have had major breaks in our drinking water lines that have caused us to have to boil water or issues like that, because the pressure has been compromised. So there have been times that we have seen major concerns about public health related to the leakages.

You mentioned a number, $300 billion in our needs for the wastewater, $335 billion in drinking water infrastructure. Those are staggering numbers, $635 billion of infrastructure needs. Can you give us a little more detail as to what that entails, how those numbers were arrived at?

Mr. HANLON. Both the Clean Water Act and the Safe Drinking Water Act require EPA on an every 4-year basis to report to Congress in terms of water infrastructure needs. We work with the States cooperatively and they with local governments to document what their infrastructure needs are. And in order to have a need that would be reported in the survey, there has to be some baseline information, a capital improvement plan, a facilities plan where the local utility has sort of done out-year planning, and basically the window for the needs surveys are 20 years, to identify their required capital improvements for drinking water and wastewater infrastructure. Those are then compiled, we do quality assurance checks. If they have confidence in the numbers, those are sent up to Congress on an every 4-year basis.

The most recent surveys summarize those $300 billion and $335 billion plus needs respectively.

Senator CARDIN. So this is based upon the local plans as to what they would want to see done?

Mr. HANLON. Yes.

Senator CARDIN. And of course, under the current financing, there is nowhere near that type of capacity to get those types of projects moving?

Mr. HANLON. That is correct.

Senator CARDIN. Water infrastructure, unlike harbor maintenance or unlike our transportation program, does not have the dedicated revenue source. Is that an area that you have looked at at all as to whether there should be a more reliable, longer-term commitment to meeting these demands?

Mr. HANLON. We have, within the Office of Water at EPA, worked very closely with the States to manage the State Revolving Funds. Those are the capital improvement programs that we have in place. And there is some baseline level of funding there, because as the design of the State Revolving Funds have played out, the Federal grants, the required State match, along with the repaid loans and the interest earnings over time have created sort of viable funds, or banks, that revolve over time, so that there is capacity in place in those 51 clean water banks and the 51 drinking water banks to provide infrastructure funding.

For example, in the 12 months that ended last June 30th, the Clean Water SRF provided $5.3 billion in assistance to local governments, yes, SRF revolving funds. And the drinking water revolving fund provided $1.6 billion in assistance. So that is a total of $6.9 billion. Again, not near sort of what the national needs are, but that's the capital financing program that EPA manages under the two statutes.

Senator CARDIN. Senator Sessions.

Senator SESSIONS. Thank you, Mr. Chairman.

Mr. Hanlon, in the course of EPA's work with sewer and water systems, have you developed and have there been developed techniques for making those systems longer lasting, more efficient, and less subject to defect and leaks?

Mr. HANLON. I think the challenges that local water utilities face, and Baltimore is an example, as was mentioned earlier, or sort of any community across the landscape, that the preponderance of the water infrastructure is out of sight. If there is a pothole in the road that you drive to every day to work, you know about it, and you avoid it. If there is a leak in a water line, if there is a leak in an underground sewage collection line, it is very difficult, it is out of sight, and for a long time it has been out of mind.

EPA has been working with the professional associations, the American Water Works Association, the Water Environment Federation, and others, the American Society of Civil Engineers, to sort of deploy better practices to account for in-place infrastructure. The use of asset management techniques, environmental management systems are tools that allow local governments to better inventory their assets, do condition assessments, and identify what the needs are. And it is those needs in part that are reflected in the needs surveys that we spoke about earlier.

Senator SESSIONS. Our country is facing the most severe debt crisis we have ever faced. It is systemic, it is long-term, it is not going to go away when the economy bounces back. And so we are having to see, how can we enhance critical matters like our water and sewer infrastructure at the lowest possible cost. I guess it is not EPA's primary responsibility. But do you think that the country has sufficiently analyzed the techniques that help keep costs down and problems down? Do you have any suggestions how we could do better?

Mr. HANLON. I think the challenge of the water infrastructure is a very sort of retail undertaking. There are 16,000 publicly owned wastewater treatment plants in the country, over 50,000 community water systems under the jurisdiction of those local water infrastructure managers. And so I think the full continuum is out there.

Senator SESSIONS. We support many of those through loans and other programs. I guess I am saying they go to a local contractor who may not be the most sophisticated contractor in the latest techniques to be more effective. Do you think that some of our moneys are spent in ways that could be better spent?

Mr. HANLON. I think the design of local infrastructure improvement projects is left to the local governments and their design engineers, primarily members of the American Society of Civil Engineers and others, who basically are the experts in designing either new systems or repairs to existing systems.

Senator SESSIONS. Mr. Hanlon, the EPA has a serious responsibility enforcing water pollution laws. And there are city and rural and municipal sewer systems that leak and that impact adversely the environment. And you have responsibilities in that regard.

One of the things I have seen both when I was United States Attorney and then as Attorney General is that some areas really have a difficult time having the funds necessary to meet what the EPA demands that they meet oftentimes right there. I don't want to raise a complex subject, and it is an embarrassment to Alabama, but the largest municipal bankruptcy in the history of the country was the water-sewer system in Jefferson County, our largest county. I remember when I was Attorney General, EPA had demanded what was then estimated to be $1 billion in sewer upgrades. Well, it sounded like a good idea, I suppose. It took my breath away, knowing how that was probably a third of the State's budget that this one county was going to have to fund.

And then it went forward, and there were negotiations, and lawsuits I guess were maintained, and the threats continued. So the county ended up spending $4 billion. They borrowed the money unwisely from people who have gone to jail as a result of all of that. But the county went into bankruptcy, and it was driven primarily by the expenditures to improve the water-sewer system in the county.

What kind of policies do you have? I know one poor city in the State that EPA worked with in my experience to try to get the system improved and deal with the worst problems first. Do you have any kind of policies that allow you to develop a plan in these areas?

Mr. HANLON. That subject has been one that we have had a fair amount of discussions on with a variety of stakeholders, including the Conference of Mayors and others over the last year or so. It had led to the issuance of a memo by my boss, Nancy Stoner, who is the Acting Assistant Administrator for the Office of Water, her counterpart, Cynthia Giles, who heads up EPA's Compliance Enforcement Office on October 27th, that laid out an integrated planning framework for municipalities. Again, it is not a requirement, but it is an option.

If the utility has basically a more cost effective way of sort of aligning their local needs in terms of these projects have the most potential to either provide protection for public health or reduction of overflows on a sort of pound per dollar basis, what the memo lays out is a process that EPA, working with the States, is willing to entertain those proposals by local governments to sequence their projects. It doesn't lower the bar or sort of put off or absolve anyone from public health or water quality protections. But basically it is an effort to better sequence projects to get the most important projects to the top of the list.

Senator SESSIONS. Do you have engineers that are capable of negotiating that, or do you just compare reports and suggestions about how to go forward? My time is up, maybe we can follow up on that.

Mr. HANLON. Both EPA and the States have technical staff on board to entertain those discussions.

Senator SESSIONS. It is important.

Thank you, Mr. Chairman.

Senator CARDIN. I hope we would be able to follow up on that point, because I do think the cost effectiveness, particularly to governments of limited capacity, is an issue that we need to be very informed about, as to the best way to proceed to make sure we protect public health, but mindful of the capacity of the local governments.

Senator SESSIONS. Mr. Hanlon, if a city is in serious violation, you require them to stop, isn't that right? It is not a question of, there are times when you just say, you have to fix this or shut the system down?

Mr. HANLON. I think the conversations that occur, both within the permitting context as well as the compliance and enforcement context, again, the standards don't change. Most of the water quality standards are established by the States. But what happens within the construct of those discussions is sort of how long it is going to take.

We understand that the sewer systems across the United States we inherited from our grandparents, and they have been in the ground for a hundred or more years, the pipes out in front of this building. And we are not going to fix them in 3 years, we are not going to fix them in 5 years. So as the compliance schedules are negotiated, basically the end point is clear in terms of where we want to get to protect public health and protect the environment.

And it is the schedules that are most often negotiated in terms of is it 10 years, is it 20 years. There are consent agreements that have been entered into within the last 6 months that go up to 25 years.

Senator CARDIN. Senator Inhofe.

Senator INHOFE. Did you want to go back and forth? OK, thank you very much. Thank you, Mr. Chairman.

First of all, I took a quote out of your written statement, and I want to repeat it here, because I think it is significant. It says, "one of the keys to the success of the SRFs is the considerable flexibility that States have to decide how funds are used under the varying State-specific circumstances. This flexibility allows both programs to make these much needed funds available to local governments in a timely manner, allowing funds to enter local economies quickly." I strongly agree with that, and I am a believer that the States are best equipped to take care of these problems.

So I would ask first, are EPA's current SRF policies continuing to provide the maximum flexibility to the States? And I would ask those who will be on the second panel to listen to your answers. I would also further request that you stay and listen to their testimony if you have time to do so.

Mr. HANLON. Yes. Basically the States, the statutory authorities are a little bit different between the Clean Water SRF and the Drinking Water SRF. On the Clean Water side, States are required to put together a project priority list, and then on an annual basis identify their list of projects they propose to fund through an intended use plan. And they can go anywhere on that list to select projects to fund. Generally basically the States go to the top of their priority list in terms of what are the most important public health or water quality projects that they have identified within the State. So that is the Clean Water Act.

On the Safe Drinking Water Act, a very similar process, although the act encourages or requires States to have their most important public health needs at the top of the list and fund in accordance with those public health priorities as identified in the State.

Within both funds, there have been some additional requirements, beginning with the Recovery Act. For example, green infrastructure, green project reserve, began with the Recovery Act and was included in both the fiscal year 2010 appropriation and through the continuing resolution in the fiscal year 2011 appropriation, encouraging—not requiring but encouraging States to the extent projects were available to use 20 percent of their capitalization grant for green infrastructure, water efficiency, or energy efficiency.

So States have sort of worked within the project list to try to meet that congressional suggestion in terms of finding the 20 percent.

Senator INHOFE. Congressional suggestion, that is a new term.

[Laughter.]

Mr. HANLON. We take those seriously, sir.

[Laughter.]

Senator INHOFE. Let me just say this. First of all, I am an admirer of yours, Mr. Hanlon. You have had this job since, what, 2002?

Mr. HANLON. Yes, sir.

Senator INHOFE. So you have gone through different Administrations. I don't think it is any real surprise that the SRF program, other clean water programs and air programs and others are normally—there is a propensity by any Administration to use these programs to advance another agenda. In this case, it could be the smart growth policies and this type of thing. I will be asking the same question of the next panel.

The SRF program is designed to give communities access to low interest loans for infrastructure in order to meet the water quality and public health goals. That is what they are supposed to be doing. I complained last year that they are getting into extraneous issues. And I would just say—I would ask if you could explain how the EPA's sustainability policy is not interfering with the important need to provide States with the flexibility that you are going to hear about in the next panel.

Mr. HANLON. The October 2010 sustainability policy basically laid out a number of activities; first of all, it encouraged States to work with their local municipalities to identify projects and to plan projects that would provide over the long term, the sustainable provision of safe drinking water and the wastewater treatment that would serve the local municipality well over the long term. So that you don't only look within the fence line of the municipality, but sort of look beyond that in terms of what was going on within their watershed, et cetera.

We have worked with the States and with the water utilities to develop a sustainability handbook. Again, it is a guidance document, not required for States and local governments to consider. We hope to have that out early next calendar year.

Senator INHOFE. OK, that is fine, Mr. Hanlon. Did you say that you would be able—your schedule would allow you to stay to listen to the second panel?

Mr. HANLON. I have a commitment, the sustainable planning effort that we talked about, the integrated planning effort we talked about earlier, there is a meeting in town with a bunch of local governments to sort of talk about implementing it. My staff is here to hear the second panel.

Senator INHOFE. Thank you, sir.

Thank you, Mr. Chairman.

Senator CARDIN. Thank you.

Senator Udall.

Senator UDALL. Thank you, Senator Cardin.

We have been having a little bit of a discussion here back and forth about funding for these programs. One point I just want to make, and I am not asking for a comment on this, Mr. Hanlon, but isn't it clear that, or maybe I am—isn't it clear that folks that are hurt the most when you reduce the funding in the Clean Water and Drinking Water State Revolving Funds are rural communities and low income communities? Those are the ones that aren't able to afford it. That is basically the case, isn't it?

Mr. HANLON. The data shows that small, mid and small size communities have taken advantage of the State Revolving Funds, because the States are able, through their management of the fund, to first of all determine their creditworthiness; basically, they are not going to make loans that can't be repaid. But also, the State Revolving Fund programs tend to avoid many of the transaction costs, the bond councils and rating agencies and things that large municipalities do as a matter of course.

So over time, the Clean Water State Revolving Fund has provided 23 percent of the dollars over the last 20 or more years to towns under 10,000 population, and the Drinking Water Fund 37 percent of the money goes to towns under 10,000. That is important as you look across the landscape. I was at a meeting a month ago with the public health officials from the State of Virginia, who document that—they believe that they have 30,000 residents in the State of Virginia that do not have access to basic sanitation. They either have outhouses or straight pipes, in Virginia, in 2011.

Senator UDALL. Shifting gears now, and I want to ask you about the non-structural approaches to stormwater, also known as green infrastructure. I have introduced legislation with Senators Whitehouse and Cardin. And it would encourage EPA to incorporate green infrastructure into its permitting actions and overall promote green infrastructure approaches. Can you give a quick explanation of what green infrastructure means in terms of water infrastructure and what its advantages are?

Mr. HANLON. Green infrastructure are techniques on the ground that basically, for wet weather, during wet weather events, either infiltrate, evapotranspirate, or store and re-use rainwater. The benefit of those designs is first of all, it eliminates some of the peak flows from getting into either storm sewers, or into an area like this, combined sewers, that then have to be sort of collected and treated before they are discharged.

Other benefits of green infrastructure are neighborhood impacts. You can put a lot of money in a tunnel or a pipe below the ground and not see any sort of surface impacts or benefits. Green infrastructure has the benefit of greening, if you will, neighborhoods. It also has the benefit, if done at a larger scale, to reduce the heat island effects of urban areas, has the potential to improve air quality in urban areas, and really, over the long term, has the potential of improving what urban America looks like, if you look out 20, 30 years.

Senator UDALL. What is EPA doing to incorporate green infrastructure into its permitting activities, and how are these actions reducing costs for local utilities?

Mr. HANLON. From the permit program standpoint, the Clean Water Act is a performance based statute. So its permits are written basically, it is sort of the performance of an individual project or an individual municipality that is the end point for the permit. How the municipality gets there, EPA typically doesn't get involved in the detailed designs, as we spoke earlier. The local consulting engineer is working with the public works department.

Having said that, EPA has had a major investment, over the last 3 years, in green infrastructure. We have a green infrastructure partnership, we are doing research in our Office of Research and Development on green infrastructure techniques, to better understand the efficiencies and efficacies of green infrastructure techniques, not only in a parcel by parcel basis, but at scale, at a sewer shed basis, 10 square blocks, 50 square blocks, how does green infrastructure work and what efficiencies can we expect.

Senator UDALL. Thank you very much.

Thanks, Chairman Cardin.

Senator CARDIN. Senator Gillibrand.

Senator GILLIBRAND. Thank you, Mr. Chairman.

Thank you very much for coming to testify in front of this Committee. New York has substantial water and sewer infrastructure needs. I think the last estimate I saw was about $70 billion of need over the next 20 years. So we have very significant, grave concerns about how we can actually get that important work done.

We also have many towns, particularly rural towns, that are under consent order because of their dilapidated or broken sewer systems. So one of the concerns that I have is that there is not enough attention being given to repairing and upgrading existing water infrastructure. The focus has been more often on new growth and development.

To what extent is the EPA working with States to ensure that funding is being utilized to repair infrastructure?

Mr. HANLON. As I said earlier, under the Clean Water State Revolving Fund, basically the States decide sort of what projects go to the top of their list and which projects are funded. Having said that, certainly there is an encouragement from EPA, working with the States, to identify those existing needs from a documented need basis or from a compliance basis, and to use scarce SRF resources there first.

Senator GILLIBRAND. Well, yes, have heard you say a couple of times that the success of the State Revolving Funds has been quite meaningful. But in our State, there is still a massive gap between the amount of funding that is needed and the amount that is available to meet the infrastructure needs that we have. What are the steps that need to be taken to ensure that we don't end up with the massive infrastructure failures that put health and safety at risk?

Mr. HANLON. Again, I would like to compliment New York State. They have been one of the leaders nationally in terms of their management of the State Revolving Fund. There is a technique called leveraging, where basically the State can go to the bond market and actually—through leveraging transactions, actually put multiples or two or three times the amount provided through the Federal grant into infrastructure. New York has done that annually since the late 1980s.

Having said that, again, I believe that the efforts at the local level to identify what their critical infrastructure needs are, through techniques like asset management, to document their assets in place, what the condition of those assets are. And then from a criticality standpoint do assessments in terms of what the immediate needs are on a local basis that should be queued up for consideration earlier, what are the most critical projects locally. It is very difficult for the people in Albany or impossible for EPA from the distance we are to determine sort of what the relative priorities are of projects within a local drinking water or wastewater jurisdiction.

Senator GILLIBRAND. Well, one of the problems is, there is just too much demand. You have a certain budget, so you have to structure projects based on the budget need. But that doesn't mean that that small town that is under consent order doesn't have still an urgent need that is not being met. It just might not have made that list.

So what I am really worried about is, if we agree that this need of $70 billion investment over 20 years is legitimate, are there any other ideas that you have besides getting local communities to leverage money beyond the State Revolving Fund models that you think we should begin to employ in different parts of the country to make more resources available? Are all States, for example, using these leveraging models to make more Federal money available for more at-risk cities, States, and communities that are already doing things well?

New York is just unique. We are an older State; our infrastructure was built between 50 and 100 years ago. It is now deteriorating significantly. We have 20 million people. So it is not the same as every other State. So the needs are very significant.

So are there things we should be doing on a national level to make more Federal money available for the more urgent needs around the country?

Mr. HANLON. The issue of making more Federal money available I will leave to the Subcommittee. With respect to leveraging, there are somewhere between 25 and 30 States who have leveraged their State Revolving Funds over time. We at EPA have worked with our environmental finance advisory board. They have produced a report that sort of demonstrates the benefits of leveraging that we have made available to the States.

And at the end of that conversation, though, the critical decision-making point for a State is they have to have projects that are absolutely ready to go, ready to go to bid, ready to go to construction before they can leverage their fund. Otherwise, they are borrowing money, basically, to do the leveraging transaction. If they can't turn that around in terms of loans to local projects, basically they are not going to go through a leveraging transaction.

So like New York has done, you have to have a full pipeline that then can support a leveraging transaction.

Senator GILLIBRAND. Thank you.

[The prepared statement of Senator Gillibrand follows:]

STATEMENT OF HON. KIRSTEN GILLIBRAND,
U.S. SENATOR FROM THE STATE OF NEW YORK

Chairman Cardin, thank you for holding this important hearing today to highlight the challenges and the opportunities that we face in maintaining our nation's water infrastructure. This is one of the most important issues that this Committee is responsible for, and it is one that affects the lives of virtually every American—across every region of the country.

In each of our States, communities are grappling with the challenge of maintaining safe and reliable water infrastructure during a time when Federal, State, and local budgets are stretched to their limits. In my State of New York, these significant challenges were made even more urgent in the aftermath of severe flooding caused by Hurricane Irene and Tropical Storm Lee. These storms devastated communities across eastern New York State and will have long-term impacts on the region's infrastructure.

New York's water needs have been well documented in reports by the New York State Department of Environmental Conservation and the New York State Department of Health. The most recent estimates project that it will cost over $70 billion to repair, replace, and upgrade New York's wastewater and drinking water infrastructure over the next 20 years.

New York has already made significant investments in protecting our water infrastructure, but State and local governments cannot meet this challenge alone. It is critical that Congress and the Administration make a strong commitment to ensuring that families across New York and the United States have access to safe and reliable water. We can do this by addressing the continued funding shortfall, investing in "green" infrastructure to provide long-term cost savings, and ensuring that rural and disadvantaged communities have access to Federal funding.

Mr. Chairman, thank you again for this hearing and for your leadership on this important issue. I look forward to continuing to work with you and with my colleagues on this Committee to strengthen and improve the Federal response to our nation's water infrastructure needs.

Senator CARDIN. Senator Merkley.

Senator MERKLEY. Thank you, Mr. Chairman. I am going to pass on my questions in order to bring up the next panel.

Senator CARDIN. Thank you.

Senator Whitehouse.

Senator WHITEHOUSE. Thank you, Chairman.

I would like to ask unanimous consent that a letter from the National Utility Contractors Association of Rhode Island in support of additional funding be part of the record.

Senator CARDIN. Without objection, so ordered.

[The referenced information follows:]

National Utility Contractors Association of Rhode Island

3 Williams Street
North Smithfield, Rhode Island 02896
Phone: 401-996-6965 Fax: 401-766-1890
Email: utilitycontrac@aol.com
Website: www.nucari.org

UCARI
NATIONAL UTILITY CONTRACTORS ASSOCIATION of Rhode Island

NUCA
REPRESENTING UTILITY & EXCAVATION CONTRACTORS

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LEGAL COUNSEL
David M. Campbell, Esq.

LOBBYIST
Terrance S. Martiesian, Esq.
Lenette F. Boisselle, Esq.

LEGISLATIVE/LABOR LIAISON
James Reger

ENGINEERING LIAISON
David M. D'Amico, P.E.

December 12, 2011

Honorable Sheldon Whitehouse
United States Senator
502 Senate Office Building
Washington, DC 20510-3905

Dear Senator Whitehouse,

I am writing to bring you up to date as to Rhode Island's continuing struggle to put our industry back to work. We are well aware of your continued support for underground and clean water and wastewater infrastructure repair.

As you already may be aware, Rhode Island's needs alone exceed $ 1.5 billion in funding and growing, in order to repair and/or replace our aging infrastructure. I need not remind you that Rhode Island as well as the Northeast has some of the oldest infrastructure in the United States. In addition to providing the necessary funding to fix our aging infrastructure, it creates sorely needed jobs in a state that still has unemployment in the construction sector over 20%.

UCARI and the National Utility Contractors Association (NUCA) who chairs the Clean Water Council (CWC), wholeheartedly supports your efforts on behalf of our nation's serious underground utility needs.

The Clean Water Council (CWC) is a coalition of 40 national organizations representing underground construction contractors, design professionals, manufacturers and suppliers, labor representatives and others committed to ensuring a high quality of life through sound environmental infrastructure. These industries work collectively to improve critical underground systems that unquestionably enhance America's quality of life.

In 2009, the CWC released a new study on the job creation and enhanced economic activity that comes with investment in water and wastewater infrastructure projects. The study, titled *Sudden Impact: Assessment of Short-Term Economic Impacts of Water and Wastewater Projects in the United States*, shows that a $1 billion investment in water and wastewater infrastructure results in:

- the creation of up to 27,000 new jobs with average annual earnings for the construction portion of the jobs at more than $50,000;
- total national output (i.e., demand for products and services in all industries) of up to $3.46 billion;

Honorable Sheldon Whitehouse
United States Senator
December 12, 2011
Page 2

- personal (household) income of $1.06 billion; and
- approximately $82.4 million in state and local tax revenue.

Each of these economic impacts occurs during and immediately after project construction. Supplementary economic benefits will also ensue in the future, when repair and maintenance is conducted on these systems. In both the short-term and long-term, economic benefits ripple through local economies from manufacturers to distributors to construction laborers, and countless other industry sectors. In fact, the study found that investment in water and wastewater infrastructure creates measurable employment in 325 other standard industry classifications. Copies of the *Sudden Impact* are available to any and all members of the subcommittee upon request.

UCARI, NUCA and the CWC believe that reauthorization of the SRF programs is critical to provide core federal funding for state and local water infrastructure. In addition, lifting the volume cap on private activity bonds for water infrastructure is a fiscally responsible complement to existing federal investments in water infrastructure that would generate up to $5 billion in annual private investment at a minimal cost to government.

Although UCARI's, NUCA's and the CWC's request for support for this additional funding will effect just the tip of the iceberg, it is a start to finally putting the nation's water and wastewater needs on the top of the priority list.

Again, I want to thank you for your past support of the Utility Contractors Association of Rhode Island as well as NUCA and the CWC.

We look forward to your continued support on behalf of the residents and future of all Rhode Islanders and our nation.

Should you have any questions, please feel free to call me.

Warmest regards,
Utility Contractors Association of RI

Robert E. Lafleur
Executive Director

Senator WHITEHOUSE. I would like to also ask that a letter from the Warwick Sewer Authority in Rhode Island be put into the record. And I would just like to read from it one short passage: "In addition to directly creating jobs, water infrastructure projects stimulate other economic activity. These projects depend on American-made pipes, fittings, cement, aggregates and other products. The United States Conference of Mayors estimates every job created through rebuilding our water systems creates over 3.6 jobs elsewhere, and every dollar invested in water infrastructure adds $6.35 to the national economy."

So I would like to ask that that also be put in the record.

Senator CARDIN. Without objection, it will be included in the record.

[The referenced information follows:]

WARWICK SEWER AUTHORITY
125 ARTHUR W. DEVINE BLVD.
WARWICK, RHODE ISLAND 02886

TEL (401)-739-4949

December 12, 2011

The Honorable Sheldon Whitehouse
717 Hart Senate Office Building
Washington, DC 20510-3905

RE: City of Warwick Water Infrastructure Needs

Dear Senator Whitehouse:

Thank you for the opportunity to provide you with information about the water-related infrastructure needs in the City of Warwick. This letter mostly focuses on wastewater infrastructure; however, I have coordinated my response with the City's Water Department and Planning Department to provide a more comprehensive picture of water infrastructure needs, including funding for drinking water and storm water projects.

Enclosed is a list of wastewater-related capital improvement and infrastructure upgrade projects. By far, the biggest expense on the list is the upgrades to the treatment facility for phosphorus removal as required by our new discharge permit. (We will be sending you more detailed information about this project and our 20-year Facilities Plan in the next week.) In addition to the phosphorus upgrades and associated equipment improvements, we are estimating that improvements to the levee that protects the facility from flooding will cost around $7 million. We also have numerous projects related to our aging collection system infrastructure, most significantly some structural improvements to the 48-inch influent pipe that runs under Interstate Route 95 to the treatment facility. The total estimated need for spending on *existing* wastewater infrastructure is over $30 million in the next five to 10 years.

As you know, the City of Warwick would like to continue its sewer expansion program as there are large, environmentally sensitive areas of the City that continue to be serviced by cesspools and aging septic systems. Our "wish" list for new sewer construction is enclosed and totals almost $55 million in today's dollars.

In addition to these wastewater infrastructure projects, the City budgets, but has no funding for, drinking water and drainage project needs totaling approximately $1.1 million *per year*. This represents mostly capital rehabilitation projects, not new construction (see enclosed excerpts from the City's capital budget).

Senator Sheldon Whitehouse
December 12, 2011
Page 2

Recent surveys by municipal and utility organizations found that there are at least $20 billion in water-related projects that are ready to go as soon as a funding commitment is made. An immediate investment of this magnitude would employ an estimated 700,000 American workers through repairs and improvements to water mains, leaking pipes, water and wastewater treatment plants, pumping stations, storage reservoirs, elevated tanks, security safeguards, installing green infrastructure to manage stormwater, and similar projects.

In addition to directly creating jobs, water infrastructure projects stimulate other economic activity. These projects depend on American-made pipes, fittings, cement, aggregates, and other products. The United States Conference of Mayors estimates that every job created through rebuilding our water systems creates over 3.6 jobs elsewhere and every dollar invested in water infrastructure adds $6.35 to the national economy. Investments in water infrastructure also offer multiple benefits, including protection of public health and safety, improved water quality, and a better quality of life. Here in the City of Warwick, we believe that our wastewater and stormwater infrastructure improvements will not only create jobs and stimulate the local economy but will have a major impact on improving water quality in both Narragansett and Greenwich Bays.

I would like to thank you for your support for water infrastructure funding initiatives and your work on the Senate Environment and Public Works Committee's Water Subcommittee.

Should you have any questions or need additional information, please contact me at (401) 468-4700 or email janine.l.burke@warwickri.com.

Respectfully,

Janine L. Burke
Executive Director

Encl.

Cc: Kate Konschnik, Chief Environmental Counsel
Mark Carruolo, Mayor's Office
Dan O'Rourke, Water Department
William DePasquale, Planning Director

Warwick Sewer Authority
Capital Improvements & Upgrades

Project Name	Total Cost (2011)	Program Implementation
Treatment Facility		
Phosphorus Removal Upgrades	$11,600,000	2014
Replace Fine Screen	$293,000	2014
Replace Submersible Mixers	$300,000	2014
Retrofit Center Clarifiers (scum removal)	$755,000	2014
Rehabilitate Existing Rotary Screen Thickener and Install Additional Unit	$562,000	2014
Flood Protection Improvements to Levee	$7,000,000	Pending funding
Collection System		
Warwick Neck Pumping Station Upgrades	$2,393,000	Pending funding
Upgrades to 7 Existing Ejector Stations (Irving Road, Northampton, Posneganset, Stanmore, Hilton Road, Lakeshore South and Lakeshore North)	$2,275,000	Pending funding
Cedar Swamp Pump Station Upgrades	$250,000	2012
Main Influent Interceptor Upgrades	$300,000	2012
Bellows Street Pump Station Replacement	$980,000	2012, EDA grant
Warwick Avenue Pump Station Upgrades	$345,000	2013
Oakland Beach Pump Station Upgrades	$500,000	2013
Knight Street Pump Station Relocation	$1,750,000	2014, pending funding
Lockwood Pump Station Force Main Relocation	$1,150,000	2014, pending funding
Warwick Vets Pump Station Force Main Relocation	$600,000	2013
TOTAL	**$31,053,000**	

12/12/2011

Warwick Sewer Authority
New Capital Projects

Project Name	Total Cost (2011)	Program Implementation
Governor Francis III Sewer Extension	$4,600,000	2014, pending bond authorization
Northwest Gorton Pond Sewer Extension	$4,000,000	2015, pending bond authorization
O'Donnell Hill Area Sewer Extension	$1,899,800	2016, pending funding
Bayside I Sewer Extention	$5,635,000	2018, pending archaeological findings
Bayside II Sewer Extension	$4,370,000	2018, pending archaeological findings
Bayside III Sewer Extension	$3,900,000	2018, pending archaeological findings
Warwick Neck South Sewer Extension	$11,933,600	2020, pending funding
Strawberry Field II Sewer Extension	$860,500	2021, pending cleanup of contamination
Greenwood East Sewer Extension	$13,362,160	2022, pending airport roadway extension
Pilgrim Park Sewer Extension	$4,250,540	2023, pending funding
TOTAL	**$54,811,600**	

12/12/2011

A. WATER DEPARTMENT

W-1 Water Department Capital Improvements and Infrastructure Replacement

The proposed expenditure of capital funds for the future reflects the upgrade of the existing infrastructure, transmission and distribution systems. Funds will be used to upgrade and expand the existing transmission and/or distribution system, including the elimination of dead-ended lines and increased fire protection in conjunction with state and local road/wastewater projects.

Allocation of Funds:

Year:	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Amount:	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000

PUBLIC WORKS

PW- 1 & 2 Streets and Drainage

The maintenance of city streets and drainage comprises a large expenditure of the city's budget. This program is a continuous project that involves the construction of new drainage facilities in selected areas and the overlaying of streets as prioritized by the Engineering Division in concert with the Public Works Director, the Mayor and the City Council.

Allocation of funds:

Year:	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Street Improvement:	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Drainage Improvement:	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000

Senator WHITEHOUSE. Finally, I would like to ask unanimous consent that a letter from the Kingston Water District be included in the record.

Senator CARDIN. Without objection.

[The referenced information follows:]

KINGSTON WATER DISTRICT

Mail to: P. O. Box 216, West Kingston, RI 02892 Tel. 401-783-5494
Office at: 14 Frank Ave., West Kingston, RI 02892 Fax 401-789-7004

December 8, 2011

Senator Sheldon Whitehouse
170 Westminster Street
Providence, RI 02903

Re: Pipe Samples

Dear Senator Whitehouse:

On behalf of Atlantic States Rural Water and Wastewater Association and Kingston Water District, thank you for taking time out of your busy schedule to meet with me last Friday.

Per your request, I have enclosed two samples of badly corroded and tuberculated pipes that were removed from the Kingston Water District's system. Both pipes typify the kinds of conditions found throughout water systems across the country, especially in older systems such as we have in Rhode Island.

The larger of the two samples is a cast iron pipe that was removed from the center of Kingston Village. Though this village served as one of the state capitals during the early years of Rhode Island's statehood, the pipe dated *only* from 1920. We still have over two miles of similar, but larger, cast iron mains that need to be replaced.

The smaller pipe sample was removed from Kingstown Road (Rt. 108). The sample was taken from a plastic water service that had to be replaced. Even though plastic services do not corrode, they can become tuberculated when fed off of old iron mains.

These are just two of many examples of decayed infrastructure that our nation must replace if the next generation is going to enjoy the benefits of reliable and high quality water supplies. Once again, thank you for your continued support of environmental and public works programs.

Respectfully,

Henry Meyer
Manager, KWD
President, ASRWWA

Kingston Water District: To Serve, Preserve & Conserve
"This institution is an equal opportunity provider, and employer."

Senator WHITEHOUSE. The Kingston Water District has sent a few samples in of piping that they have removed. This is piping taken from the Kingston City Center, and as you can see, it is filled in and corroded a lot. This was installed in 1920. So the city has been around since the 17th century, the late 17th century or early 18th century. But these aren't pipes that are that old, these are newer. And you can see how much of it has been lost.

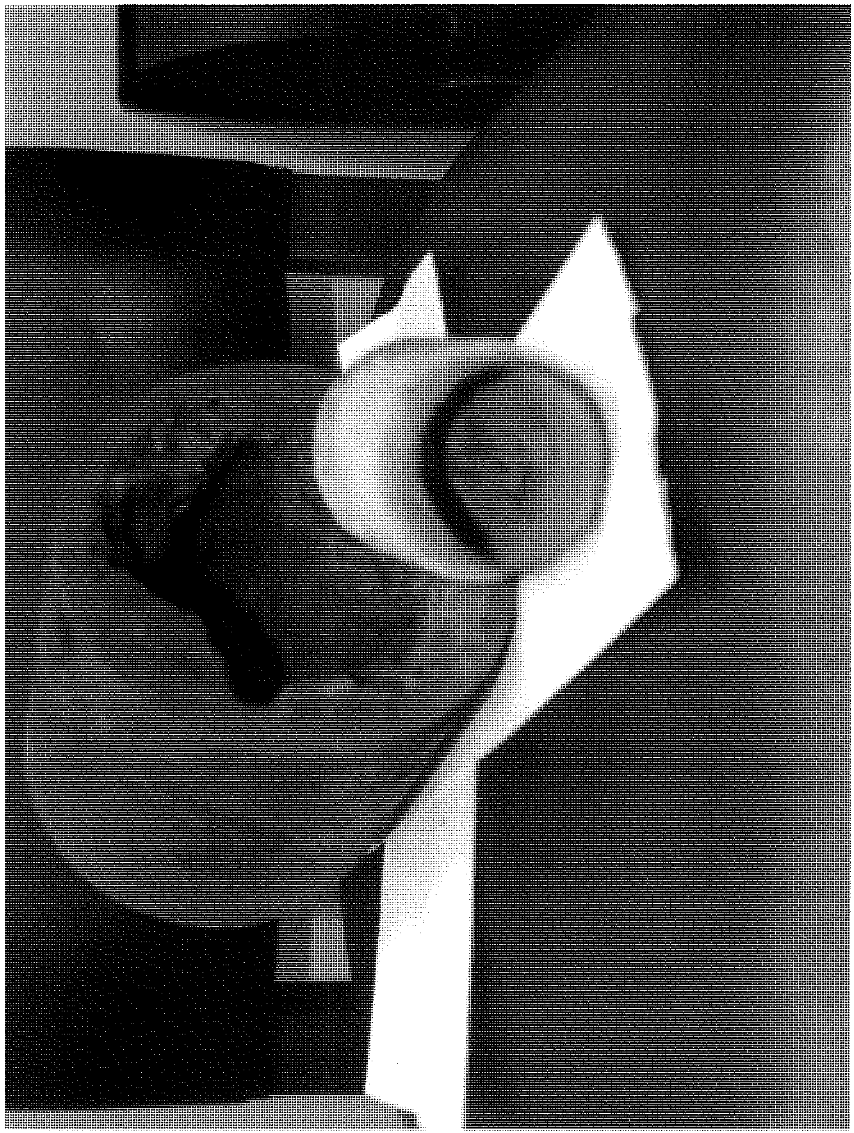
So that is the status quo out there. And we have a chance to fix that. It is not just the big pipes as well, and it is not just the old iron ones. This is a piece of plastic pipe. And despite the fact that it is plastic, if you try to look through it, the hole, I can barely get my finger through and the pipe is 2 inches or so across. And because the plastic piping is attached to the regular cast iron piping, it tuberculates just as much as the others do.

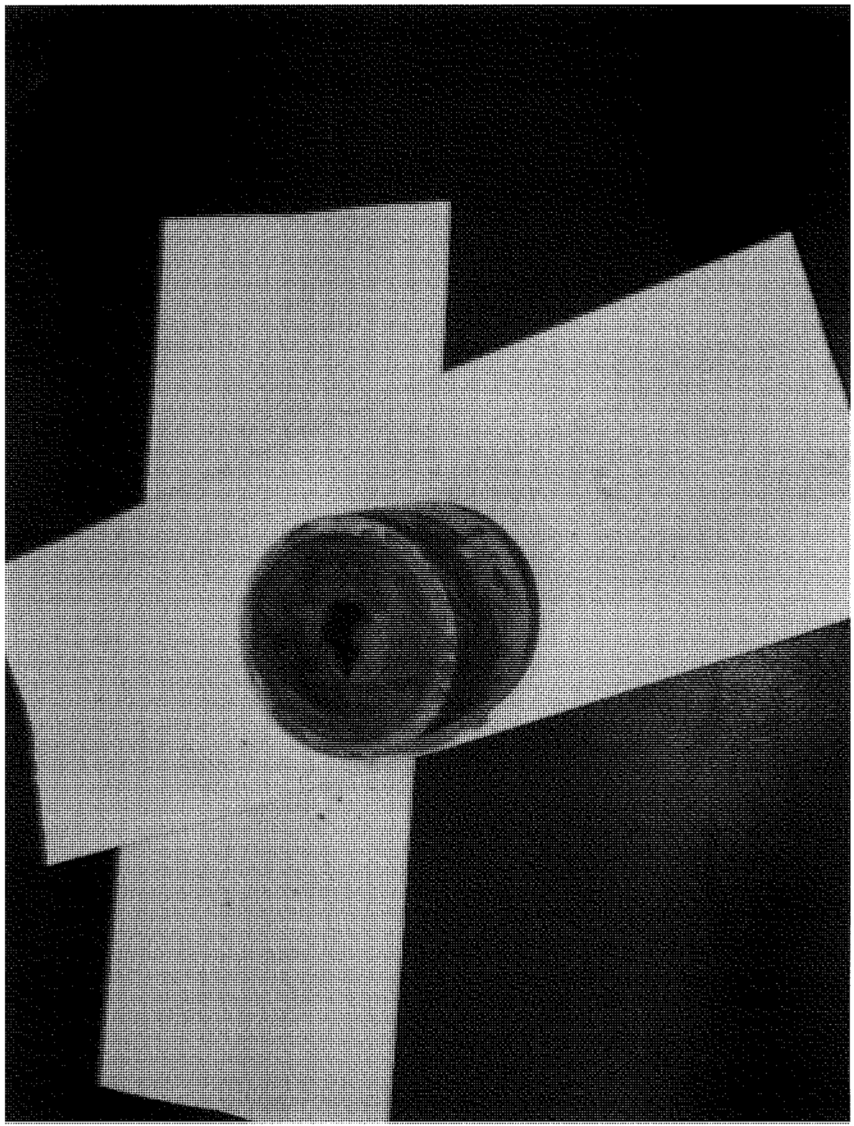
So this is the status quo out there. I think this is a call to action from the U.S. Congress to make sure that Americans have the water quality infrastructure that they deserve, and we are going to have to do this sooner or later. Why not do it now, while we so urgently need the jobs?

So I want to congratulate Chairman Cardin for holding this hearing. I thank Ranking Member Sessions for his support of this hearing, and urge that we work our way forward, so that America's drinking water no longer has to go through piping that looks like this, while we have the ability to upgrade it.

Thank you very much.

[The referenced information follows:]





Senator CARDIN. Thank you, Senator Whitehouse. I appreciate that. It will be difficult to figure out how we are going to get that into the record, but we will do the best we can.

[Laughter.]

Senator CARDIN. Let me thank Mr. Hanlon very much for your testimony.

We will now turn to the second panel. And for that, let me first turn to Senator Sessions, who I believe wants to introduce one of the panelists.

Senator SESSIONS. I would be honored to introduce Van Richey, who served as President and CEO of American Cast Iron Pipe Company, or CIPCO, since 1989. Founded in Birmingham in 1905, CIPCO is a global manufacturer of industrial and capital goods. CIPCO's founder, John Eagen, actually gave the company to the employees in 1922. Since then, they have been frequently recognized as one of the "best companies to work for in America."

Mr. Richey was born in Cullman, Alabama, not too far north of Birmingham; a pretty good town, Cullman is. Served in the United States Army, received his BS and MBA degrees from the University of Alabama, and completed Harvard's advanced management program. An outstanding citizen, he served as Chairman of the Business Council of Alabama, several boards, including the President's Cabinet at the University of Alabama—roll, Tide. Our Chairman, Senator Boxer, put on an Oklahoma shirt with No. 1 on it. That faded fast, didn't it, Senator Inhofe?

Senator INHOFE. Indeed it did.

[Laughter.]

Senator SESSIONS. So maybe she would be willing to put on an Alabama one if your team wins.

He is active in the Boy Scouts, Alabama Health Services, and University of Alabama Birmingham Health System and the Salvation Army.

Thank you, Mr. Chairman. Mr. Richey will be an excellent witness, and I appreciate his ability to come.

Senator CARDIN. We will next turn to the Oklahoma Senator for a response.

Senator Inhofe, do you want to make an introduction?

Senator INHOFE. Yes, I do. I am real pleased to have Joe Freeman here. He has served as the Chief of the Oklahoma Water Board since 1993. So he has been around for a long time. He joined that board actually in 1990, to supervise financial analysts in technical and credit reviews and served on the water and wastewater facility loans.

Prior to joining the board, he was a banker, 13 years in Oklahoma. He has deep roots there. He is a past president and member of the board of directors of the Council of Infrastructure Financing Authorities. He also serves on the Oklahoma Funding Agency's coordinating team.

In 2010 he was named to the Oklahoma Rural Water Hall of Fame. And there is somebody else who is in the Oklahoma Rural Water Hall of Fame, who had the same job as Mr. Freeman many years ago, and that was my father-in-law, Glade Kirkpatrick. He was kind of Mr. Water at the time. And all the way back to when we had the McClellan-Kerr navigation way going in, he was very much involved in that. So we have that bias also.

I don't think there is anyone who could do a better job on this panel, and I hope that you will be very straightforward on some of the problems and lack of flexibility. That is what this hearing is for, and we appreciate your being here, Mr. Freeman.

Senator CARDIN. And Senator Merkley, for an introduction.

Senator MERKLEY. Thank you very much, Mr. Chairman. It is my pleasure today to introduce one of our distinguished witnesses, Mr. Gregory DiLoreto, of Portland, Oregon. Mr. DiLoreto holds degrees in civil engineering and public administration from Oregon State and Portland State University. He has applied his expertise in these two areas to serving the public, and has become one of the most highly respected water administrators in the country.

Under his leadership, the Tualatin Valley Water District has been a leader in the field of sustainability, receiving two awards from the American Public Works Association, and recently doubling their renewable energy generation, all while serving more than 200,000 customers in the Portland metro area.

Mr. DiLoreto has been a leader in the field of civil engineering as well, and is here today to represent the American Society of Civil Engineers as their new president-elect. Congratulations.

Water infrastructure is extremely important to Oregon, as it is to States throughout our nation. The next generation of projects will be critical for the maintenance and improvement of that infrastructure. Oregon is looking to the Federal Government to partner in these efforts.

With his dual expertise in water administration and civil engineering, Mr. DiLoreto is exceptionally qualified to testify to the state of our nation's water infrastructure and potential consequences of inaction or under-action. Mr. Chairman, I am very pleased to introduce to the Subcommittee Mr. Gregory DiLoreto.

Senator CARDIN. Thank you very much.

Let me now welcome the Marylander that is on the panel, Ted Scott, a Maryland small business owner with expertise in green infrastructure for stormwater management and design. Mr. Scott is a practicing professional civil engineer, certified professional in erosion and sediment control, LEED accreditation professional, and master stormwater practitioner with over 25 years of experience. Mr. Scott's firm provides design and maintenance for stormwater systems as well as environmental restoration consultation.

Mr. Scott also serves on the board of directors of Blue Water Baltimore, a group that uses community-based restoration to achieve clean, healthy water in Baltimore Harbor and the Chesapeake Bay. Mr. Scott, we welcome you also to our Committee.

We will start with Mr. DiLoreto and then work our way across.

STATEMENT OF GREGORY E. DILORETO, PRESIDENT-ELECT, AMERICAN SOCIETY OF CIVIL ENGINEERS

Mr. DILORETO. Mr. Chairman, Senator Sessions and members of the Subcommittee, again, my name is Gregory E. DiLoreto, and I am the President-Elect of the American Society of Civil Engineers.

I am also the Chief Executive Officer for the publicly owned Tualatin Valley Water District in the Portland, Oregon, metropolitan area. The district is the second largest water utility in Oregon, serving over 200,000 customers in the Portland area. I am also a licensed professional engineer in Oregon.

As a public official, I am honored to be here today to testify on behalf of ASCE on the state of America's drinking water and wastewater infrastructure as the Subcommittee examines our nation's water infrastructure challenges and opportunities.

Every 4 years ASCE publishes the Report Card for America's Infrastructure which grades the current state of 15 national infrastructure categories on a scale of A through F. In 2009 our most recent report card gave the nation's wastewater and drinking water infrastructure systems a grade of D−.

As a snapshot at a moment in time, the Report Card identifies 20-year funding needs. It does not answer critical questions about the impact of delayed or reduced investments in key infrastructure systems as the nation grapples with its aging public works. That is why ASCE has undertaken a series of four economic studies to identify the long-term consequences to the nation's economy due to our deteriorating infrastructure.

In July of this year we issued the first report on the under-investment in the nation's surface transportation system. Our second report, which we will issue Thursday, answers the questions of how the condition of the nation's deteriorating wastewater and drinking water infrastructure impinges on our economic performance. In other words, how does that D− for water treatment and transmission affect America's economic future?

The answer is sobering. Our report, the Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure, concludes that the nation's wastewater and drinking water infrastructure is under great strain. By now, I am sure every member of this Subcommittee is aware of the funding needs for drinking water and wastewater systems. According to our report, if current investment trends persist, by 2020, just 8 years from now, the anticipated capital funding gap will be $84 billion. This funding gap will lead to $147 billion in increased costs for businesses and a further cost of $59 billion for households.

In the worst case, by 2020 the U.S. could lose almost 700,000 jobs. By 2020 the average annual effect on the U.S. economy is expected to be $416 billion in lost GDP. Putting the problem in terms that all of us can understand, the average family household budget will increase by about $900 per year due to increased water rates and lost income.

Our key solutions are ambitious and will not be achieved overnight. But Americans are capable of real and positive change. In the short term, we believe that Congress must act quickly to address the under-investments in drinking water and wastewater infrastructure. Congress needs to first reinvigorate the State Revolving Loan Fund programs under the Clean Water Act and the Safe Drinking Water Act by reauthorizing Federal funding of $13.8 billion over 5 years. Second, explore the potential for a water infrastructure finance innovations authority that would access funds from the U.S. Treasury at their rates and use those to support loans and credit mechanisms for water projects. Those loans would be repaid with interest back to the Treasury.

Three, eliminate the State cap on private activity bonds for water infrastructure projects that could bring $6 billion to $7 billion annually in new private financing to bear on the problem. Fourth, allow public-private partnerships as one of the many methods of financing infrastructure improvements. ASCE supports the use of PPPs, but only when the public interest is protected. And we believe any public revenue derived from PPPs should be and must be dedicated exclusively to comparable infrastructure facilities in the State or locality where the project is based.

Fifth, establish a national infrastructure bank. Such a bank would leverage public funds with private dollars to invest in the infrastructure. And sixth, investigate legislation to establish a dedicated source of revenue for wastewater and drinking water projects that would provide a stable, long-term basis for financing these critical systems.

Now, finally, the Federal Government cannot be the bank of last resort. Individual water utilities must consider the possibility of increasing the price of water to local ratepayers. Water must be appropriately priced to ensure improvements can rebuild the infrastructure.

All these solutions involve costs, separately or in combination. These solutions will require action at the national, regional, local, private levels and will not occur automatically.

I want to thank you, Mr. Chairman, for the opportunity to testify, and I would be pleased to answer your questions.

[The prepared statement of Mr. DiLoreto follows:]

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Testimony Of

The American Society of Civil Engineers

Before The Subcommittee on Water and Wildlife

Environment and Public Works Committee

U.S. Senate

On

Our Nation's Water Infrastructure: Challenges and Opportunities

December 13, 2011

Mr. Chairman, Senator Sessions, and Members of the Subcommittee:

Good morning. My name is Gregory E. DiLoreto, and I am the president-elect of the American Society of Civil Engineers (ASCE). I am the chief executive officer for the publicly owned Tualatin Valley Water District in the Portland, Oregon, metropolitan area. The District is the second largest water utility in Oregon, serving more than 200,000 customers in the Portland area. I am a licensed Professional Engineer in the state of Oregon in civil and environmental engineering.

As a public official, I am honored to be here today to testify on behalf of ASCE on the state of America's drinking-water and wastewater infrastructure as the Subcommittee examines "Our Nation's Water Infrastructure: Challenges and Opportunities."

Every four years, ASCE publishes the *Report Card for America's Infrastructure*, which grades the current state of 15 national infrastructure categories on a scale of A through F. In 2009, our most recent *Report Card* gave the nation's wastewater and drinking-water infrastructure systems a grade of a D–.

As a snapshot at a moment in time, the *Report Card* identifies 20-year funding needs; it does not answer critical questions about the impact of delayed or reduced investments in key infrastructure systems as the nation grapples with its aging public works.

That is why ASCE has undertaken a series of four economic studies to identify the long-term consequences to the nation's economy due to our deteriorating infrastructure.

In July, we issued our first report on the under investment in the nation's surface transportation systems. We concluded that by 2020 the nation's deteriorating surface transportation systems could cost the American economy more than 876,000 jobs, and suppress the growth of the country's Gross Domestic Product (GDP) by $897 billion.

Our second report, which we will release later this week, answers the question of how the condition of the nation's deteriorating wastewater and drinking-water infrastructure impinges on economic performance. In other words, how does that D– for water treatment and transmission affect America's economic future? The answer is sobering.

Water is vital. If it is not available, essential life activities cannot be sustained. Although water may be conserved, it must be obtainable. A well-maintained public drinking-water and wastewater infrastructure is critical for public health, strong businesses, and clean rivers and aquifers.

But capital spending has not kept pace with needs, and if these trends continue, the resulting gap will only widen. As a result, pipes will leak, new facilities required to meet stringent environmental goals will be delayed, operations and maintenance will become more expensive, and sources of water will become polluted.

I. Investment Shortfalls Total Billions of Dollars

By now every member of this subcommittee is aware of the funding needs for drinking-water and wastewater systems. In short, by 2020 the gap between needs and anticipated funding for wastewater and drinking-water infrastructure will be $84 billion.

The nation's drinking-water systems face staggering public investment needs over the next 20 years. According to the EPA, while America spends billions on infrastructure each year, drinking-water faces an average annual shortfall of at least $11 billion to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations. The shortfall does not account for any growth in the demand for drinking-water over the next 20 years.

In January 2008, the U.S. Environmental Protection Agency (EPA) reported that the total investment needs of America's publicly owned treatment works were $202.5 billion. This reflects an increase of $16.1 billion (8.6 percent) since the previous analysis was published in January 2004.

In 2002, the Congressional Budget Office (CBO) estimated that for the years 2000 to 2019 annual costs for investment would need to be between $13 billion and $20.9 billion for wastewater systems.

II. The Economic Impact of Current Investment Trends

Our report, *The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure,*[1] concludes that the nation's wastewater and drinking-water infrastructure is under great strain.

Clean water is fundamental to our economy and our way of life. Today, the clean water necessary to support our economy and our health cannot be supplied by nature alone. Drinking-water systems collect source water from rivers and lakes, remove pollutants, and distribute safe water for people to drink and for businesses to operate. Wastewater systems collect used water and sewage, remove contaminants, and discharge clean water back into our rivers and lakes for future use. Wet weather management prevents various types of pollutants like sewage,

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[1] The full report will be available on December 15th at www.asce.org/failuretoact

heavy metals, or fertilizer from lawns from ever reaching our waterways. These systems are inextricably linked.

As the U.S. population has increased, the percentage served by public water systems has also increased. Each year new water lines are constructed to connect more distant dwellers to centralized systems, continuing to add users to aging systems. Although new pipes are being added to expand service areas, drinking-water systems degrade over time; they must be replaced at the end of their useful life, which ranges from 15 to 95 years.

Particularly in the country's older cities, much of the drinking-water infrastructure is old and in need of replacement. Failures in drinking-water infrastructure can result in water disruptions, impediments to emergency response, and damage to other types of essential infrastructure. In extreme situations caused by failing infrastructure or drought, water shortages may result in unsanitary conditions, increasing the likelihood of public health issues.

Water infrastructure in the U.S. is clearly aging, and investment is not able to keep up with the need. Our findings indicate that investment needs will continue to escalate.

To repeat, if current trends persist, by 2020 the anticipated capital funding gap will be $84 billion. Even with the increased use of sustainable practices and cost-effective development of other efficiency methods, the growing gap between capital needs to maintain drinking-water and wastewater treatment infrastructure and investments to meet those needs will likely result in unreliable water service and inadequate wastewater treatment.

Our analysis assumes that the mounting costs to businesses and households will result in a number of scenarios or choices:

- Doing nothing and living with water shortages, and higher rates (rationing though price increases); major outlays by businesses and households, including expenditures incurred by moving to where infrastructure is still reliable, purchasing and installing equipment to conserve water or recycle water, and increasing reliance on self-supplied water and wastewater treatment (i.e., installing individual wells and septic waste systems when municipal facilities and services are not available options).
- Responses to failing public infrastructure will vary by location, size, household characteristics, and type of business. Expenditures due to moving, or from installing and operating new capital equipment for "self-supply," are estimated for households, commercial establishments, and manufacturers.

- Movement across regional boundaries and relocation of businesses outside of the U.S. is certainly a response that may be triggered by decreasing reliability of public water and sewer systems.
- Households and businesses that do not self-supply are assumed to absorb the higher costs that are a consequence of disruptions in water delivery and wastewater treatment due to worsening infrastructure. The assumption for this category is that these households and businesses will pay the $84 billion associated with the 2020 capital gap in terms of higher rate costs over and above the baseline projected rates for water and wastewater treatment.

III. Effects on the Nation's Economy

The $84 billion funding gap may lead to $147 billion in increased costs for businesses and a further $59 billion for households. In the worst case, the U.S. will lose almost 700,000 jobs by 2020.

By 2020, the average annual effect on the U.S. economy is expected to be $416 billion in lost GDP. Putting the problem in terms we can all understand, the average family household budget will increase about $900 annually to cover the cost of increased water rates and lost income.

IV. What Can Be Done?

First, the good news is that some of these effects can be mitigated if American households and businesses adopt sustainable practices. Without sustainable practices, the economic effects outlined above will continue to escalate.

But, if households and businesses adopt sustainability practices like improved efficiency through process or equipment changes, water reclamation, or green infrastructure to address wet weather management as water rates continue to rise, negative long-term economic effects can be mitigated.

If sustainability measures are broadly adopted, for example, rather than job losses possibly reaching 1.4 million by 2040, losses would peak at between 800,000 and 830,000 in 2030, and drop to 615,000 by 2040.

Sustainability measures alone won't solve the problem, but they're a good first step. And an additional $84 billion in investments by 2020 will amount to an annualized cost of approximately $9.3 billion.

Funding to close the gap can come from multiple sources. Federal grants and loans have played crucial roles in building water infrastructure over the decades. Despite recent federal deficits, infrastructure spending can both create short-term construction jobs and improve the foundation upon which the nation's economy rests.

Yet federal funding is not the only answer; since the mid-1970s, money from local and state governments has represented an increasing percentage of public drinking-water and wastewater investment—rising to more than 95 percent in recent years. Because some water systems are now privatized (approximately 10 percent of the 170,000 public-serving drinking-water systems), private capital may become increasingly important. But whether a system is government owned or private, households and businesses still ultimately foot the bill; thus, setting rates at levels sufficient to maintain and upgrade infrastructure is critical. If rates increase too much, however, more low-income residents would face financial hardship.

Of course, we recognize that Congress is dealing with enormous deficits and a massive federal debt, but the remedies for these problems must not come at the expense of programs aimed at protecting public health from the dangers of increased contamination in our rivers, lakes and streams and our drinking-water supplies.

Americans owe their economic prosperity, public safety, and high quality of life to the infrastructure that serves them every day. While we have identified the serious needs facing the nation's infrastructure, these can be solved.

Our *Key Solutions* are ambitious and will not be achieved overnight, but Americans are capable of real and positive change.[2] ASCE urges all those who want to continue our tradition of a strong and prosperous nation to begin by maintaining and improving the infrastructure that makes us great.

In the short term, we believe that Congress must act quickly to address the under investments in drinking-water and wastewater infrastructure. Congress needs to:

1) Reinvigorate the State Revolving Loan Fund (SRF) programs under the Clean Water Act and the Safe Drinking-water Act by reauthorizing federal funding of $13.8 billion over five years.

2) Explore the potential for a "Water Infrastructure Finance Innovations Authority" that would access funds from the U.S. Treasury at Treasury rates and use those funds to support loans and other credit mechanisms for water projects. The loans would be repaid to the Authority and then to the U.S. Treasury with interest.

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[2] http://www.infrastructurereportcard.org/solutions

3) Eliminate the state cap on private activity bonds for water infrastructure projects to bring an estimated $6 billion to $7 billion annually in new private financing to bear on the problem.

4) Allow Public Private Partnerships (PPPs) as one of many methods of financing infrastructure improvements. ASCE supports the use of PPPs only when the public interest is protected. Any public revenue derived from PPPs must be dedicated exclusively to comparable infrastructure facilities in the state or locality where the project is based.

5) Establish a National Infrastructure Bank. Such a bank would leverage public funds with private dollars to invest in infrastructure—transportation, environment, and energy projects of significance—that could play a significant role in improving the nation's infrastructure.

6) Investigate legislation to establish a dedicated source of revenues for wastewater and drinking-water projects that would provide a stable, long-term basis for financing for these critical systems.

Finally, the federal government cannot be the bank of last resort. Individual water utilities must consider the possibility of increasing the price of water to local ratepayers. Water must be appropriately priced to ensure investments can rebuild the infrastructure.

V. Conclusion

Unless current trends are reversed, the performance of the U.S. economy will continue to suffer.

▪ Business productivity will go down. As water rates rise, costs to businesses will go up, and Gross Domestic Product will have dropped by a cumulative total of $416 billion below its anticipated level.

▪ America will lose jobs. The U.S. economy is predicted to lose 700,000 jobs by 2020.

▪ These effects will be widely felt. Job losses will occur throughout the economy, with almost 500,000 jobs threatened in sectors traditionally employing people without extensive education and 184,000 jobs in knowledge-based sectors.

▪ Cumulatively, families will earn $541 billion less in 2020 than they earned in 2011. By 2020, this means that an individual household will be earning $806 less a year.

▪ U.S. exports will fall by a cumulative total of approximately $6 billion by 2020, accounting for about four percent of the total decrease in business sales estimated for that year. The greatest losses are in the technology and manufacturing sectors, including aerospace, instruments, chemicals and drugs, as well as associated finance and professional services.

There are multiple ways to prevent these negative consequences described in this report. Possible preventive measures include spending more on existing technologies, investing to develop and then implement new technologies, and changing patterns in where and how we live.

All these solutions involve costs. Separately or in combination, these solutions will require action at the national, regional, and private levels, and will not occur automatically.

Thank you, Mr. Chairman. That concludes our testimony. I would be pleased to answer your questions.

Environment and Public Works Committee Hearing
December 13, 2011
Follow-Up Questions for Written Submission

Questions for DiLoreto

Questions from:

Senator Barbara Boxer

1. *Your testimony highlights how implementation of sustainability practices (e.g., improved efficiency, water reclamation, and green infrastructure) can help close the infrastructure funding gap and mitigate impacts of failing infrastructure on the economy. How can Federal agencies help promote these practices in communities nationwide? Have Federal financing programs (e.g., the State Revolving Funds) been effective at promoting these types of practices.*

ASCE defines sustainability as a set of environmental, economic and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or availability of natural, economic, and social resources. Sustainable development is the process of converting natural resources into products and services that are more profitable, productive, and useful, while maintaining or enhancing the quantity, quality, availability and productivity of the remaining natural resource base and the ecological systems on which they depend.

To achieve these aims, ASCE supports the following implementation strategies:

- Promote broad understanding of economic, environmental, political, social, and technical issues and processes as related to sustainable development.
- Advance the skills, knowledge and information necessary for a sustainable future, including habitats, natural systems, system flows, and the effects of all phases of the life cycle of projects on the ecosystem.
- Advocate economic approaches that recognize natural resources and our environment as capital assets.
- Promote multidisciplinary, whole system, integrated and multiobjective goals in all phases of project planning, design, construction, operations, and decommissioning.
- Promote reduction of vulnerability to natural, accidental, and willful hazards to be part of sustainable development.
- Promote performance based standards and guidelines as bases for voluntary actions and for regulations in sustainable development for new and existing infrastructure.

The Environmental Protection Agency (EPA) has taken significant steps in this direction. These steps include labeling green products and promoting green chemistry and engineering, managing materials rather than creating waste, using green infrastructure to manage stormwater runoff, and supporting the sustainable design of urban communities. The agency has used funding through the State Revolving Loan Fund (SRF) program under the Clean Water Act to advance these priorities in the area of water infrastructure.

2. *In addition to continued support for the State Revolving Funds, what other financing tools are most important to help local communities invest in aging infrastructure? Please expand on how the "Water Infrastructure Finance Innovations Authority" described in your testimony would promote further investment in water infrastructure. What benefits would such an authority provide?*

ASCE supports a variety of financial mechanisms for the trust fund, such as appropriations from general treasury funds; issuance of revenue bonds and tax exempt financing at state and local levels; public-private partnerships; state infrastructure banks; user fees on certain consumer products; and other innovative financing mechanisms, including broad-based environmental restoration taxes to address problems associated with water pollution, wastewater management and treatment, and stormwater management. ASCE continues to support reauthorization of the Clean Water Act to increase and expand the federally funded State Revolving Loan Fund (SRF) program in the short-term.

The "Water Infrastructure Finance and Innovation Act" (WIFIA) would be modeled in the program for major surface transportation projects enacted in 1998. The Act would provide credit assistance for qualified projects of regional and national significance. The projects eligible under the WIFIA would have to satisfy the state's 'intended use plan" required by the Clean Water Act for projects receiving SRF monies.[1] The WIFIA credit program would be designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital. The federal government would be a minority investor, providing anywhere from a 33 percent to 50 percent of a project's cost.

Financing would be in the form of secured (direct) loans—the most likely form of assistance—loan guarantees, or standby lines of credit. Loans would be repaid over 35 years from the completion of the project. Interest rates would be fixed and follow the equivalent Treasury rates (currently at 1.95 percent for a 10-year Treasury security constant maturity).

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[1] "Each State shall annually prepare a plan identifying the intended uses of the amounts available to its water pollution control revolving fund." 33 U.S.C. § 1386 (c).

The WIFIA program would assist sewage treatment projects having their own revenue streams from the federal trust fund, user fees, local ratepayers, or other revenue sources, all of which can help attract substantial private capital with a limited federal investment. This program offers the sponsors of large projects a new tool to leverage limited federal resources, stimulate additional investment in our nation's infrastructure by as much as $15 billion annually, and encourage greater private sector participation in meeting the nation's clean water needs.

Finally, ASCE supports the creation of a federal Water Infrastructure Trust Fund to establish a dedicated revenue stream to finance WIFIA and the national shortfall in funding of infrastructure systems under the Clean Water Act and the Safe Drinking Water Act, including stormwater management and other projects designed to improve the nation's water quality.

Senator James Inhofe

1. *You mentioned the need to identify critical questions about the impact of delayed or reduced investments in key infrastructure systems. Can you identify some of those questions for us?*

Without a continuing commitment at the federal and state levels to renewing the nation's infrastructure, we must ask what the consequences will be for the sustained economic development necessary to keep America competitive with other nations. What is the "missing risk" if our infrastructure fails? What will be the impact on public health if essential wastewater treatment systems are allowed to deteriorate further? What will happen to the economy if nationwide transportation systems fail or function so poorly that commerce is severely interrupted? The longer we delay critical investments to improve the operability, safety, and resilience of the nation's infrastructure, the greater the future cost and risk of failure.

2. *Will you please describe the economic impact to both businesses and the American family if we continue to delay investment in water infrastructure?*

Our testimony only briefly summarized a new ASCE report released in December. The report, "Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure," found that aging water infrastructure will cost U.S. businesses $147 billion over the next decade.[2] Our water and wastewater infrastructure systems are aging and overburdened, with many of them built around the turn of the century. Unless new investments are made, by 2020 unreliable and insufficient water infrastructure will cost the average American household $900 a year in higher water rates and lower wages. American

[2] The report is at http://www.asce.org/failuretoact/

businesses can expect an additional $147 billion in increased costs and the economy will lose 700,000 jobs by 2020.

The report also shows that a modest investment in drinking water, wastewater, and wet-weather management can prevent these economic losses. The analysis showed that by 2020, the gap between what is being spent on water infrastructure and what is needed to meet the nation's needs will reach $84 billion.

Annual capital investment in water infrastructure is approximately $36.4 billion. In order to meet the needs of our growing population for clean, available water, the annual investment must increase to $91 billion. An additional $9.4 billion per year between now and 2020 would avoid $21 billion per year in costs to households and businesses. The report identifies three sectors of the economy that will bear the brunt of the impact. Retail, restaurants and bars, and construction businesses face the greatest job losses as a result of aging water infrastructure, driven by a combination of less disposable income, increased water costs and the higher costs of water-based goods.

Other solutions can help minimize these impacts. If households and businesses adopt sustainability practices such as improved efficiency through process or equipment changes, water reclamation or green infrastructure to address wet weather management, the economic impact could be lessened. The report's projections assume needs and available funding based on current trends, and do not adjust for possible costs associated with climate change, changes in regulations, or other factors.

Delays in providing federal assistance to water infrastructure will continue to retard the U.S. economy. Economists have known for more than 20 years that public expenditures for infrastructure assure a healthy economy. "[S]ignificant weight should be attributed to public investment decisions—specifically, additions to the stock of nonmilitary [public] structures such as highways, streets, *water systems, and sewers*—when assessing the role the government plays in the course of economic growth and productivity improvement."[3] "[P]ublic infrastructure investment has a significant, positive effect on output and growth."[4]

3. *You mentioned that both businesses and households can adopt sustainability measures to help circumvent this problem. Will you describe some of those measures that can be adopted to help with this problem?*

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[3] David Aschauer, Is Public Expenditure Productive? 23 J. MON. ECON. 177, 197 (1989) (emphasis added). Moreover, this Committee has studied the problem for more than two decades. *See Infrastructure, Productivity, and Economic Growth: Hearing before the Subcomm. on Water Res., Trans., and Infrastructure*, 102nd Cong. (1991).

[4] Alicia H. Munnell, Infrastructure Investment and Economic Growth, 6 J. ECON. PERSP. 189, 197 (1992).

If we want to assure that households and businesses will continue to receive access to affordable and safe water in the future, then there are also needs to maintain and grow available resources such as dams, aquifers, and other water supply sources. Three of the nation's four regions with high population growth—the Far West, Rocky Mountain, and Southwest—include virtually all its desert lands and most of its semiarid regions. Deserts and semiarid regions receive less than 20 inches of rain per year, and have evaporation rates that exceed precipitation rates. In these water-scarce regions, water is often drawn from deep underground aquifers or piped in from wetter climes.

One area of focus for future research will be to refine estimates of the availability and cost to access additional water sources, particularly as technology continues to develop. A related focus for future research would be to examine how climate change may affect water supplies. Future climate change can alter the timing and extent of snow and rain seasons, affecting reservoirs and exacerbating drought conditions in arid climates. Additionally, extended storms may overextend wet-weather system overflows in place.

Another area for future research would attempt to develop data on how households and businesses react to the loss of reliable water services and the costs to adjust. Tools that could be employed in a study include a survey to examine how businesses and households have reacted to breakdowns in water delivery and costs that have been incurred to date. To be most effective, this type of survey effort should be segmented by household income and industry sector—the latter to separate water-dependent industries from other industries.

A second tool would be to fully develop a national database of water and sewer systems that includes a historical national profile of water delivery and cross-tabulated by gallons per day, costs, geography, customer market, and age of the system (or state of good repair).

Our research validates a widely accepted premise that the age of the water and wastewater treatment infrastructure is a major problem in maintaining reliable service. The disaggregation of water delivery and treatment systems is a barrier to developing a comprehensive national study of the age of pipes and their remaining useful life. Nevertheless, given the aging infrastructure, particularly in the older urban areas of the Northeast, Mid-Atlantic, and Midwest, older water systems that are not being replaced or substantially upgraded appear to be critical points for infrastructure failure. In this context, a comprehensive national study is needed as the first step toward.

There are several types of new and emerging technologies and approaches are described that may impact drinking-water, wastewater, and wet-weather overflow infrastructure, and therefore affect the size of the capital gap of failing to invest in current systems.

- **Separate Potable and Nonpotable Water**
A large portion of public supply water is used for watering lawns, flushing toilets, and washing clothes. These uses do not require potable water, but in most localities, all publicly supplied water is treated to meet federal drinking-water standards.

- **Advanced Treatment of Wastewater**
The "advanced" treatment of wastewater denotes treatment that is more stringent than secondary treatment or produces a significant reduction in biochemical oxygen demand, nitrogen, phosphorous, ammonia, metals, or synthetic organic compounds.

- **Reclaimed Wastewater**
In areas of water scarcity, it is sometimes reasonable to divert wastewater treatment plant effluent for beneficial uses such as irrigation, industrial use, and thermoelectric cooling, instead of releasing the effluent into rivers or aquifers. In this way, a "new" water source is tapped.

- **Green Infrastructure**
Green infrastructure provides several techniques that mimic natural systems by providing infiltration and capturing mechanisms for wet weather runoff, including green roofs, grassy swales, permeable pavement, and rain barrels.

- **Desalination**
Although a response to water-supply shortages and not a type of water delivery, desalination is important because of the scale of investment required for its development. Desalination removes salt and minerals from seawater or brackish groundwater, making it fit to drink.

- **Water Hauling**
One extreme and logistically challenging strategy to address water deficiencies in delivery systems and supply is water-hauling, which is the practice of supplying water to households and businesses by truck delivery. Although this practice is part of everyday life in many nations, in the U.S. it is mostly limited to cases of extreme droughts and large natural disasters,

ASCE also has been involved in the education process through research into such areas as sustainable design and construction technologies, the use of biofuels and biomass to produce renewable energy, the effects of urbanization on groundwater, and low-impact development (LID).

In reauthorizing the Clean Water Act, for example, Congress could consider specific funding for programs to promote the use of LID as an effective alternative for, or be integrated with, traditional stormwater management, as well as to examine successful watershed management practices related to protection of streams through hydromodification; practices that accelerate change in the practice of stormwater management, including an information exchange that intends to refine design processes, review procedures, and evaluate construction standards related to LID technologies; and establishing a national program to improve our collective understanding of how vegetation helps manage stormwater, intercept precipitation, expand urban green space, and improve urban livability.

4. *What kinds of new technology can be invested in to contain costs in the long run and improve our aging infrastructure?*

Recent ASCE research by the Society's *Task Committee on Planning for Sustainable Infrastructure* concluded: "New technologies are emerging in the market at an accelerating rate. Performance measures can assess the contributions of new technologies to sustainable communities. More efforts are also being made to integrate traditionally disparate technologies and specialties for additional benefits. Transportation planning increasingly is relying on communications and information technology to manage congestion; energy planning is venturing to integrate wastewater treatment and traditional power generation with the delivery of thermal heating and cooling; and waste management programs are generating energy. Another instance is in the use of model-based, simulation-based design tools for sustainable design and constructability analysis in building information modeling (BIM) processes supported by Integrated Project Delivery (IPD) and Project Alliancing approaches. These are reducing risk, liability and project costs while improving project delivery timelines."[5]

Asset management also may play a role. ASCE research has investigated asset management system utilizing life-cycle analysis and life-cycle optimization methods for infrastructure systems and components. For example, to aid the decisionmaking process in highway construction, ASCE experts have developed a life-cycle optimization model to determine the near optimal preservation strategy for a pavement network.

5. *Is there anything else you would like to add for the record?*

It is not clear how America will continue to pay for essential infrastructure systems with greatly reduced federal appropriations. Enabling the potential failure of the nation's indispensable public infrastructure through arbitrary budget-cutting is deeply troubling to ASCE. "Doing more with less" is a political slogan that disguises severe cuts or the complete elimination of funding for key infrastructure programs, leaving the nation vulnerable to future catastrophic system breakdowns that could well threaten public safety and ensure the nation's economic decline.

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[5] ASCE Task Committee on Planning for Sustainable Infrastructure, Planning Infrastructure to Sustain America 4 (2010), http://www.asce.org/uploadedFiles/Sustainability - New/Resources/PLANNING%20INFRASTRUCTURE%20TO%20SUSTAIN%20AMERICA%20100915 -2.pdf .

Respectfully submitted,

THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Senator CARDIN. Thank you for your testimony.
Mr. Freeman.

STATEMENT OF JOE FREEMAN, CHIEF, FINANCIAL ASSISTANCE DIVISION, OKLAHOMA WATER RESOURCES BOARD

Mr. FREEMAN. Good morning, Mr. Chairman and members of the Committee. As Senator Inhofe said, my name is Joe Freeman, I am Chief of the Financial Assistance Division of the Oklahoma Water Resources Board.

We administer the Clean Water State Revolving Fund in Oklahoma, along with the financial portion of the Drinking Water State Revolving Fund, and three other State water and wastewater funding programs. I am pleased to be with you today to share Oklahoma's views with the Committee on the challenges and opportunities that face us.

Today I am not only representing the State of Oklahoma, but also the Council of Infrastructure Financing Authorities, the Association of Clean Water Administrators, and the Western States Water Council. We believe sustained Federal funding is essential to realizing our nation's water quality goals, and we hold strongly to the view that the State Revolving Fund loan program should remain a foundation for future projects in meeting water infrastructure needs.

It is vital that the SRF partnership between Federal and State governments continue as the basic mechanism for assistance to communities in addressing water quality issues. In the past two decades few federally authorized programs have proven as effective in realizing their intended goals as the SRF programs. It is important to note that the assistance made available to communities is significantly greater than the initial Federal investment as a result of State match, loan repayments, issuance of bonds, and interest earnings. The State Revolving Funds nationwide have committed over $84 billion to projects for wastewater infrastructure and over $20 billion for drinking water infrastructure. The majority of funding goes to the highest priority projects that clean up polluted streams, rivers, and estuaries and ensure safe drinking water nationwide.

Furthermore, public investment in water infrastructure yields significant economic benefits. The U.S. Department of Commerce estimates that $1 invested in water infrastructure generates $2.62 in economic output in other industries, and that each job created in the local water and sewer industry creates 3.68 jobs in the national economy. States, including Oklahoma, as the recipients of SRF capitalization grants, recognize that we incur a number of responsibilities. We must manage those funds in a fiscally responsible manner and be accountable. We must give priority in our funding decisions to the resulting water quality benefits and the urgency of environmental problems needing resolution. We need to pay particular attention to the challenges faced by small, rural, and disadvantaged communities.

We see our mission as using all the possible tools and strategies to achieve the largest impact in terms of achieving the goals of the Clean Water Act and the Safe Drinking Water Act. As we look to the future, the ability of States to meet water and wastewater infrastructure needs is based on continued funding of the SRF programs at a sufficient level to ensure the full realization of the revolving nature of the funds and to maximize the utilization of leveraging by States such as Oklahoma that choose the leveraging option.

We recognize the current budget realities and the fact that the annual capitalization grants represent a significant percentage of the overall EPA budget. We understand the need for budget restraint, but would hope that not too great a share of that restraint is at the expenses of the SRF programs.

Through the Oklahoma Comprehensive Water Plan, the Oklahoma Water Resources Board and its many partners assessed the water and wastewater infrastructure needs over the next 50 years in Oklahoma. Detailed information was gathered from large and small urban and rural systems to complement the needs survey conducted through the Environmental Protection Agency. In Oklahoma, we have documented alone over the next 50 years $82 billion in needs for water and wastewater infrastructure. In order to meet these needs, it is going to take continued partnership and innovative discussions between local and State governments and the Federal Government.

As a proactive response to the findings of our intensive water planning efforts, we have compiled a committee of infrastructure financing professionals with the goal of investigating solutions to meeting Oklahoma's infrastructure needs. The group is evaluating a number of options, including restructuring our State infrastructure loan programs and creation of a credit reserve enhancement program.

As this Committee weighs the future of SRF legislation, we would hope that you will keep the record of accomplishments by States and the perspective of State program managers uppermost in your considerations. After years of successful program operation, it is clearly the experience of Oklahoma that the more latitude and operating flexibility that States are allowed, the greater our ability is to accomplish our environmental and financial goals. Certainly, States need to continue to be fully accountable for their use of Federal dollars, but excessive oversight or administrative control by EPA stifles innovation and the ability of States to best respond to local needs.

The success of the program derives from the flexibility of the SRF model, which allows each State to decide the best approach to meet its individual water quality needs. The SRF programs have historically allowed for individual water quality needs to be addressed using traditional construction methods or in many cases, more green methods. We believe that it is important to recognize that water quality needs vary from State to State and that States are in the best position to recognize the needed priorities for providing assistance.

Oklahoma's needs are most likely not much different than the needs in other States, but we are confident that we if take intense planning and collaborative teamwork, Federal, State, and local partners coming together to find creative solutions to address infrastructures, we can succeed.

In closing, I just want to remind you of the success that State-run SRF programs have had in addressing our nation's water quality and drinking water issues, and I hope that together we can work to protect water for future generations. Thank you.

[The prepared statement of Mr. Freeman follows:]

Senate Committee
On
Environment and Public Works

"Our Nation's Water Infrastructure: Challenges and Opportunities"

December 13, 2011

Testimony by
Joe Freeman, Chief
Financial Assistance Division
Oklahoma Water Resources Board

State of Oklahoma
OWRB
WATER RESOURCES BOARD
the water agency

Good morning Mr. Chairman and members of the committee. My name is Joe Freeman I am Chief of the Financial Assistance Division of the Oklahoma Water Resources Board. We administer the Clean Water State Revolving Fund as well as the financial portion of the Drinking Water State Revolving Fund along with three other state water and wastewater financing programs.

I am very pleased to be with you this morning to share Oklahoma's views with the Committee on the Challenges and Opportunities facing Water and Wastewater Infrastructure Financing. Today, I am not only representing the Great State of Oklahoma but also the Council of Infrastructure Financing Authorities, the Association of Clean Water Administrators, and the Western States Water Council. This is obviously a subject which we give a great deal of thought as we attempt to meet the challenges of addressing pressing needs with often limited resources.

We believe sustained Federal funding is essential to realizing our nation's water quality goals. And, we hold strongly to the view that the State Revolving Fund loan programs should remain a foundation for future progress in meeting water infrastructure needs. Innovation, new approaches and new priorities can and should be addressed in the context of the SRF concept. It is vital that the SRF partnership between federal and state government continue as the basic mechanism for assistance to communities in addressing water quality issues.

In the past two decades, few federally authorized programs have proven as effective in realizing their intended goals as the SRF programs. They have provided a sustainable source of funding to protect and restore our nation's rivers and streams and assure safe drinking water for all our citizens. It is important to note that the assistance made available to communities is significantly greater than the initial federal investment as a result of state match, loan repayments, issuance of bonds and interest earnings. In Oklahoma for example, every one million in federal funds is leveraged into three million dollars in capacity for funding additional infrastructure projects. Consequently, the Federal Government is providing less than one-third of the infrastructure funded via the SRF Programs.

The Clean Water State Revolving Fund and the Drinking Water State Revolving Funds nationwide have committed over $84 billion to projects for wastewater infrastructure and over $20 billion for drinking water infrastructure. The majority of funding goes to the highest priority projects that clean up polluted streams, rivers, lakes and estuaries and ensure safe drinking water nationwide. Furthermore, public investment in water infrastructure yields significant economic benefits, the U.S. Department of Commerce, estimates that one dollar invested in water infrastructure generates $2.62 in economic output in other industries and that each job created in the local water and sewer industry creates 3.68 jobs in the national economy.

States, including Oklahoma, as the recipients of SRF capitalization grants, recognize that we incur a number of responsibilities. We must manage those funds in a fiscally responsible manner and be accountable. We must give priority in our funding decisions to the resulting water quality benefits and the urgency of environmental problems needing resolution. We need to give particular attention to the challenges faced by small, rural and disadvantaged communities. And, we must be creative financial stewards seeking to identify every appropriate avenue for delivering as much assistance as feasible to communities and ensuring that this assistance achieves the fullest potential impact in terms of improved water infrastructure.

We see our mission as using all the possible tools and strategies, allowable by law and consistent with prudent financial management, to achieve the largest impact in terms of achieving the goals of the Clean Water Act and Safe Drinking Water Act. As we look into the future, the ability of States to meet water and wastewater infrastructure needs is based on continued funding for the SRF programs at a sufficient level to ensure the full realization of the revolving nature of the funds and the maximum utilization of leveraging by States, such as Oklahoma, that choose this option. We recognize the current budget realities and the fact that the annual capitalization grants represent a significant percentage of the overall EPA budget. We understand the need for budget restraint but would hope that not too great a share of that restraint is at the expense of the SRF programs.

Through the Oklahoma Comprehensive Water Plan, the Oklahoma Water Resources Board and its many partners assessed the water and wastewater infrastructure needs over the next 50 years. Detailed information was gathered from large and small, urban and rural systems to compliment the Drinking Water and Watershed Needs Surveys conducted through the Environmental Protection Agency. In Oklahoma, we have documented over $82 Billion in need for water and wastewater infrastructure over the next 50 years. In order to meet these needs, it is going to take continued partnership and innovative discussions between local and state governments and the federal government. As a pro-active response to the findings of our intensive water planning efforts, we have compiled a committee of infrastructure financing professionals with the goal of investigating solutions to meeting Oklahoma's burgeoning infrastructure needs. The group is evaluating a number of options including re-structuring our state infrastructure loan programs and creation of a Credit Reserve Enhancement Program.

As this Committee weighs the future of SRF legislation, as well as other initiatives to spur water infrastructure development, we would hope that you will keep the record of accomplishment by States and the perspective of State program managers uppermost in your consideration. If progress is to continue, it will be in the hands of each individual State to deliver.

After years of successful program operation it is clearly the experience of Oklahoma that the more latitude and operating flexibility that States are allowed, the greater our ability is to accomplish our environmental and financial goals. Certainly States need to continue to be fully accountable for their use of federal dollars, but excessive oversight or administrative control by EPA stifles innovation and the ability of States to best respond to local needs. Currently, funding levels are decreasing while the restrictions and set-asides for those funds are increasing, thus making the program even less sustainable and growing the gap of unmet needs.

The success of this program derives from the flexibility of the SRF model which allows each State to decide the best approach to meet its individual water quality needs. The SRF programs have historically allowed for individual water quality needs to be addressed using traditional construction methods or in many cases more green methods. In Oklahoma, we have funded Automated Meter Reading projects, reflective roofs, high efficiency pumps, rain gardens, green roofs and streambank stabilization projects to name a few. We firmly support green infrastructure and the desire for additional subsidization but we believe that the actual funding levels for these types of initiatives should be at the discretion of the states to ensure that the individual state's needs are being addressed. We believe that it is important to recognize that water quality needs vary from State to State and that States are in the best position to recognize the needed priorities for providing assistance. Additionally, every federal dollar that EPA directs away from addressing the primary goal of the SRF programs – addressing public health and water quality protection – reduces the capacity of a state to leverage their programs and address infrastructure needs.

Again, I sincerely appreciate the opportunity to discuss Oklahoma's perspective on meeting our State's water and wastewater infrastructure needs. Oklahoma's needs are most likely not much different than the needs in other states. But, we are confident that it will take intense planning and collaborative teamwork – federal, state, and local partners coming together to find creative solutions to address our mounting infrastructure needs. The SRF Programs with their infusion of federal funds is one of the most important tools in our Nation's infrastructure financing tool kit. In closing, I just want to remind you of the success that state-run SRF programs have had in addressing our nation's water quality and drinking water issues and I hope that together we can protect our water for future generations.

Environment and Public Works Committee Hearing
December 13, 2011

Questions from:
Senator James M. Inhofe

Follow-Up Questions for Mr. Joe Freeman

1. Mr. Richey of the American Cast Iron Pipe Company testified that, on average nationwide, 20-25% of treated water that goes into the distribution system is lost to leakage. Do you have an estimate for the amount that is lost to leakage in Oklahoma? Do you think this is a significant problem in Oklahoma and, if so, what is the best way to fix this problem?

   OWRB Response: *Unfortunately, there is not an official repository in Oklahoma which tracks system leakage. In discussions with our friends at the Oklahoma Rural Water Association and the Oklahoma Municipal League we agree that leakage is a significant problem In Oklahoma.*

   In Oklahoma, the SRF programs fund approximately 70% of the water and wastewater infrastructure construction. We see many systems with acceptable water loss (amounts necessary to allow for line flushing and fire protection) but other systems exhibit extreme loss due to leakage. An extreme example is a system that we are working with in central Oklahoma which documented more than a 50% water loss in 2011. To arrive at an estimate for Oklahoma in 2011, OWRB staff evaluated the SRF applications received between July 1, 2011 and December 31, 2011 and compared the amount of water purchased/produced to the amount of water sold/consumed. In 2011 the average amount of water which was unaccountable was 25.21%.

   In my opinion, the solution to fix the leakage problem is twofold. First, ensure that there are affordable sources of fundlng available to systems so that they can proactively address their infrastructure needs. We would encourage the sources of funding to continue to be a combination of federal and state funds delivered through existing programs such as the SRF and state grant/loan programs. Secondly, ensure that there is adequate continuing education available for system owners and operators. it is imperative that systems are able to know what to look for and how to address minor problems before them become major issues. In Oklahoma, Oklahoma Rural Water Association, the Oklahoma Munlcipal League, and the Funding Agency Coordinating Team provide ongoing training opportunities for systems.

2. You state that "We need to give particular attention to the challenges faced by small, rural and disadvantaged communities." Can you give any specific examples of problems facing these communities in Oklahoma and how OWRB is working to address these issues?

   <u>OWRB Response:</u> A detailed analysis of Oklahoma's water and wastewater infrastructure needs was completed as part of the 2012 Update of the Oklahoma Comprehensive Water Plan. Through that analysis it was determined that 45% of the identified demand ($17.4 Billion) for drinking water infrastructure investment over the next 50 years is associated with 13% of the population, whereas 23% of the Identified demand ($10.3 Billion) for wastewater infrastructure investment over the next 50 years is associated with 23% of the population. Ultimately it Is the smaller systems that, over time, will have greatest need for infrastructure Improvements.

   So why is this? Smaller systems in many cases have less capacity - managerial, financial and technical - than larger systems making it difficult to meet state and federal water/wastewater regulations. The OWRB is not a regulatory agency therefore we are unable to specifically comment on water/wastewater regulatory issues. However, there are many systems that are unable to meet these requirements because they are so small and do not have the staff nor the customer base to adequately support the system. It is a very delicate issue but we try to encourage these systems with the help of the Oklahoma Department of Environmental Quality to investigate consolidation and regionalization opportunities.

3. You mentioned that SRF money and state money will not be adequate to meet the projected $82 billion in needs in Oklahoma over the next 50 years. How will more flexibility with regards to additional subsidization help Oklahoma meet these needs?

   <u>OWRB Response:</u> The requirement for additional subsidization does not help Oklahoma meet the projected $82 billion in infrastructure funding needs over the next 50 years. Every dollar that is removed from a State's revolving pool of funds reduces the number of projects that can be funded that year as well as into the future.

   As additional subsidization continues with the SRF programs, we would like to see the maximum level of flexibility be provided to the States. Furthermore, we believe that the amount of subsidization provided should be at State's discretion with a ceiling or maximum amount available for subsidization mandated via the appropriations bill or guidance thus ensuring that 100% of the SRF funds are not provided as subsidy. Flexibility would allow Oklahoma the ability to maximize our leveraging capacity to help meet the $82 billion in need but also to utilize the subsidization as an incentive when appropriate to encourage the implementation of priority practices such as regionalization, consolidation or conservation.

4. Can you expand on the duplicative reporting requirements imposed by EPA?

   <u>OWRB Response:</u> *Utilizing public funding understandably requires the SRF programs to be transparent and accountable. It becomes burdensome, however, when the State Programs have to report or provide the same information via multiple websites and documents.*

   Example of Duplication of Reporting

   a) *Intended Use Plans – Annual planning documents for the SRF Programs. Must be specific regarding how the funds will be utilized over the next 12 months.*
   b) *Annual Reports – Annual Report on how SRF and leveraged funds were used over the last 12 months. Includes much of the same information as the EPA NIMS/Clean Water Benefits Report System.*
   c) *State Websites – Per EPA guidance (as well as a good business practice) information and documentation regarding the current and historic use of funds under the SRF program.*
   d) *Federal Funding Accountability Transparency Act website – Federal website which tracks the expenditure of all federal funds which were awarded after October 1, 2010.*
   e) *Automated Standard Application for Payments website – Federal website where Oklahoma draws funds from the Federal Government.*
   f) *EPA NIMS/Clean Water Benefits Reporting – These applications specific to the Clean Water State Revolving Fund Program. Electronic based where State's enter project specific data. It is a way for states and EPA to track environmental improvements.*
   g) *Periodic EPA Requests for Information – We receive multiple requests from the regional office to provide information that they already have access to but would like in a different format. The majority of the requests are required within an unrealistic timeframe.*

5. Is there anything else you would like to add for the record?

   <u>OWRB Response:</u> *EPA Headquarters and Regional Offices are partners along with States in the SRF Program. The challenge, however, is when EPA guidance is interpreted different ways by the 10 Regional Offices. Obviously, there are differences in every state but the implementation of EPA guidance should be the same regardless of what part of the country you are located.*

Senator CARDIN. Thank you, Mr. Freeman, for your comments.
Mr. Scott.

STATEMENT OF THEODORE E. SCOTT, EXECUTIVE VICE PRESIDENT AND FOUNDER, STORMWATER MAINTENANCE

Mr. SCOTT. Good morning, Mr. Chairman and members of the Committee. Thank you for the opportunity to be here today.

I am going to lend a little bit of a different perspective, one of an on the ground small businessman that deals with these issues.

I am a professional engineer, and I am co-owner of a civil engineering firm and a niche construction and maintenance company that specializes in stormwater related infrastructure. We work from Richmond, Virginia, to Connecticut. A critical part of our work is minimizing the impacts on the environment.

Being involved in this field for 25 years, I have been part of a paradigm shift toward green infrastructure. I am also involved in work that addresses our aging stormwater infrastructure.

Ever since people began converting land for their use, the changes to the physical characteristics of the land and resulting stormwater runoff have impacted the environment. Traditionally, engineers have designed storm drain systems that reduce water filtering into the ground, increased flows and downstream flooding, and eventually send the problem downstream. This results in impacts to what were natural filters, streams, bays, estuaries, and ultimately the oceans. Minuscule pieces of plastic, once thought too small to matter, are becoming great floating masses in our oceans. This all begins with how we treat our stormwater on the street.

About 30 years ago, some parts of the country, including my home State of Maryland, began to regulate the treatment of stormwater. The first methods used were large basins and ponds that collected drainage and treated it in centralized ponds and basins. Several decades of research have indicated that these practices do not allow enough water to filter into the ground and convey a significant amount of pollutants downstream. The results were continued impacts.

Since the 1990s alternative ways to treat stormwater have been researched and implemented. Referred to as green infrastructure, these practices are a different way of planning communities and urban areas. Alternative materials such as green roofs and permeable pavement are used for surfaces that absorb pollutants and allow stormwater to filter directly into the ground. Landscape practices use natural processes to slow flows, absorb water, and remove pollutants. With careful planning and engineering and landscape design, stormwater practices have become an integral part of the community and are considered amenities.

As these practices represent a change in the way land is developed, adoption has taken some time. In Maryland, new regulations were suggested for the use of these practices starting in the year 2000. Because voluntary change was not embraced, the regulations were revised to mandate these practices on every project beginning in 2009. These practices are now becoming the status quo for stormwater design in Maryland.

Green infrastructure differs in many other ways from traditional large engineered ponds. Being smaller, they require more hand labor and less heavy equipment. Maintenance changes requiring teams of laborers instead of large equipment with few operators. This generates permanent jobs, not one-time construction employment assignments.

Because skill sets and equipment requirements are less with green infrastructure, a wide range of alternatives to traditional construction are available. Grass roots NGOs, such as Blue Water Baltimore, have initiated numerous community projects involving green infrastructure. Through efforts like these, clean water has become a meaningful vehicle to bring urban communities together.

Many stormwater treatment facilities, such as ponds and basins, are nearing 30 years old. The materials in these systems have finite life systems. Failure of pipe systems leads to hazardous sinkholes and pollution from sediments. The failure of stormwater ponds can result in catastrophic floods that can damage property, cause injuries or even death. These situations can be easily avoided by requiring inspection and maintenance programs for aging stormwater infrastructure. Costs for maintaining stormwater facilities are usually borne by property owners, just like other expenses of maintaining a property, such as repairs to plumbing or heating systems.

Many municipalities and large corporations understand the value of maintaining their infrastructure and have programs in place. These municipalities and landowners have found that ongoing inspection and routine maintenance involve budgeted costs that can be incidental to doing business. Others, including many Federal facilities, await specific mandates to begin maintaining their infrastructure. Meanwhile, many Federal and private stormwater facilities have become point sources for pollution and some on the verge of catastrophic failure.

With the appropriate regulatory directives, the resources and jobs that were dedicated to constructing this infrastructure can be converted to maintaining and repairing it. Some have suggested environmental regulations and infrastructure maintenance mandates are bad for business. My personal experience is the opposite. Many business owners, like myself, have identified how regulations change the business environment and met the changing market's needs, resulting in success. Over the course of the worst economic environment since World War II for design and construction firms, we have quadrupled the size of our firm. Regulations involving green and existing infrastructure are the primary drivers for this growth.

Thank you, Mr. Chairman and Committee members, for the opportunity to appear before you today. I appreciate it.

[The prepared statement of Mr. Scott follows:]

STORMWATERCONSULTING**INC.** STORMWATER | STREAMS | WETLANDS
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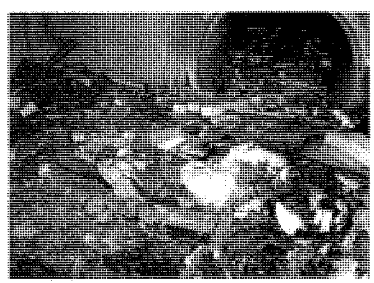
United States Senate
Committee on Environment and Public Works
Subcommittee on Water and Wildlife
Testimony of Theodore E. Scott, PE, CPESC, LEED AP, MSP
December 13, 2011

Good Morning Mr. Chairman and Members of the Committee. My name is Theodore Scott. I am a professional engineer and co-owner of two small businesses: a civil engineering and landscape architecture firm and a niche construction and maintenance company. Both companies specialize in stormwater related infrastructure from Richmond, Virginia to Connecticut. Our professions design, construct, and maintain spaces that communities use to live, work, shop, and play. A critical part of our work is designing to minimize the impacts on the environment. Being involved in this field for 25 years, I have been a part of the paradigm shift in the way development protects and restores the environment. I have also been involved in work that begins to address our aging stormwater infrastructure.

After a brief introduction of the issue of stormwater runoff, I'd like to discuss three topics:

- Green Infrastructure
- The condition of our existing stormwater infrastructure,
- The economic impact of green infrastructure and maintaining existing stormwater infrastructure.



Stormwater Runoff

Urbanization creates a wide variety of pollution. Every time it rains, stormwater runoff flushes pollutants from rooftops, sidewalks, and streets. Flooding and pollutants such as trash, debris, and sediment are the visible impacts of urban stormwater runoff. But stormwater also carries unseen pollutants such as oil and grease from vehicles, and chemicals from a wide variety of sources.

Ever since people began converting land for their use, the changes to the physical characteristics of land and resulting stormwater runoff have impacted the environment. Traditionally, engineers have designed storm drain systems that are efficient and quickly put runoff out of sight into pipe systems. These methods reduce water filtering into the ground, increase flows and downstream flooding, and efficiently send the problem downstream. This results in physical impacts to streams, bays, estuaries and ultimately the oceans, causing unbalanced marine environments. With these natural filters impacted, many pollutants now end up in our oceans.

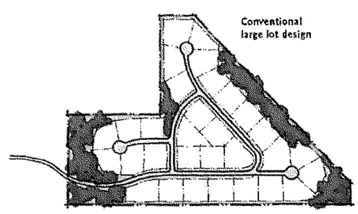
By now, many have heard of the emerging ocean garbage patches. The styrofoam coffee cup or plastic water bottle dropped outside on the street will quite possibly end up in the Atlantic Garbage Patch. Miniscule pieces of plastic, once thought to be too small to matter, are becoming great floating masses in our oceans. We are realizing that society's lack of action regarding stormwater runoff is becoming an international public health issue that affects everyone. It all begins with how we treat our stormwater runoff.

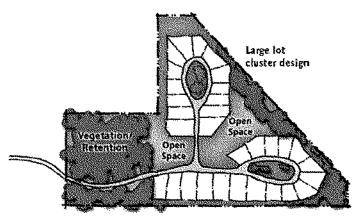
Green Infrastructure

Mitigation of stormwater pollution has been occurring for some time. About 30 years ago, some areas of the country, including my home state of Maryland, began efforts to regulate the treatment of stormwater.

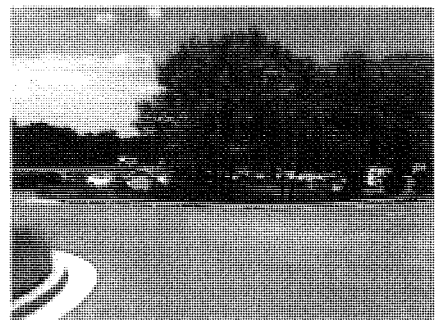
The first methods utilized were larger basins and ponds that collected drainage and treated it in centralized areas. Several decades of research indicated these practices do not allow enough water to filter into the ground, radically change drainage patterns, and convey a significant amount of pollutants downstream. The results were continued impacts to streams, estuaries, and our oceans. Since the 1990s, alternative ways to treat stormwater have been researched and implemented to resolve these continuing issues.

Referred to as green infrastructure, these practices are a different way of planning communities and urban areas. Alternative materials such as green roofs and permeable pavement are used for surfaces that absorb pollutants and allow stormwater to filter directly into the ground. Landscaped practices use natural processes to slow flows, absorb water, and remove pollutants. These practices are very small and are distributed throughout site areas. Instead of one or two very large ponds, we may have 20 or 30 small practices throughout the site. In lieu of mounded landscaping, we design strategically located stormwater treatment areas.





Land planning is also different. Instead of using all available land area for communities, as we have done for decades to create tract housing, land use is intensified in smaller areas leaving natural or restored areas interspersed throughout. This planning preserves sensitive forest and wetland resources while facilitating restoration of features degraded by past development.



By converting parking lot islands into small stormwater practices, natural runoff processes are preserved, allowing water to seep into the ground throughout the site. With careful planning, engineering, and landscape design, stormwater practices become an integral part of the community and are considered amenities instead of being hidden out of site. Invisible pollutants are treated by the vegetation or absorbed into the ground. Trash, debris, and sediments are easily removed by homeowners or landscape maintenance crews. Micro-habitats emerge within the spaces created for people, establishing flora and fauna in between rows of parking.

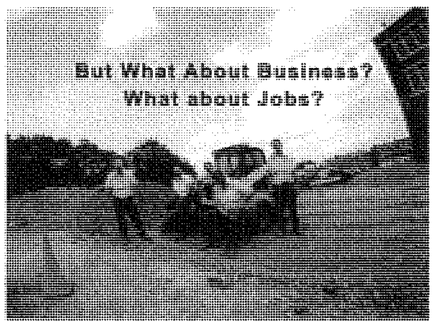
As these practices represent a change in the way land is developed, adoption has taken some time. In Maryland, new regulations suggested the use of these practices starting in year 2000. Even though there are numerous advantages, sometimes including cost savings, many developers and engineers resisted the change. In 2009, the Maryland legislature revised our regulations regarding stormwater, which mandated these practices on every project. While some developers and engineers resistant to change feel challenged, they are clearly working through it and these practices are becoming the status quo for stormwater in Maryland.

These practices differ in many ways from the traditional large engineered ponds. One important way is in how they are constructed and maintained. Because they are smaller and integrated throughout sites, they require more hand labor and less heavy equipment. With many more of them on a given site, maintenance changes dramatically, requiring teams of laborers instead of large equipment with a few operators. This generates jobs. As they are also amenities, there is more motivation for re-occurring maintenance. Therefore, many of the jobs created are permanent – not one-time construction employment assignments.

Because the skill set and equipment requirements are less with green infrastructure, a wide range of alternatives to traditional construction are available. We have been engaged in numerous projects at school sites. These projects introduce green infrastructure hands-on and involve a wide range of students. The design, construction, and monitoring of these practices involves practically every subject – from art and math to geography and biology. Known as retrofits, these projects right previous wrongs with green infrastructure treating areas that never before had treatment. In many cases, existing infrastructure is upgraded at that same time. Learning outdoors, the kids love it. The driver for these projects is usually grant funding with volunteer participation.

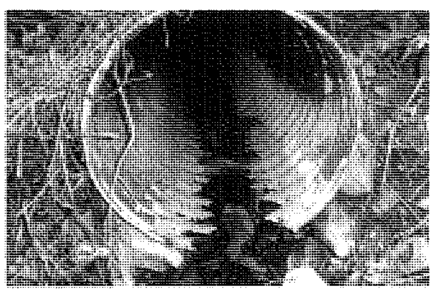
These programs are also being extrapolated into larger community events. Grass roots NGOs such as Blue Water Baltimore have initiated numerous community projects involving green infrastructure. Through efforts like these, clean water is becoming a meaningful vehicle to bring urban communities together. An example is a Blue Water Baltimore school greening project at the Academy for College & Career Exploration in Baltimore last summer that involved several hundred volunteers.

We understand what the problems are and the solutions that Green Infrastructure offers. The challenge is implementing the solutions with the least impact on economics. As mentioned, in Maryland we have had several iterations of regulations moving toward green infrastructure. In the end, we found that the most effective way to make it happen is with a regulatory mandate. All along the way, there have been naysayers that simply did not want to deal with change. True, these practices present new challenges to design and construct. It takes creativity. The most creative designers consistently realize cost savings with these practices. Those who prefer to do cookie cutter work are the ones who have struggled the most. In the end, we have found that creative developers and designers can incorporate green stormwater practices into new projects with minimal economic impact.

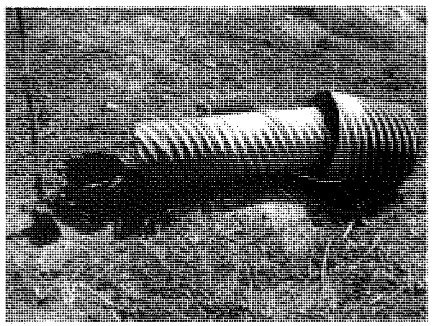


Existing Stormwater Infrastructure

As mentioned, stormwater related infrastructure has been in place for some time. Conveyance systems, such as catch basins and underground pipe systems have been installed in urban areas for many years. Since the 2nd World War, most suburban areas have been developed with these systems. Large stormwater treatment facilities, such as ponds and basins, began to be installed in many parts of the country thirty years ago. As with the case of any infrastructure, the materials in these systems have finite life cycles. Constant exposure to water accelerates corrosion and degradation. Failure of pipe systems leads to pollution from sediments entering the pipes and being conveyed downstream. When part of a stormwater pond or basin, the failure of these pipes can result in



embankment failure which results in sudden and uncontrollable floods. Floods from dam failures can be catastrophic and can damage the environment, other infrastructure such as homes and roads, and result in deaths to people who may be caught in the path of the floodwaters.



These situations can be easily avoided by instituting reliable Operations and Maintenance (O&M) programs. These programs establish standards for the inspection, maintenance, and repair of aging infrastructure. Although some of the infrastructure is publically owned, the majority of stormwater facilities that we see are privately owned. Therefore costs of instituting and maintaining O&M plans for stormwater facilities are distributed to many parties. For the typical property owner, this is an expense of maintaining property, such as repairs to plumbing or heating systems.

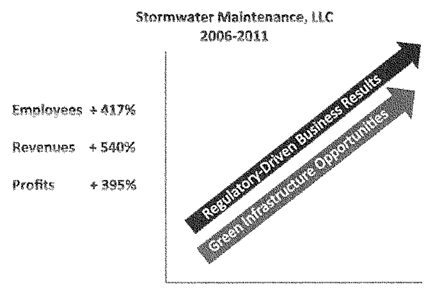
Many municipalities have these programs in place. Numerous large corporations understand the value of maintaining their infrastructure and have programs in place. These municipalities and landowners have found that once the initial repairs are performed, ongoing inspection and maintenance involve costs that are incidental to doing business.

Others, including many federal facilities, await specific mandates to begin to maintain their infrastructure. Without such a mandate, those responsible for the maintenance of stormwater infrastructure can take little action. Meanwhile, many stormwater facilities have become point-sources of pollution with some on the verge of catastrophic failure.

With the appropriate regulatory directives, the resources and jobs that were dedicated to constructing this infrastructure can be converted to maintaining and repairing it.

Impact on Business

Some may suggest that environmental regulations and infrastructure maintenance mandates are bad for business. My experience is the opposite. As demonstrated from the success of the Leadership in Energy and Environment Design (LEED) driven green building industry over the past five years, businesses that rely on regulatory insight and market savvy capitalize on environmental initiatives. Many business owners have identified how regulations change the business environment, and met the changing market needs, resulting in success. Over the course of the worst economic environment since World War II for design and construction firms, we have quadrupled the size of our firm. Regulations and green infrastructure are the primary drivers for this growth.



In the midst of these difficult economic times, our company's greatest challenge is determining the best way to maximize benefits from the opportunities ahead. Along the way, we look forward to continuing to do our part to improve and restore the impacts of urbanization, one stormwater facility at a time.

Thank you, Mr. Chairman, and committee members for the opportunity to appear before you today. I stand ready to answer any questions you might have.

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www.MdSWM.com | www.SWMaintenance.com

THEODORE E. SCOTT, PE, CPESC, LEED AP, MSP

A practicing Professional Civil Engineer, Certified Professional in Erosion and Sediment Control, LEED Accredited Professional, and Master Stormwater Practitioner, Mr. Scott has over 25 years of experience in site and stormwater management design, maintenance, construction, and repair.

He is the founder of Stormwater Consulting, Inc., which is an engineering and landscape architecture firm specializing in stormwater, environmental, and infrastructure restoration design. He is also the founder of Stormwater Maintenance, LLC, a niche construction company devoted to the inspection, maintenance, repair, and construction of stormwater management, stream, and wetlands systems. The firms collectively trade as Applied Stormwater and perform work from Richmond, Virginia to Connecticut.

His on-the-ground experience and specialization provides unique insight into emerging trends in design, inspection, maintenance, and repair of stormwater BMPs. He applies this experience to help his clients minimize the cost of constructing, owning, and operating stormwater infrastructure.

Founded by an established industry leader, Mr. Scott's firms provide services throughout the Mid-Atlantic and Northeast with clients ranging from small "Mom & Pop" businesses to Fortune 50 Corporations. Together, his firms provide turn-key design/build services for stormwater and environmental restoration projects.

Mr. Scott is a sought after national speaker and trainer on subject matter related to the design, inspection, construction, maintenance, and repair of all types of stormwater management facilities and drainage infrastructure.

STORMWATER FACTS

WHAT IS STORMWATER?

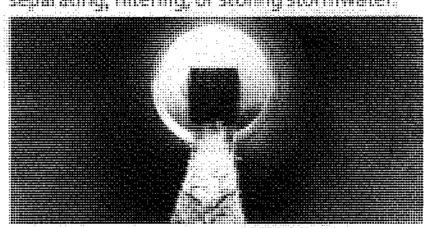
Stormwater runoff occurs when rain and snowmelt flows over land or impervious surfaces (such as streets, parking lots, sidewalks, and rooftops) and does not percolate into the ground. Increases in impervious surface area cause higher flow rates as runoff collects debris, chemicals, oils, sediment and other pollutants that could adversely affect water quality if discharged to the environment without first being treated.

WHY TREAT STORMWATER?

Control and treatment of stormwater runoff in the United States was mandated by the Clean Water Act in 1972. The National Pollutant Discharge Elimination System (NPDES) program requires businesses, states, and municipalities to have programs, practices, and infrastructure in place to control the discharge of pollutants in stormwater. As a result, most sites constructed in the past 20 years include some form of stormwater treatment.

HOW IS STORMWATER MANAGED?

Controlling and treating runoff is known as stormwater management. While there are many different types of facilities used to control stormwater, two broad categories are Above Ground and Below Ground. Above Ground facilities include basins, dry ponds, wet ponds, sand filters, bioretention, swales, etc. Below Ground facilities are usually unseen and may be underground pipe storage systems, oil/water separators, sand filters, vaults, or they may be proprietary devices for separating, filtering, or storing stormwater.



See reverse side for more information...

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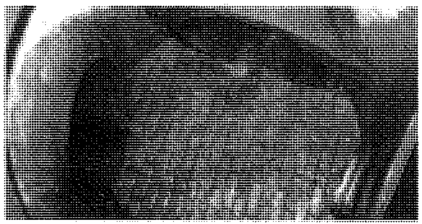
INSPECTIONS

- Inspections help to identify issues that can be addressed with a customized maintenance program.
- Inspections catch small problems before they become larger (and more expensive) problems.
- Inspections include photo documentation and a consise, understandable report including recommendations.

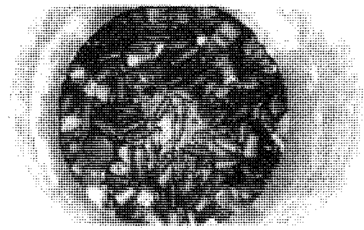


MAINTENANCE

- Maintenance of above-ground facilities targets common problems such as erosion, burrowing rodents and vegetation managment.
- Sediment, litter, and debris should be regularly cleaned to avoid clogging of infrastructure.
- Routine maintenance reduces expensive repairs and helps meet regulatory obligations.

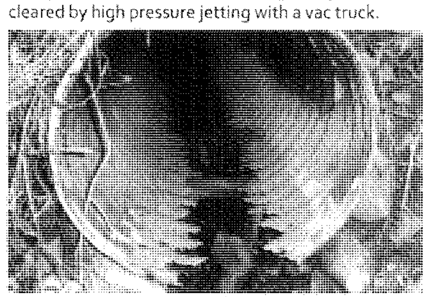
REPAIRS

- Repair work may be necessary if:
  - -A facility has been neglected for too long
  - -Damage occurs due to a large storm event
  - -A facility was designed or constructed poorly
  - -Materials have degraded over time
- Our in-house civil engineers design and prepare plans for major repairs.



UNDERGROUND STRUCTURES

- Underground structures designed to capture floatables and sediment. Structures should be cleaned when accumulated sediment has reached a certain volume, as determined by an inspection.
- Clogged pipes can cause flooding. Clogs are easily cleared by high pressure jetting with a vac truck.



COMMON PROBLEMS

- Standing water in metal pipes can accelerate corrosion.
- Damaged pipes can cause sinkholes in parking lots.
- Backed up systems can cause flooding.
- Rodent burrows and woody vegetation can weaken embankments and cause a failure.
- Sediment build-up in infiltration or bioretention facilities can cause a standing water nuisance
- Erosion causes sedimentation and increases frequency of dredging.
- A clogged pond out flow significantly increases costs by destroying vegetation and requiring dredging.

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January 24, 2012

Mr. Jonathan Aronchick
US Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washingtoon, DC 20510

VIA EMAIL: Jonathan.Aronchick@epw.senate.gov

Subject: Committee on Environment and Public Works
December 13, 2011 hearing
Answer to Questions from Senator Boxer

Dear Mr. Aronchick:

Below please find responses to Senator Boxer's questions:

Question 1: Please expand on the benefits of using green infrastructure to help reduce stormwater pollution and infrastructure costs.

Answer:

Green Infrastructure (GI) reduces stormwater pollution by mimicking natural processes. This differs from traditional engineered approaches that attempted to invent ways of dealing with stormwater runoff. By applying smaller facilities that rely on biologic-based processes, GI: increases recharge of groundwater which maintains consistent subsurface flows into wetlands and stream systems, reduces surface flows to receiving water bodies which in turn lowers the likelihood of stream bank erosion and related pollution, and eliminates or filters out pollutants close to their source to avoid concentration in streams, estuaries, and oceans.

Development costs can often be reduced with GI. One of the most obvious ways is by having the GI stormwater treatment serve multiple purposes and benefits. For example, a green roof not only reduces stormwater pollution, it serves as a rooftop. The green roof also saves energy by insulating the roof, reducing the costs for insulating a traditional rooftop. In many cases, GI drainage techniques, such as vegetated swales, convey storm flows and reduce or eliminate traditionally specified underground pipe systems. Rain gardens treat stormwater, but also meet landscaping requirements and improve aesthetics.

Question 2: Can additional use of green infrastructure help to reduce the large gap in infrastructure funding that currently exists? What job-creation benefits have you seen from the use of green infrastructure?

Answer:

There are many aspects to the infrastructure funding gap. GI can contribute to savings in many cases. For example, integrating a holistic watershed-based GI approach in a Combined Sewer Overflow (CSO) system can reduce flows that would normally contribute to over-capacity pipe systems and wastewater treatment plants. Such an approach can reduce the costs of upgrading this infrastructure. Because GI is more sustainable than traditional hard engineered approaches, once a system is upgraded it will have a longer effective lifespan and cost less the next time it requires remediation.

Committee on Environment and Public Works
December 13, 2011 hearing
Answer to Questions from Senator Boxer
January 24, 2012
Page 2 of 2

Because they are usually smaller and distributed throughout site areas, GI stormwater practices are more labor intensive to construct than traditional stormwater practices. This requires re-tooling for contractors and increases the focus on manpower while reducing the use of large highly automated equipment. The result is an increase in the number of employees required to construct these practices. Equivalent or reduced costs can be achieved by reducing the heavy equipment used on a give project.

Employment is also increased on the operations and maintenance phase long after construction is complete. Because GI techniques serve multiple uses, the aesthetics and associated motivation to maintain them increases. Again, manpower is the key as smaller landscape oriented crews perform the work instead of traditional heavy equipment used for mucking out large ponds. These jobs are not one-time construction assignments, there are permanent.

Question 3: How can Federal infrastructure financing programs (e.g., the State Revolving Funds) promote green infrastructure practices?

Answer:

As mentioned in the original testimony, our experience in Maryland has been that adoption of GI is limited if it is only suggested or recommended. We believe this is because GI requires a high level of creativity and demands a change in the way sites are designed and constructed. It does require re-tooling of civil design and construction businesses. For example, contractors need to hire more workers who are skilled in detailed construction and purchase smaller equipment that can work on smaller facilities. Their large heavy equipment is too cumbersome to build these types of projects. So those who have been satisfied with the status quo have little desire to change.

Because of this resistance to change, in Maryland we found that the most effective way to begin meaningful implementation of GI was to mandate it. The market is then put in a position to work through the changes in their business practices.

The regulatory requirement provides the spark for the free market to identify opportunities and to adjust accordingly. As has been consistently evident throughout the history of our great country, those who adjust will succeed.

Based on this, it seems reasonable to conclude that the most effective way Federal infrastructure financing programs can promote GI practices would be to require them as a condition of funding. While I am not personally familiar with the intricacies of these funding mechanisms, I leave the specifics of such an approach to others more knowledgeable on the subject matter.

Thank you for the opportunity to testify and to submit these answers. Please contact me if further information is needed.

Very Truly Yours,

STORMWATER MAINTENANCE, LLC

Theodore E. Scott, PE (MD), CPESC, LEED AP
Executive Vice President

Senator CARDIN. Thank you, Mr. Scott.
Mr. Richey.

STATEMENT OF VAN L. RICHEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, AMERICAN CAST IRON PIPE COMPANY

Mr. RICHEY. Thank you, Chairman Cardin and Ranking Member Sessions, for the opportunity to testify here today.

I am Van Richey, President and CEO of American Cast Iron Pipe Company. American is a leading domestic manufacturer of waterworks products, with manufacturing plants in Alabama, Oklahoma, Arizona, Texas, Minnesota, and South Carolina.

Our 2,600 employees proudly make the pipe, valves, hydrants, and other products that are vital to our nation's water distribution and wastewater collection systems. American was founded in 1905, and in 1922 the company's founder, John J. Eagan, left all the stock in the company in a trust for the benefit of the employees, who are still the beneficial owners today. Our structure philosophy led Fortune Magazine to include us as one of the 100 best companies to work for for 8 straight years.

Today, however, I am speaking on behalf of both our company's employees and the other domestic manufacturers of ductile iron pipe. They are Griffin, McWane and Mueller/U.S. Pipe. Our industry employs approximately 16,000 people in 20 States. Iron pipe has been the backbone of our country's water systems since the 1800s, and is still the preferred pipe used for drinking water systems.

It is almost completely manufactured from recycled materials, removing hundreds of thousands of old cars from our nation's highways and junk yards every year. I want to thank the members of this Committee for all the support you have shown in maintaining and improving our water infrastructure. I know that you are keenly aware of the crisis that we all face.

Past generations had the wisdom to invest in clean, safe drinking water and in treating wastewater. But today, the system is breaking down. Communities are facing major challenges to replace their water infrastructure, much of which was constructed 100 to 150 years ago. On average, 25 percent of treated water is lost. An investment funding gap of more than $500 billion exists.

The recession has hit our industry especially hard. Almost 50 percent of our business has evaporated with the lack of new housing starts. Our business with water utilities has also suffered because of their difficulty in raising capital for projects. As a result, our industry's employment is down almost 30 percent and could decline further, a loss of approximately 4,700 high paying manufacturing jobs along with tens of thousands of construction jobs.

Once a foundry closes, it is usually gone forever, as are the jobs that it provides. Investment in water infrastructure creates new jobs and boosts our economy. Studies show that $1 billion of investment creates or supports up to 27,000 jobs and adds $9 billion to our GDP. While funds are scarce, two proven policies will improve our water systems, foster economic growth in the manufacturing sector, and preserve and create jobs quickly. They are the State Revolving Funds and the private activity bonds.

Let me thank the Committee for its support of the SRF programs. They have been crucial to help ensure the quality of America's drinking water and wastewater facilities. And there is a pressing need to reauthorize them. Although no program should be immune to budgetary review, we ask the Committee to continue to recognize the effectiveness of the SRF programs.

We should also look to public-private partnerships for additional sources of investment. Lifting the State volume caps on PABs for water projects would inject billions of dollars into the infrastructure. PABs encourage State and local governments to collaborate with private capital to meet a public need without increasing the debt of governments. The debt is borne by the private sector, therefore benefiting users and customers.

The revenue impact would be nominal relative to the significant benefits. Each year $35 million in lost tax revenue would leverage as much as $5 billion annually in private capital, creating more than 135,000 jobs and adding almost $45 billion to the nation's GDP. This is a good investment under any circumstance and the perfect example of a public-private partnership.

Senators Robert Menendez and Mike Crapo have introduced the Sustainable Water Infrastructure Investment Act. I would like to thank the Committee co-sponsors of this bill, Senators Cardin, Gillibrand, Inhofe, and Whitehouse. I also thank Senator Baucus for his support.

Along with the companion bill in the House, both bills have bipartisan support, creating an opportunity for Congress to tackle a pressing public problem on a cooperative and cost effective basis.

In summary, today we are facing crises of lost water, lost jobs, and the lost opportunity to address our country's needs. The reauthorization of the SRF programs is important for Congress to address as soon as possible to help provide the core Federal funding for State and local infrastructure. I believe domestic manufacturers and their employees can fairly compete for these projects.

Lifting the volume cap on PABs would generate billions in annual investment at a minimal cost. By meeting the public need through these two measures, Congress could protect hundreds of thousands of domestic jobs. On behalf of our industry's 16,000 employees, we respectfully ask Congress to enact both of these measures without delay, and thank you all for your service and opportunity.

[The prepared statement of Mr. Richey follows:]

Testimony as Submitted

Van Richey – President & CEO
American Cast Iron Pipe Company

December 13, 2011

Mr. Richey: Thank you, Chairman Boxer, Ranking Member Inhofe, Subcommittee Chairman Cardin and Subcommittee Ranking Member Sessions for the opportunity to testify here today. I am Van Richey, President & CEO of American Cast Iron Pipe Company. American is a leading domestic manufacturer of water works products, with manufacturing plants in Alabama, Oklahoma, Texas, Minnesota and South Carolina. Our 2,600 employees proudly make the iron and steel pipe, valves, hydrants, fittings and gaskets that are vital to our nation's water distribution and waste water collection systems.

American has been in continuous operation since 1905, and in 1922 the Company's founder John J. Eagan left all of the stock in the Company in a trust for the benefit of the employees of American. Today the employees are still the beneficial owners of the Company, and our Company's governing rule continues to be the Golden Rule -- "Do unto others as you would have them do unto you." Our ownership structure and management philosophy led *Fortune* Magazine to include American as one of the "100 Best Companies To Work For" in the United States for 8 straight years.

Today I have the privilege of speaking on behalf of not only our Company's employees and their families, but also the other domestic manufacturers of ductile iron pipe, fittings, valves and fire hydrants. They are Griffin Pipe Products, McWane, Inc. and Mueller Water Products/U.S. Pipe and Foundry Company. Altogether our industry operates foundries and manufacturing plants located in 19 different states. Iron pipe has been the backbone of our country's water systems since the 1800's and is still the most prevalent and preferred water pipe material used for drinking water systems in the United States. Ductile iron pipe is recognized as an especially long-lasting and cost-effective solution for providing clean, safe drinking water. It is almost completely manufactured from recycled ferrous scrap materials. As a result, each year ductile iron pipe companies take tens of thousands of old cars from our nation's highways and junkyards for use in the manufacture of our products.

Before I go further I want to thank the members of this Committee for all of the support you have shown in maintaining and improving our nation's water infrastructure. I know that you are keenly aware of the crisis that we face. It is a crisis which affects every major constituency in the water works sector - taxpayers/consumers, owners, operators, engineers, installers, distributors and manufacturers.

First and foremost, the crisis is one of need for a safe, efficient, reliable water system. Past generations had the wisdom to invest in providing clean, safe drinking water and collecting and treating wastewater. It is a system that has worked so well that most citizens take it for granted. But today that system is breaking down. The "out of sight, out of mind" nature of water infrastructure has resulted in communities across the nation facing major challenges over the next 20 years in replacing their aging water and wastewater infrastructure, much of which was constructed 100 to 150 years ago. Studies estimate that as much as 20-25% of the treated water that goes into the distribution system is lost through leakage, wasting not only one of our most precious resources, but also all of the energy and expense associated with treating and pumping it. In addition, leaking sewage poses serious threats to public health and the environment.

Recent studies by the EPA and the GAO predict an investment-funding gap of more than $500 billion for needed upgrades and repairs to puhlic water and wastewater systems, but capital investment for such projects will be difficult as many states and local governments face mounting budget deficits, constraining debt, and revenue shortfalls. Already state and local governments are delaying or shelving much needed water projects due to falling sales tax revenues and the decline of property values.

Not only are state and local governments facing a crisis, so is the domestic water infrastructure industry. The recession has hit the waterworks foundry industry hard. Almost fifty percent of our business has evaporated with the crash in the real estate markets and the lack of new housing starts. Similarly, despite the pressing need for waterworks infrastructure repairs, our remaining business with water utilities has also suffered because of their difficulty in raising capital for such projects. As a result, our industry's nationwide employment is down by 29% as a result of the economic downturn, and could decline further. This represents a loss of approximately 4,700 high-paying manufacturing jobs, along with tens of thousands of construction-related jobs associated with the installation and repair of water systems. It is important to note that these job losses cannot be easily reversed -- an iron foundry cannot be turned on and off like a light switch. Because of the technical and regulatory requirements related to the operation of these complex operations, once a foundry closes, it is usually gone forever, as are the jobs that it provides.

Beyond the need to provide safe, clean water, to preserve a vital resource and to protect existing jobs and operations, however, investment in water infrastructure is a proven method of creating new jobs and boosting our economy. According to the Associated General Contractors and the

National Conference of Mayors respectively, each billion dollars of investment in infrastructure creates or supports 28,500 jobs, and every dollar invested in water and wastewater infrastructure adds $8.97 to our nation's gross domestic product. That's a significant return on investment by any measure.

Although we all realize that funds are scarce in these difficult times, there are two proven policies under consideration by Congress – the reauthorization of the State Revolving Funds (SRF) and lifting the state volume caps on private activity bonds (PABs) for water infrastructure projects -- that will enhance our ability to improve our clean water and wastewater systems, foster economic growth in the U.S. manufacturing sector, preserve and create jobs quickly, and thus make a significant difference in the health and welfare of this country, the future of the waterworks foundry industry and the livelihoods of our communities and employees.

First, let me once again thank the members of the Committee for their support of the primary federal-aid programs for our nation's drinking water and wastewater infrastructure, the Drinking Water State Revolving Funds and Clean Water State Revolving Funds. The SRF programs have been crucial to help ensure the quality of America's drinking water and wastewater facilities. However, in recent years funding for the SRF programs have been significantly reduced, and there is a pressing need to reauthorize the programs. We agree with the need to reduce the federal deficit and that no program is immune to reductions in federal spending. But we ask that the Committee continue to recognize the effectiveness of the SRF programs and the vital importance they have to fund water infrastructure projects.

Given the fiscal challenges and mounting debt faced by all levels of government, we should look to a proven tool for numerous other types of projects by forming partnerships with private enterprise to secure additional sources of funding for water infrastructure projects. Lifting the state volume caps on private activity bond financing for water infrastructure projects would inject billions of dollars of low cost, private capital into infrastructure repairs, while shifting the economic risk away from cash-strapped municipalities and toward the private sector. Private activity bonds are a form of tax-exempt financing that encourages state and municipal governments to collaborate with sources of private capital to meet a public need without increasing the debt of local governments – the debt is borne by the private sector. Currently, the tax code caps the volume of most types of federal tax-exempt bonds that may be issued in a given year, and allocates them state-by-state based upon population. Historically, most of the tax-exempt bonds have been issued to politically attractive, short-term projects such as housing and education loans. This tendency has limited the amount of such bonds that can be utilized for long-term water infrastructure projects; in fact in 2007 only 1.3% of all exempt facility bonds were issued to water and wastewater projects.

Local governments commonly use PABs for a variety of public purposes: public housing; school loans; airports; recreation and cultural facilities; solid waste facilities; port facilities; airport terminals; and, certain industrial pollution prevention projects. In the past, PABs have been used to solve critical infrastructure problems including the solid waste disposal crisis in the 1980's, where the private sector invested over $20 billion in new waste-to-energy facilities to avoid massive groundwater pollution and reduce the growing number of hazardous waste sites.

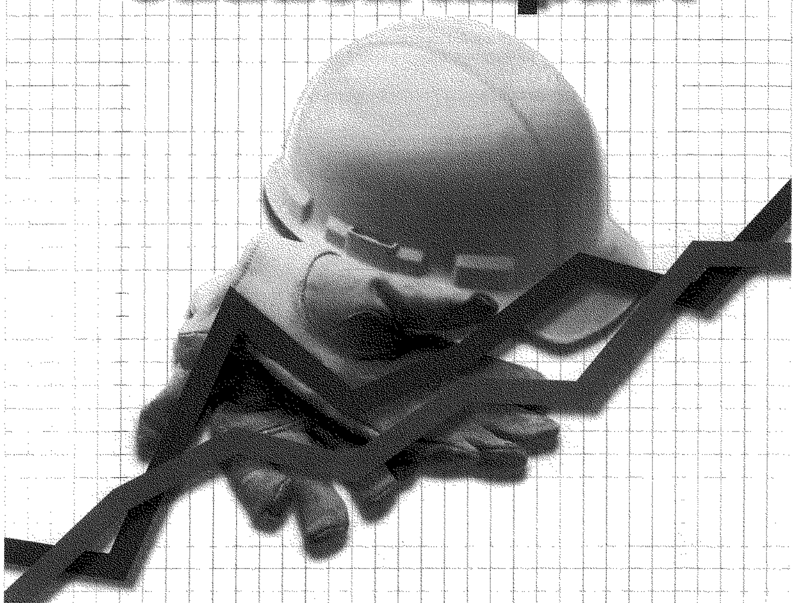
Lifting the cap for water projects would generate additional, more affordable capital for infrastructure repair and construction for municipalities, thereby ultimately benefitting users and customers. Moreover, these are projects that private investors are willing to invest in and bear the risk. The revenue impact would be nominal relative to the significant benefits: each year a mere $35.4 million in lost tax revenue (according to 2010 scoring from the Joint Committee on Taxation) would leverage as much as $5 billion annually in private capital, creating more than 135,000 jobs and adding almost $45 billion to our nation's GDP. This is a good investment under any circumstance and the perfect example of a public-private partnership.

Reps. Bill Pascrell (D-NJ), Geoff Davis (R-KY) and Senators Robert Menendez (D-NJ) and Mike Crapo (R-ID) have introduced H.R. 1802/S. 939, the Sustainable Water Infrastructure Investment Act that would lift the cap on private activity bonds for water infrastructure. Both bills have bipartisan cosponsors -- 54 in the House and 7 in the Senate -- creating an opportunity for Congress to demonstrate its ability to tackle a pressing public problem on a cooperative, bipartisan and cost-effective basis.

In summary, today we are facing a crisis of loss in the waterworks sector of our economy. It's a crisis of lost water, lost jobs, and the lost opportunity to address our country's needs. Changing how we view the crisis and how we fund the vital repairs in an age of budget constraints is our challenge. Using a mix of traditional funding and innovative ways to partner government efforts with private capital is our opportunity. I believe that the reauthorization of the SRF programs is important for Congress to address as soon as possible to help provide the core federal funding for state and local water infrastructure. In addition, lifting the volume cap on private activity bonds for water infrastructure is a fiscally responsible complement to existing federal investments in water infrastructure that would generate billions in annual investment at a minimal cost. By meeting the public need for additional water infrastructure through these two measures, Congress could also help protect hundreds of thousands of domestic jobs at a time when they are desperately needed. On behalf of our industry's 16,000 employees, we respectfully ask Congress to enact both of these measures without delay.

Thank you all for your service and this opportunity.

Sudden Impact



An Assessment of Short-Term Economic Impacts of Water and Wastewater Construction Projects in the United States

CLEAN WATER COUNCIL

Committed to America's Water Infrastructure

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Acknowledgement

This assessment was prepared for the Clean Water Council (CWC), a coalition of 35 national organizations dedicated to protecting and enhancing America's water and wastewater infrastructure. The report was prepared by PA Consulting Group, a leading global management, systems and technology consulting firm.

The project was made possible by generous financial support from the following members of the CWC and its corporate partners:

- American Council of Engineering Companies
- American Road and Transportation Builders Association
- American Society of Civil Engineers
- Associated Equipment Distributors
- Association of Equipment Manufacturers
- Caterpillar
- Ductile Iron Pipe Research Association
- John Deere Construction Equipment Company
- Laborers-Employers Cooperation and Education Trust
- National Stone, Sand and Gravel Association
- National Utility Contractors Association
- Plastics Pipe Institute
- Portland Cement Association
- The Vinyl Institute
- Water and Sewer Distributors of America

The CWC is headquartered at 4301 N. Fairfax Dr., Suite 360, Arlington VA 22203, (703) 358-9300. Please visit www.waternewsupdate.com for additional information about the CWC.

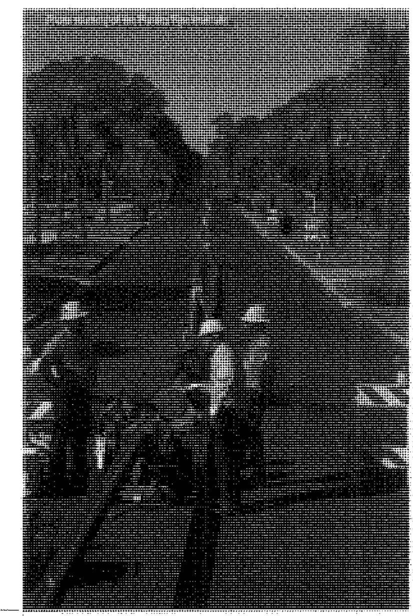
09NUCA Study-36.indd 2 6/8/09 1:17:38 PM

Table of Contents

09NUCA Study-36.indd Sec1:3 6/8/09 1:17:38 PM

Background and Purpose

Water and wastewater pipelines, treatment plants and related facilities are core components of our environmental infrastructure. The condition of our nation's environmental infrastructure has deteriorated significantly as a direct result of perpetual underinvestment. Water and wastewater capital "needs estimates" produced by the U.S. Environmental Protection Agency (EPA) are nothing short of staggering. In fact, the EPA's *2002 Clean Water and Drinking Water Infrastructure Gap Analysis* forecast an alarming $534 billion gap between current investment and projected needs over 20 years for water and wastewater infrastructure if federal funding was not increased. (That funding has in fact been significantly cut over the past few years.) Two years later, the EPA's *2004 Clean Watersheds Needs Survey* documented existing nationwide wastewater infrastructure needs alone at $202.5 billion. In 2009, EPA projected 20-year needs for drinking water infrastructure alone at $334.8 billion.



In addition, the American Society of Civil Engineers (ASCE) has given America's wastewater infrastructure and drinking water infrastructure letter grades of "D minus" in their most recent (January, 2009) *Report Card for America's Infrastructure*. Clearly, there is a consensus among government, industry and academic professionals that the condition of this infrastructure has gone from bad to worse. This consensus is supported by the first-hand experiences of communities across the land as they manage the fallout from collapsed and deteriorated water and wastewater facilities. (See www.waternewsupdate.com for daily reports highlighting environmental infrastructure failures.)

In light of the size and scope of the documented national needs, legislators, policy makers and planners at all levels of government need to know the short-term economic impacts and value added to local economies by construction projects pertaining to water treatment and distribution, and wastewater collection and treatment. This assessment provides data demonstrating that water, sewer and storm water management projects do in fact add immediate value to the local economy in three well-defined ways during the time period of construction:

1. Direct impacts through jobs and the purchase of materials and supplies directly related to the construction and operation of

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the project.

2. Indirect impacts through jobs and the purchase of equipment, materials and supplies by vendors indirectly related to the construction and operation of the project.
3. Induced impacts supported by spending and re-spending of the income earned by workers in 1 and 2 above, often described as the "multiplier effect."

There are also long-term economic benefits that result from these projects during the multi-decade life expectancy of each facility, including higher private sector profitability, increased private investment in plant and equipment, improved labor productivity, a stronger tax base and future employment. These benefits are summarized in *America's Environmental Infrastructure* (1990), which is available by request from the CWC. In addition, these projects generate a number of quality of life benefits, such as a reliable supply of clean water for human consumption and household use, public safety (fire protection and flood control), and environmental protection (safeguarding our waterways, fisheries, recreational lands, and flora and fauna from sewage, contaminated storm water runoff and other forms of pollution). While these lasting benefits are not the focus of this short-term economic assessment, it is important to recognize that they occur.

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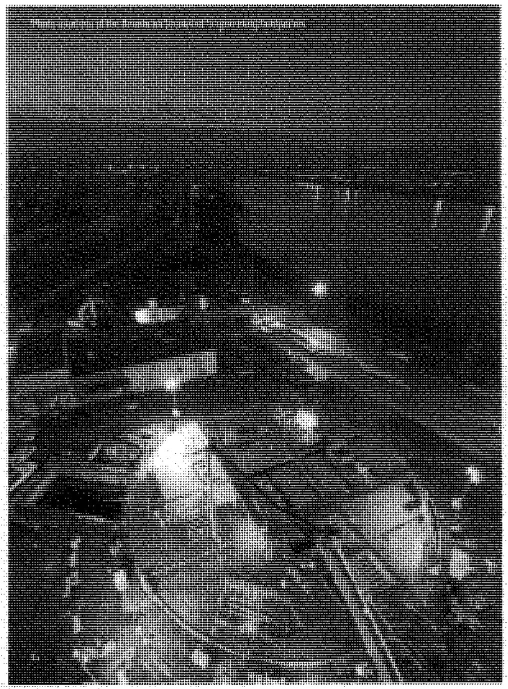
Key Findings

Investments in water and wastewater infrastructure have immediate, substantial and far-reaching effects on the economy.

- At the national level, an investment of $1 billion almost triples in size as total demand for goods and services reaches an estimated $2.87 to $3.46 billion.
- The total effect on economic demand is smaller at the state level, but direct investments in water and wastewater infrastructure can nearly double as expenditures for necessary supplies and household spending impact the economy.
- Spending to rebuild our infrastructure affects a wide range of economic sectors. Engineering services, heavy equipment, truck transport, and pipe materials are needed to complete infrastructure projects, but businesses and households, in turn, spend money on goods and services across a wide array of sectors.
- An estimated 20,003 to 26,669 jobs can result from a national investment of $1 billion. These opportunities are spread across the economy with more than one-half of the jobs in industries other than water and wastewater construction.
- Personal incomes and economic security are impacted by infrastructure investment. An increase in total employee compensation accompanies job creation at the national, state, and local levels.
- State and local revenues increase as infrastructure is built or improved, though the size of effects vary by location, size, and type of project.



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Methodology

Our study is designed to estimate the economic impacts of water and wastewater infrastructure on local, state, and national economies. Key objectives included quantifying the following effects:

- What is the indirect effect of infrastructure investment? That is, what is the economic impact on industries that supply necessary products and services, such as engineering services, truck transport, or pipelines?
- What is the impact on economic demand as households re-spend income in the local economy? That is, to what extent are other businesses (e.g., retail establishments, professional and personal services, housing) affected as infrastructure projects provide jobs and personal income to households?
- How many jobs can be attributed to infrastructure investment? Are these jobs primarily in water and wastewater construction sectors or are relatively large numbers of jobs also created in other sectors?

To address these questions, the study uses data from recently completed projects across 5 states, draws on regional input-output models that allow us to differentiate among impacts, and utilizes local data as well as hypothetical scenarios to estimate effects at local, state, and national levels of analysis.

We defined a study area comprised of five states: California, Georgia, Minnesota, New Mexico, and Pennsylvania. These states were selected to capture a range of economic conditions as well as regional variation in climate and labor markets.

Estimates of local economic impacts are based on data from recently completed projects. While limited to only 5 states, these projects capture variation in size (fairly small to very large) and type (e.g., replacing, rehabilitating, or installing new water and wastewater pipes or treatment facilities). State- and national-estimates are based on hypothetical investments of $1 billion to facilitate comparison.

We invited members of the National Utility Contractors Association in the five target states to provide data on water and wastewater projects. Data on project type, location, contract value and costs were gathered for 116 projects from 35 contractors and represented 73 counties across the five states.

Project cost data were analyzed using input-output models. These models are a technique for quantifying the transactions between industries: When a firm in Industry A receives a $1M order to install new water pipes, it must purchase supplies and services from firms in Industries B, C, and D. Input-output models capture these relationships and make it possible to estimate economic effects above and beyond the initial investments.

We used IMPLAN – a computer software package for input-output modeling – to estimate the indirect effects of infrastructure investment (impact on industries that are related to water and wastewater construction) as well as the secondary effects of household spending in the local economy. Using IMPLAN, we can also estimate impacts on jobs, employee compensation, and

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Methodology

state and local tax revenues.

We also used RIMS II (Regional Input-Output Modeling System) to examine the national and state-level effects of infrastructure investment. Like IMPLAN, RIMS II is a method for accounting for interindustry relationships within a geographic region using I-O tables that show, for each industry, the distribution of the inputs purchased and the outputs sold. Because the methodologies underlying IMPLAN and RIMS II differ, we use both approaches to estimate the range of impacts on jobs, employee compensation, and output.

Design Study

The study is designed to reflect regional and local variation.

Study area: California, Georgia, Minnesota, New Mexico, and Pennsylvania define the geographic boundaries over which economic impacts were measured. These states were selected to reflect variation in region, local economies, climate, and labor conditions.

Case Studies: Actual construction projects within each state capture variation in project size and local economies. In addition, taking inventory of what is known about actual projects fuels the models with real-world data and more accurately reflects existing activity.

Time frame for analysis: Projects completed in 2006 and 2007 were eligible for selection to ensure results were based on recent construction activity.

Develop Model

Transparency is essential for building a credible model.

Software: IMPLAN and RIMS II are computer software packages that consist of procedures for estimating local input-output models and associated databases.

Input-Output models: Input-output models are a technique for quantifying interactions between firms, industries, and social institutions within a local economy. IMPLAN models include outputs and inputs

from 440 industrial sectors, value added, employment, wages and business taxes paid, imports and exports, final demand by households and government, capital investment, business inventories, marketing margins, and inflation factors. RIMS II provides multipliers for nearly 500 industries.

Multipliers: Multipliers quantify how certain changes (i.e., in jobs, earnings, or sales) in one industry will have effects on other industries in the region. Multipliers are aptly called estimators of the 'ripple effect' and are available at the national, state and county levels.

Data sources: The economic source data for IMPLAN models includes the system of national accounts for the US based on data collected by the US Department of Commerce, US Bureau of Economic Activity, US Bureau of Labor Statistics, and other federal and state agencies. All analyses used 2007 IMPLAN data (released in October 2008). RIMS II uses national and regional I-O tables from the US Bureau of Economic Activity.

Industry: The 2007 IMPLAN data classifies water and wastewater pipe construction activity in the 'Construction of other new non-residential structures', which corresponds to the updated classification used by the US Bureau of Economic Activity. The corresponding RIMS II sector is construction.

Collect Case Studies

Actual project data provide real world results.

Sample: Members of the National Utility Contractors Association in the five target states were invited by phone and email to provide data on water and wastewater pipe construction projects completed in 2006 and 2007. In total, data from 116 projects were analyzed, representing 35 contractors, 5 states, and 73 counties.

Data collection: Respondents reported project data electronically or by fax. Information was collected on type and location of project, contract value and project costs, and year of completion. As needed, follow-up phone calls were made to clarify questions about the data or try to obtain additional information.

Data checks: County-level data can be unreliable if the county has sparse economic activity or is thinly populated. Internal checks were conducted to ensure case data and local level inputs used were reliable and in-line with state inputs.

Estimate Impacts

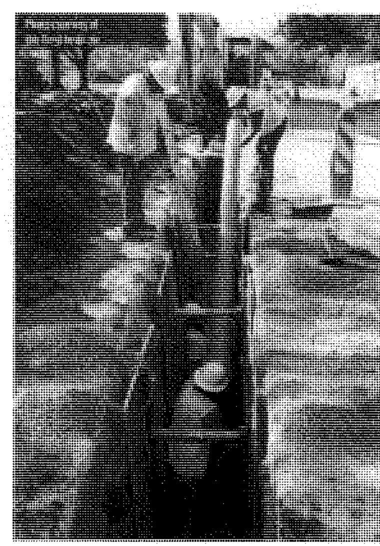
Economic impact results help prioritize planning & investment decisions.

The economic impacts at the state level, and county level for actual pipe construction projects, were estimated using IMPLAN software and economic multiplier data. Briefly, the analysis produced the following estimates:

Direct effects: The output, jobs, and income that are directly related to the construction of the project.

Indirect effects: The additional output, jobs, and incomes for suppliers and vendors indirectly related to the construction project. These reflect the broader impacts in the community such as expanding business among local vendors and suppliers.

Induced effects: The expansion of local commercial business as a result of income re-spent by persons employed by the construction project sector or by the suppliers and vendors that indirectly support that sector.



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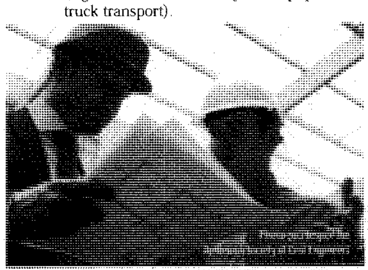
Results and Analysis - United States

A $1 billion investment in water and wastewater infrastructure at the national level has substantial and far-reaching effects throughout the economy.

- The total effect of a $1 billion investment almost triples in size to an estimated $2.87 to $3.46 billion in economic demand.
- Industries indirectly related to water and wastewater infrastructure experience an estimated $918 million in demand. These industries are indirectly affected by investments in water and wastewater infrastructure because they provide services that support project design (e.g., architectural and engineering services) or products and supplies essential for project completion (e.g., industrial machinery and equipment, truck transport).



- Ripple effects on economic demand can range across a number of industries and amount to an estimated $949 million. A wide range of industries that are not related, directly or indirectly, to building or improving water and wastewater infrastructure nonetheless see demand for their products or services increase as households re-spend income in the economy. These effects occur in sectors as varied as bookkeeping services, energy and telecommunications, health care, motor vehicles, food retail stores, dining establishments, and amusement and recreation services.

What Jobs?

Besides construction jobs, a $1 billion investment in water and sewer projects generates measurable national employment in 325 other standard industry classifications, everything from tires to tortillas. For every 20,003 jobs created, at least 100 workers are hired in the short-term, in each of the following industry segments:

Construction of new nonresidential [illegible]	[illegible]
[illegible]	[illegible]
Food services and drinking places	[illegible]
[illegible]	[illegible]
Real estate	[illegible]
[illegible]	[illegible]
Offices of physicians, dentists, and other health practitioners	[illegible]
[illegible]	[illegible]
Services to buildings and dwellings	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Retail - Motor vehicle and parts	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Retail - Miscellaneous	[illegible]

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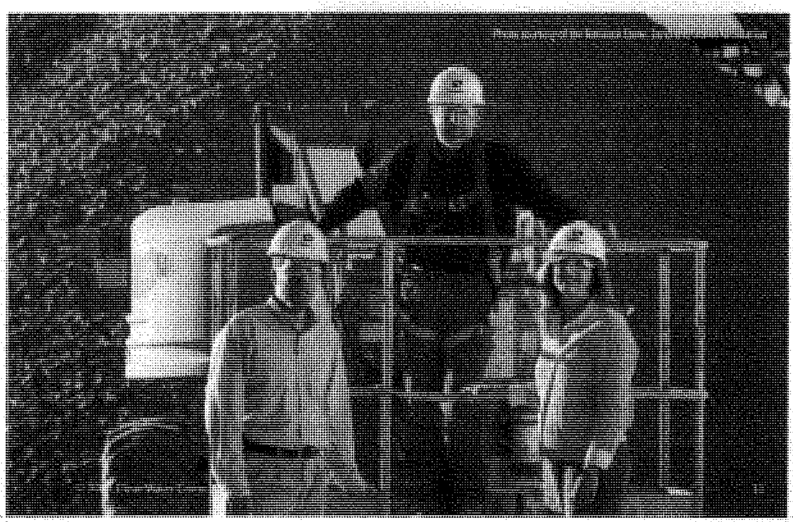
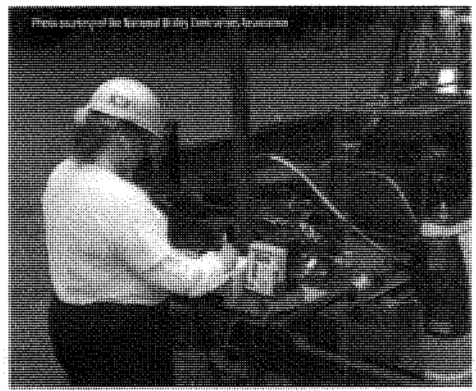
- An estimated 20,003 to 26,669 jobs are created. About one-half of these jobs are in industries outside of water and wastewater construction, further illustrating the broad reach of the initial investment.
- The economic security of households is strengthened. Total employee compensation – a category that includes wages and salaries as well as contributions to social insurance programs such as Social Security – is enhanced by an estimated $1 billion. Job creation includes an estimated 8,366 jobs in the pipe construction sector where average earnings of more than $50,000 exceeds median household income for the US.

A $1B investment in pipe construction in the United States results in the following economic impacts:

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]



Results and Analysis - California



- An investment of $1 billion in California's water and wastewater infrastructure would result in an estimated $1.8 to 2.5 billion demand for goods and services across the state's economy.
- Industries that provide goods and services in support of infrastructure projects would experience over $370 million in economic demand. A wide range of other industries would sell an estimated $448 million in goods and services as businesses and households spend money in the economy.
- 12,390 to 19,574 jobs would be created. About 7,000 of these jobs would be in the pipe construction sector where average earnings of $68,000 exceed the statewide median household income of about $50,000.
- We analyzed data on 16 recently completed projects that ranged in size from $250,000 to $60 million and covered 12 counties.

A new 84" groundwater replenishment project in Orange County illustrates the local economic impacts of these investments in the water and wastewater infrastructure. The $2.5 million project fell just short of generating another $2 million in demand for goods and services across other economic sectors. Industries that support water and wastewater construction by providing services and supplies experienced $780,000 in demand. Re-spending of income in the local economy generated $950,000 in sales. About 28 jobs were created, 17 of which were in the construction sector. An estimated $1.8 million in employee compensation (wages, salaries, and payroll contribution to social insurance programs) derived from the initial $2.5 million project, which also raised state and local tax revenues by approximately $110,000.

A $1B investment in pipe construction in California results in the following economic impacts:

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Personal Income	[illegible]
State and local tax revenue	[illegible]
Employment	12,390-19,574 jobs
Pipe construction	[illegible]
Other	[illegible]
Average Earnings	[illegible]

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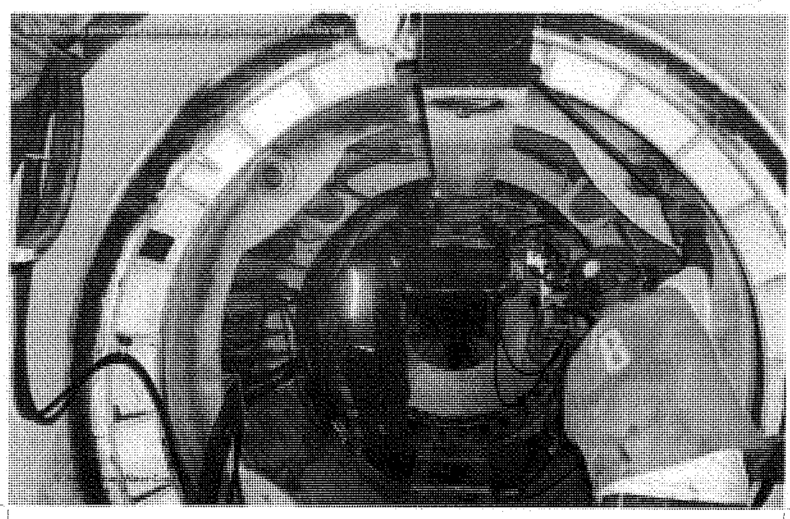
Case Studies

Project Name	Booster Pump Station	Bypass Mud Outlets	Interceptor Overflow Structures	Force Main Reconstruction
County	Alameda	Alameda	Alameda	Contra Costa
Total output of the region	**11.38 M**	**2.04 M**	**1.61 M**	**5.06 M**
[illegible] business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	2.06 M	0.11 M	0.20 M	[illegible]
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	5.49 M	1.35 M	0.74 M	2.29 M
State & local tax revenue	0.31 M	0.07 M	0.04 M	[illegible]
Employment	79	19	11	33
[illegible] employment	[illegible]	[illegible]	[illegible]	[illegible]
Other	32	3	5	12



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Results and Analysis - California

Case Studies

Project Name	Sewer Lines	Water/Sewer Replacement	GWRS Unit II	Force Main
County	Kern	Merced	Orange	Sacramento
Total output of the region	0.63 M	1.65 M	4.17 M	51.08 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.11 M	0.22 M	0.78 M	9.91 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.21 M	0.66 M	1.94 M	24.7 M
State & local tax revenue	0.02 M	0.03 M	0.11 M	1.34 M
Employment	5	13	28	412
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	2	4	11	161

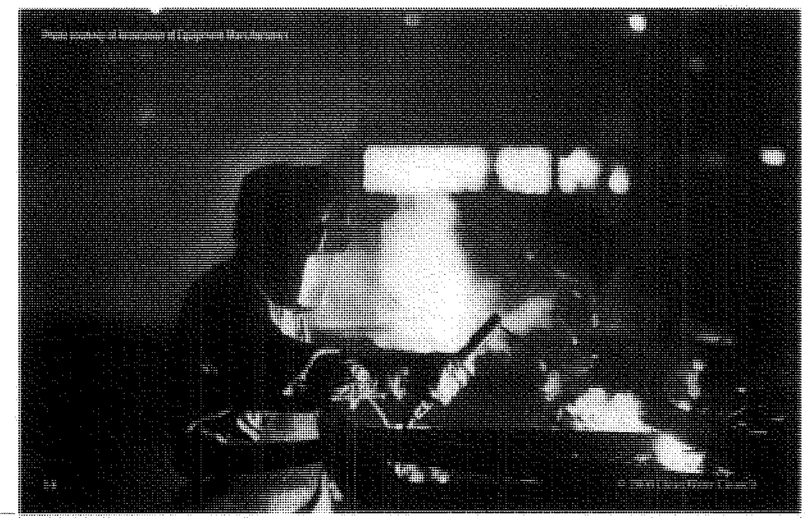

Photo courtesy of Association of Equipment Manufacturers

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Project Name	36" Waterline	Upper NW Interceptor	WWTP Improve.	Transmission Main
County	Sacramento	Sacramento	San Benito	San Francisco
Total output of the region	2.28 M	1.83 M	0.33 M	0.52 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.41 M	0.33 M	0.04 M	0.08 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	1.01 M	0.81 M	0.14 M	0.25 M
State & local tax revenue	0.05 M	0.04 M	0.01 M	0.01 M
Employment	17	14	3	3
Pipe construction	10	8	2	2
Other	7	6	1	1

Project Name	Storm Drainage Improvements	Interceptor Rehab	Sanitary Sewer Trunk Line	Force Main
County	San Joaquin	Santa Clara	Tulare	Yolo
Total output of the region	6.14 M	6.75 M	7.75 M	90.85 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.92 M	1.12 M	1.19 M	16.53 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	2.64 M	3.16 M	3.26 M	40.64 M
State & local tax revenue	0.15 M	[illegible]	0.17 M	[illegible]
Employment	46	43	63	563
Pipe construction	29	29	36	329
Other	17	14	27	234

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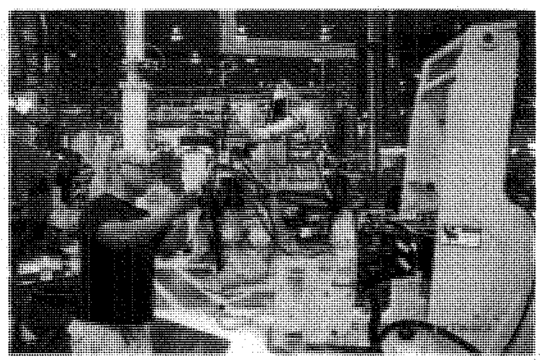
Results and Analysis - Georgia

- An investment of $1 billion in Georgia's water and wastewater infrastructure would result in an estimated $1.76 to 2.6 billion demand for goods and services across the state's economy.
- Industries that provide goods and services in support of infrastructure projects would experience over $390 million in economic demand. A wide range of other industries would sell an estimated $365 million in goods and services as households spend money in the economy.
- 14,867 to 22,254 jobs would be created with slightly fewer than 6,000 occurring in sectors other than water and wastewater construction. Nearly 9,000 jobs would be in the pipe construction sector where earnings average $44,260.
- We analyzed data on 33 recently completed projects that ranged in size from $100,000 to $164 million and covered 20 counties.

A $4.3 million wastewater treatment plant in Chatham County illustrates the local economic impacts of these investments. The plant generated another $2.6 million in demand for goods and services across other economic sectors. Slightly less than $1.5 million was spent on goods and services that support construction of treatment plants, such as engineering services, industrial machinery, and other equipment and supplies. As households paid for goods and services as varied as telecommunications and child care services, the local economy experienced an estimated $1 million in demand. More than 60 jobs were created, more than 20 of which were in industries other than pipe construction. An estimated $2.6 million in employee compensation (wages, salaries, and payroll contribution to social insurance programs) results from the initial $4.3 million investment, and state and local tax revenues increase an estimated $160,000.

A $1B investment in pipe construction in Georgia results in the following economic impacts:

Total output of the region	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Personal income	[illegible]
State and local tax revenue	[illegible]
Employment	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Average Earnings	[illegible]



Case Studies

Project Name	12" DIP Water Main	New Sewer & Water Lines	Wastewater Treatment PII	Wastewater Treatment PII
County	Barrow	Bibb	Chatham	Chattooga
Total output of the region	0.28 M	1.77 M	6.94 M	6.60 M
Local business expenditures	0.20 M	[illegible]	4.31 M	4.12 M
Sales of suppliers	0.04 M	0.33 M	1.45 M	1.16 M
Household spending	0.04 M	[illegible]	1.17 M	1.32 M
Personal income	0.10 M	0.66 M	2.46 M	2.28 M
State & local tax revenue	0.01 M	0.04 M	0.16 M	0.14 M
Employment	3	16	67	103
Pipe construction	2	10	35	82
Other	1	6	32	21

Project Name	Pump Station	WWTP Improvements	Sewer & Water Line Replace	New Sewer & Water Lines
County	Cherokee	Clarke	Cobb	Cobb
Total output of the region	0.60 M	43.03 M	1.50 M	1.09 M
Local business expenditures	0.47 M	31.01 M	[illegible]	[illegible]
Sales of suppliers	0.10 M	6.31 M	0.30 M	0.22 M
Household spending	0.07 M	[illegible]	[illegible]	0.26 M
Personal income	0.22 M	16.10 M	0.61 M	0.44 M
State & local tax revenue	0.01 M	0.85 M	0.04 M	0.02 M
Employment	6	397	13	9
Pipe construction	4	286	8	6
Other	2	111	5	3

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Results and Analysis - Georgia

Case Studies

Project Name	WWTP Expansion	Water Filter Plant	New Water & Sewer Lines	New Sewer & Water Lines
County	Coweta	Dekalb	Dekalb	Dekalb
Total output of the region	17.74 M	267.2 M	0.55 M	0.34 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	2.86 M	51.8 M	0.11 M	0.08 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	6.38 M	107.0 M	0.22 M	0.13 M
State & local tax revenue	0.38 M	6.00 M	0.01 M	0.01 M
Employment	169	2246	6	3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	49	836	1	1

Project Name	Storm Drain Improvements	New Sewer & Water Lines	Wastewater Treatment Plt	Pump Station
County	Dougherty	Fayette	Floyd	Floyd
Total output of the region	4.46 M	0.20 M	5.15 M	1.33 M
Local business expenditures	3.20 M	0.13 M	4.20 M	0.91 M
Sales of supplies	1.56 M	0.04 M	0.01 M	0.21 M
Household spending	0.65 M	0.03 M	0.01 M	0.21 M
Personal income	1.72 M	0.08 M	2.15 M	0.47 M
State & local tax revenue	0.00 M	-0.01 M	0.13 M	0.03 M
Employment	42	2	58	15
Type construction	27	1	45	9
Other	15	1	13	6

Project Name	Pump Station	Sanitary Sewer	Gravity Sewer	Sewer & Water Line Rehab
County	Floyd	Forsyth	Forsyth	Fulton
Total output of the region	0.40 M	4.37 M	0.20 M	0.84 M
Local business expenditures	0.31 M	2.85 M	0.13 M	0.55 M
Sales of supplies	0.10 M	0.41 M	0.04 M	0.17 M
Household spending	0.10 M	0.69 M	0.03 M	0.11 M
Personal income	0.17 M	1.84 M	0.08 M	0.34 M
State & local tax revenue	0.01 M	0.16 M	-0.01 M	0.02 M
Employment	5	34	2	7
Type construction	4	24	1	5
Other	2	10	1	2

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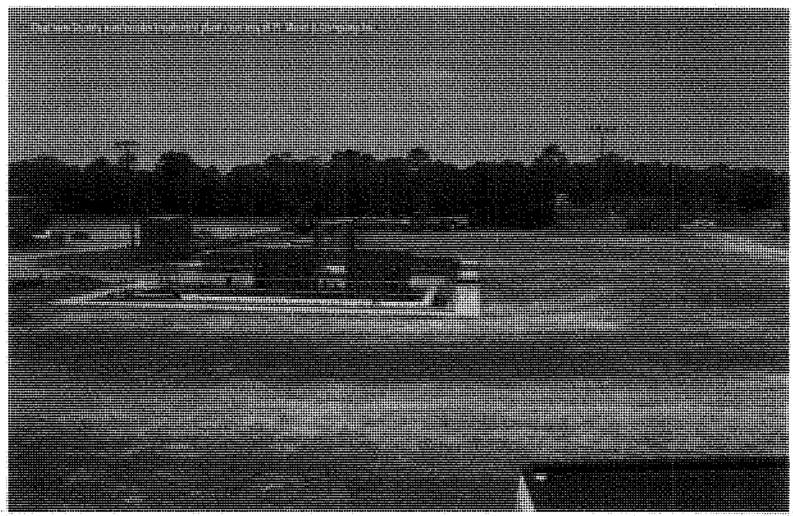
Results and Analysis - Georgia

Case Studies

Project Name	New Sewer & Water Lines	Gravity Sewer	Reuse Pipeline and Diffuser	Water Line Improvements
County	Fulton	Gordon	Gwinnett	Gwinnett
Total output of the region	0.16 M	0.23 M	42.87 M	29.20 M
Local business expenditures	0.11 M	0.19 M	26.23 M	[illegible]
Sales of suppliers	0.03 M	0.03 M	8.36 M	[illegible]
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.07 M	0.09 M	17.64 M	12.02 M
State & local tax revenue	<0.01 M	<0.01 M	1.09 M	0.76 M
Employment	1	2	339	231
[illegible]	1	2	218	144
Other	0	0	121	87



Project Name	Sanitary Sewer	Sanitary Sewer Replacement	Water & Sewer Utility Relocations	Sewer & Water Line Repairs
County	Gwinnett	Gwinnett	Gwinnett	Gwinnett
Total output of the region	**15.25 M**	**6.66 M**	**4.95 M**	**0.82 M**
Local business expenditures	9.04 M	4.18 M	[illegible]	0.51 M
Sales of suppliers	2.97 M	1.30 M	0.95 M	0.10 M
Household spending	2.93 M	1.26 M	0.95 M	0.20 M
Personal income	**6.28 M**	**2.74 M**	**2.02 M**	**0.34 M**
State & local tax revenue	**0.36 M**	**0.17 M**	**0.13 M**	**0.02 M**
Employment	**120**	**52**	**39**	**7**
Pipe construction	75	33	24	6
Other	45	20	15	1

Project Name	Pump Station	WWTP Expansion	Water Extension	Water Main Connections	35,000 LF 12" Water Main
County	Henry	Newton	Putnam	Richmond	Troup
Total output of the region	**10.72 M**	**18.50 M**	**7.03 M**	**1.35 M**	**1.44 M**
Local business expenditures	7.32 M	12.92 M	[illegible]	1.00 M	1.05 M
Sales of suppliers	1.84 M	1.50 M	0.85 M	0.20 M	0.18 M
Household spending	1.56 M	2.08 M	0.73 M	0.15 M	0.19 M
Personal income	**3.94 M**	**6.19 M**	**2.60 M**	**0.52 M**	**0.54 M**
State & local tax revenue	**0.23 M**	**0.31 M**	**0.15 M**	**0.02 M**	**0.03 M**
Employment	**101**	**149**	**68**	**12**	**13**
Pipe construction	69	115	54	8	10
Other	31	34	14	3	3

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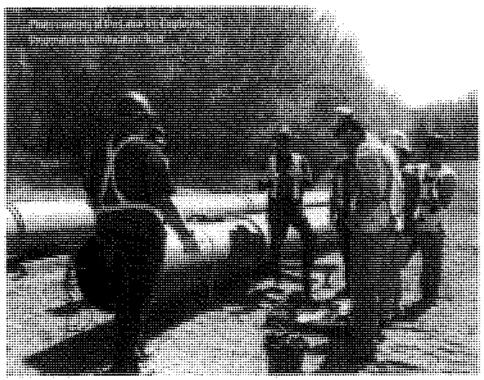
Results and Analysis - Minnesota



- An investment of $1 billion in Minnesota's water and wastewater infrastructure would result in an estimated $1.8 to 2.4 billion demand for goods and services across the state's economy.
- Industries that provide goods and services in support of infrastructure projects would experience over $400 million in economic demand. A wide range of other industries would sell an estimated $396 million in goods and services as households spend money in the economy.
- 14,698 to 20,397 jobs would be created with about 6,000 occurring in sectors other than water and wastewater construction and 8,500 jobs in the construction sector where earnings average $48,122.
- We analyzed data on 11 recently completed projects that ranged in size from $900,000 to $14 million and covered 10 counties.

A $1.8 million storm water treatment project in Hennepin County illustrates the local economic impacts of these investments. The storm water treatment project generated another $1.1 million in demand for goods and services across other economic sectors. About $600,000 was spent on goods and services needed to complete the project, including engineering services, industrial machinery, and other equipment and supplies. Another $500,000 of other goods and services were sold as a result of household spending. More than 20 jobs were created, 15 in the water pipe construction sector. An estimated $1.2 million in employee compensation (wages, salaries, and payroll contribution to social insurance programs) derived from the initial $1.8 million investment, and state and local tax revenues were affected an estimated $70,000.

A $1B investment in pipe construction in Minnesota results in the following economic impacts:

Total output for the region	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Household spending	[illegible]
Personal income	[illegible]
State and local tax revenue	[illegible]
Employment	[illegible]
Pipe construction	[illegible]
Other	[illegible]
Average Earnings	[illegible]

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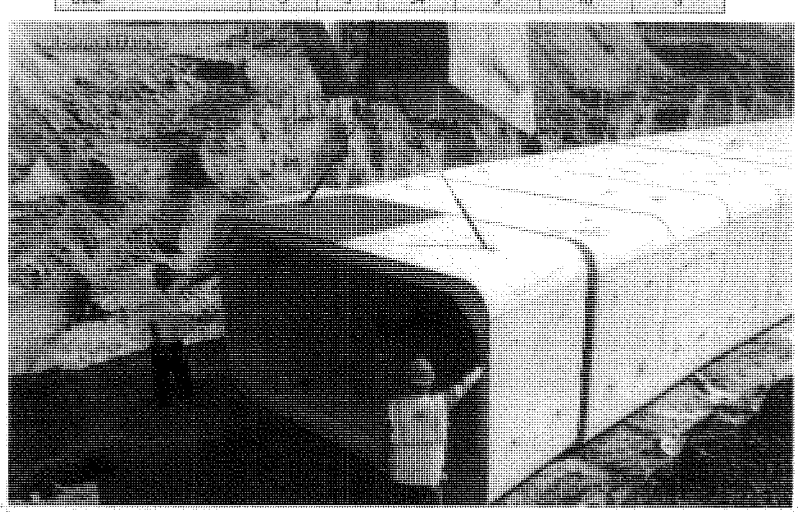
Case Studies

Project Name	Utility Line Reconstruction	Collection Sys Improvements	Storm water Treatments	Water Collection Sys	Wastewater System
County	Blue Earth	Douglas	Hennepin	Kandiyohi	Wabasha
Total output of the region	1.75 M	4.38 M	2.07 M	2.21 M	1.74 M
Local business expenditures	1.18 M	[illegible]	[illegible]	[illegible]	[illegible]
Sales of supplies	0.32 M	0.73 M	0.19 M	0.34 M	0.15 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.67 M	1.60 M	1.27 M	0.85 M	0.56 M
State & local tax revenue	0.04 M	0.10 M	0.07 M	0.05 M	0.02 M
Employment	16	43	23	21	18
Pipe construction	10	28	[illegible]	14	[illegible]
Other	6	15	8	7	3

Results and Analysis - Minnesota

Case Studies

Project Name	Sewer Lining	Sewer Lining	Sanitary & Storm Sewer Improve.	Storm Sewer Replacement	Utility Rehabilitation	Water Main Extension
County	Ramsey	Ramsey	Roseville	St. Louis	[illegible]	Wright
Total output of the region	2.06 M	1.08 M	17.72 M	1.67 M	3.53 M	1.25 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.37 M	0.34 M	1.78 M	0.27 M	0.54 M	0.18 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.81 M	0.83 M	5.95 M	0.65 M	1.14 M	0.48 M
State & local tax revenue	0.03 M	0.05 M	0.59 M	0.03 M	[illegible]	[illegible]
Employment	16	14	178	15	57	11
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	5	3	34	3	10	3



Results and Analysis - New Mexico

- An investment of $1 billion in New Mexico's water and wastewater infrastructure would result in an estimated $1.7 to 2 billion demand for goods and services across the state's economy.
- Industries that provide goods and services in support of infrastructure projects would experience almost $390 million in economic demand. A wide range of other industries would sell an estimated $320 million in goods and services as households spend money in the economy.
- 15,329 to 20,901 jobs would be created with 6,000 occurring in sectors other than water and wastewater construction and more than 9,000 jobs would be in the pipe construction sector where earnings average $40,930.
- We analyzed data on 18 recently completed projects that ranged in size from $120,000 to $9.2 million and covered 10 counties.

A $2.6 million project to install new water and sewer lines in Dona Aña County illustrates the local economic impacts of these investments. Altogether the infrastructure investment resulted in slightly less than $4 million in demand for products and services. In addition to the $2.6 million investment for the water and sewer lines, about $730,000 were spent on supplies and services necessary to complete such work. Re-spending of income resulted in another $610,000 in local economic demand as households paid for goods and services ranging from rent, motor vehicles, and gasoline to amusement centers and beverage establishments. More than 40 jobs were created, including an estimated 27 in water pipe construction sector and another 15 across other economic sectors. An estimated $1.3 million in employee compensation (wages, salaries, and payroll contribution to social insurance programs) derived from the initial $2.6 million investment, and state and local tax revenues were affected an estimated $80,000.

A $1B investment in pipe construction in New Mexico results in the following economic impacts:

Total output of the region	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Household spending	[illegible]
Personal Income	[illegible]
State and local tax revenues	[illegible]
Regional Employment	15,329-20,901 jobs
Pipe construction	[illegible]
Other	[illegible]
Average Job Compensation	[illegible]

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Results and Analysis - New Mexico

Case Studies

Project Name	Water & Wastewater Trans Lines	New 36" & 60" Water Lines	Water & Sewer Lines	Water & Sewer Line Improve.
County	Bernalillo	Bernalillo	Bernalillo	Bernalillo
Total output of the region	14.45 M	5.27 M	4.94 M	0.55 M
Local business expenditures	6.51 M	3.30 M	3.13 M	0.32 M
Sales of suppliers	2.02 M	1.03 M	0.98 M	0.10 M
Household spending	5.92 M	[illegible]	0.83 M	[illegible]
Personal income	5.58 M	2.03 M	1.91 M	0.20 M
State & local tax revenue	0.31 M	0.11 M	0.11 M	0.01 M
Employment	130	47	44	4
Pipe construction	90	30	29	3
Other	40	17	15	1

Project Name	Sewer Line & Storm Drain Improve.	Water Line Replacement	Pipe Bursting	Sewer Line & Lift Station	Wastewater Treatment Plt
County	Dona Ana	Guadalupe	Otero	Rio Arriba	San Juan
Total output of the region	0.81 M	1.66 M	0.72 M	0.39 M	4.92 M
Local business expenditures	0.54 M	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.15 M	0.12 M	0.09 M	0.05 M	0.07 M
Household spending	0.12 M	0.10 M	[illegible]	0.04 M	0.76 M
Personal income	0.27 M	0.59 M	0.24 M	0.13 M	1.88 M
State & local tax revenue	0.02 M	0.03 M	0.01 M	0.01 M	0.11 M
Employment	8	16	8	4	47
Pipe construction	5	14	6	3	33
Other	3	2	2	1	14

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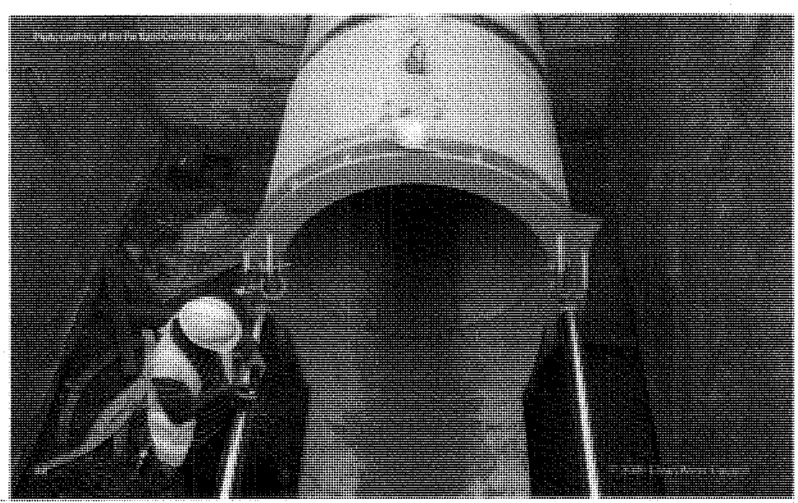
Project Name	Water & Sewer Line Improve.	Water & Sewer Line Improve.	WWTP Upgrade	New Water & Sewer Lines
County	Bernalillo	Cibola	Cibola	Dona Ana
Total output of the region	0.47 M	0.69 M	0.56 M	[illegible]
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.06 M	0.06 M	0.06 M	[illegible]
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.18 M	0.26 M	0.22 M	1.55 M
State & local tax revenue	0.01 M	0.01 M	0.01 M	0.09 M
Employment	4	6	5	42
Pipe construction	3	5	4	[illegible]
Other	1	1	1	15

Results and Analysis - New Mexico

Case Studies

Project Name	New Well Bldg, Pump, & Lines	Storm Improvements	WWTP Expansion	Water Storage Tank Upgrade	WWTP Upgrade
County	Sandoval	Sandoval	Santa Fe	Santa Fe	Taos
Total output of the region	1.62 M	0.16 M	4.93 M	0.31 M	2.34 M
Local business expenditures	1.35 M	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.24 M	0.02 M	0.91 M	[illegible]	0.29 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.82 M	0.06 M	1.73 M	0.11 M	0.79 M
State & local tax revenue	0.03 M	-0.01 M	0.10 M	0.01 M	0.04 M
Employment	15	2	50	3	24
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	4	1	13	1	7



Results and Analysis - Pennsylvania

- An investment of $1 billion in Pennsylvania's water and wastewater infrastructure would result in an estimated $1.8 to 2.6 billion demand for goods and services across the state's economy.
- Industries that provide goods and services in support of infrastructure projects would experience almost $430 million in economic demand. A wide range of other industries would sell an estimated $438 million in goods and services as households spend money in the economy.
- 14,524 to 20,037 jobs would be created with more than 6,000 in sectors other than water and wastewater construction and more than 8,000 jobs in the pipe construction sector where earnings average $52,037.
- We analyzed data on 38 recently completed projects that ranged in size from $80,000 to $10.3 million and covered 21 counties.

A $2 million pumping station in in Bucks County illustrates the local economic impacts of these investments. Altogether the infrastructure investment resulted in about $3.2 million in demand for products and services. In addition to the $2 million investment for the pumping station, about $640,000 were spent on supplies and services necessary to complete such work. Re-spending of household income resulted in another $570,000 in demand for goods and services in the local economy. More than 20 jobs were created, most of which (17) were in the water pipe construction sector and another 9 across other economic sectors. An estimated $1.3 million in employee compensation (wages, salaries, and payroll contribution to social insurance programs) derived from the initial $2 million investment, and state and local tax revenues were affected an estimated $80,000.

A $1B investment in pipe construction in Pennsylvania results in the following economic impacts:

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

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Results and Analysis - Pennsylvania

Case Studies

Project Name	Sanitary Sewer System Improvements	Interceptor Replacement	Water Line & Services	Sanitary Sewer Replacement
County	Adams	Allegheny	Beaver	Beaver
Total output of the region	0.78 M	0.79 M	1.87 M	1.70 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.11 M	0.10 M	0.33 M	0.30 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.30 M	0.33 M	0.75 M	0.69 M
State & local tax revenue	0.02 M	0.02 M	0.04 M	0.03 M
Employment	7	6	16	15
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	2	2	5	5

Project Name	Valve Vault & Tie-ins	Water & Sewer Extension	Sewer & Water Lines	Pipe Bursting, Reline & Rehab
County	Beaver	Bedford	Bedford	Blair
Total output of the region	0.12 M	1.80 M	0.38 M	7.57 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.03 M	0.21 M	0.04 M	1.30 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.05 M	0.73 M	0.15 M	2.84 M
State & local tax revenue	-0.01 M	0.04 M	0.01 M	0.16 M
Employment	1	17	4	72
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	0	5	1	26

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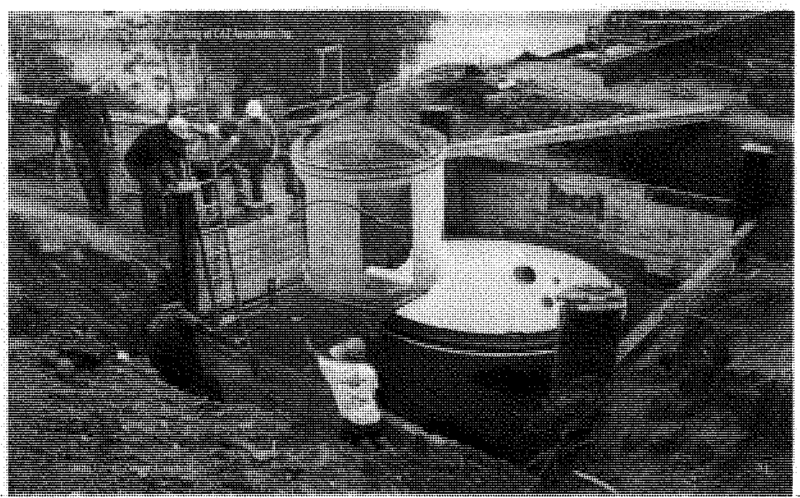
Project Name	Wastewater Treatment Plant	New Pumping Stations	Pumping Station Rehabs	New Collector Sewer
County	Bucks	Bucks	Bucks	Butler
Total output of the region	3.95 M	3.22 M	1.87 M	16.45 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.79 M	0.64 M	0.37 M	3.48 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	1.59 M	1.30 M	0.75 M	6.34 M
State & local tax revenue	0.03 M	0.03 M	[illegible]	[illegible]
Employment	32	26	16	126
Pipe construction	21	17	[illegible]	[illegible]
Other	11	9	5	40



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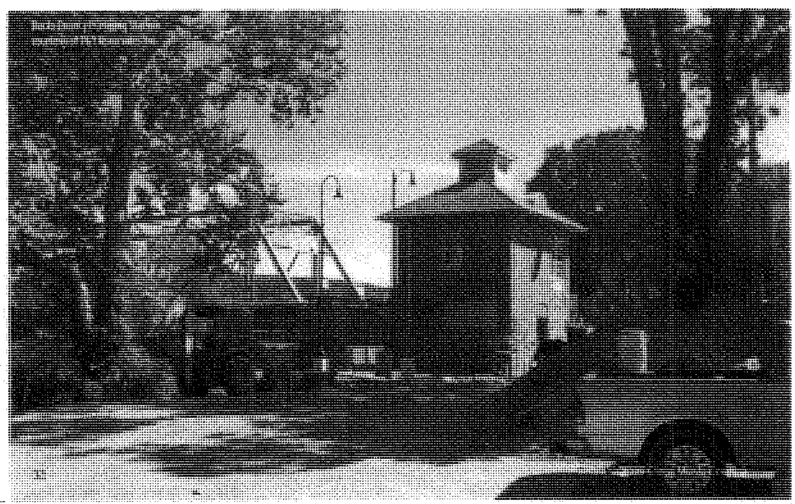
Results and Analysis - Pennsylvania

Case Studies

Project Name	New Collector Sewer & Appurt.	Sewer Main & Lateral Rpl.	Sewer Main & Lateral Rpl.	Waste Water Collection Sys.
County	Butler	Clearfield	Clearfield	Clearfield
Total output of the region	14.9 M	10.89 M	5.07 M	4.67 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	3.11 M	1.83 M	1.43 M	0.87 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	5.72 M	4.00 M	2.97 M	1.71 M
State & local tax revenue	0.37 M	0.25 M	0.19 M	0.20 M
Employment	122	105	78	45
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	44	35	26	13



Project Name	Pump Station Sludge Tank	Sanitary Sewer Replacement	Sewer Lines	Sewer Extension
County	Dauphin	Dauphin	Fayette	Franklin
Total output of the region	4.19 M	1.94 M	7.57 M	0.56 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.87 M	0.37 M	1.32 M	0.06 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	1.77 M	0.82 M	2.90 M	0.21 M
State & local tax revenue	0.03 M	0.04 M	0.15 M	0.01 M
Employment	34	16	70	6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	12	6	24	2

Project Name	Sanitary Sewer	Wastewater System Improvement	Sewer Lines & Appurt.	Wastewater Treatment Plt
County	Huntingdon	Jefferson	Jefferson	Jefferson
Total output of the region	1.50 M	8.31 M	3.65 M	1.49 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.17 M	1.70 M	0.51 M	0.21 M
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.54 M	2.64 M	1.25 M	0.51 M
State & local tax revenue	0.05 M	0.14 M	0.06 M	0.03 M
Employment	14	84	37	15
[illegible]	[illegible]	[illegible]	[illegible]	11
Other	3	22	10	4

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Results and Analysis - Pennsylvania

Case Studies

Project Name	Storm Sewer	Sludge Holding Tank Filter Building w/ UV	Storm Water Pump Station Improvement	Interceptor Replacement
County	Jefferson	Lebanon	Lycoming	Mercer
Total output of the region	0.35 M	10.45 M	1.39 M	3.04 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	0.05 M	1.60 M	0.24 M	[illegible]
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	0.12 M	4.02 M	0.54 M	1.16 M
State & local tax revenue	0.01 M	0.32 M	[illegible]	0.09 M
Employment	4	55	13	28
[illegible]	3	[illegible]	[illegible]	[illegible]
Other	1	21	5	10

Project Name	WWTP Renovation	Renovation of Primary Seal Tank	Water Distribution Lines	Sewer Lines & Appurtenances
County	Montgomery	Philadelphia	Schuylkill	Westmoreland
Total output of the region	5.42 M	6.05 M	8.73 M	7.41 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	[illegible]	[illegible]	1.30 M	[illegible]
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	2.30 M	2.76 M	3.28 M	2.92 M
State & local tax revenue	0.13 M	0.13 M	0.15 M	0.17 M
Employment	41	45	39	55
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	14	15	23	15

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Project Name	Sewage Coll Sys & Pump Station	Water Main Transmission	Underground Water Tanks	Water Filtration Plant Rehab
County	Westmoreland	Westmoreland	Westmoreland	Westmoreland
Total output of the region	7.28 M	4.58 M	4.22 M	4.11 M
Local business expenditures	[illegible]	[illegible]	[illegible]	[illegible]
Sales of suppliers	1.47 M	0.81 M	0.84 M	0.82 M
Household spending	[illegible]	[illegible]	[illegible]	[illegible]
Personal income	2.89 M	1.50 M	1.46 M	1.61 M
State & local tax revenue	0.17 M	0.10 M	0.10 M	0.09 M
Employment	64	40	37	36
Pipe construction	40	25	23	22
Other	24	15	14	14

Project Name	Wastewater Treatment Plant	Force Main and Trunk Sewer Upgrade
County	York	York and Adams
Total output of the region	4.91 M	1.16 M
Local business expenditures	[illegible]	0.74 M
Sales of suppliers	0.32 M	0.22 M
Household spending	[illegible]	[illegible]
Personal income	2.01 M	0.46 M
State & local tax revenue	0.11 M	0.03 M
Employment	41	10
Pipe construction	25	6
Other	16	4

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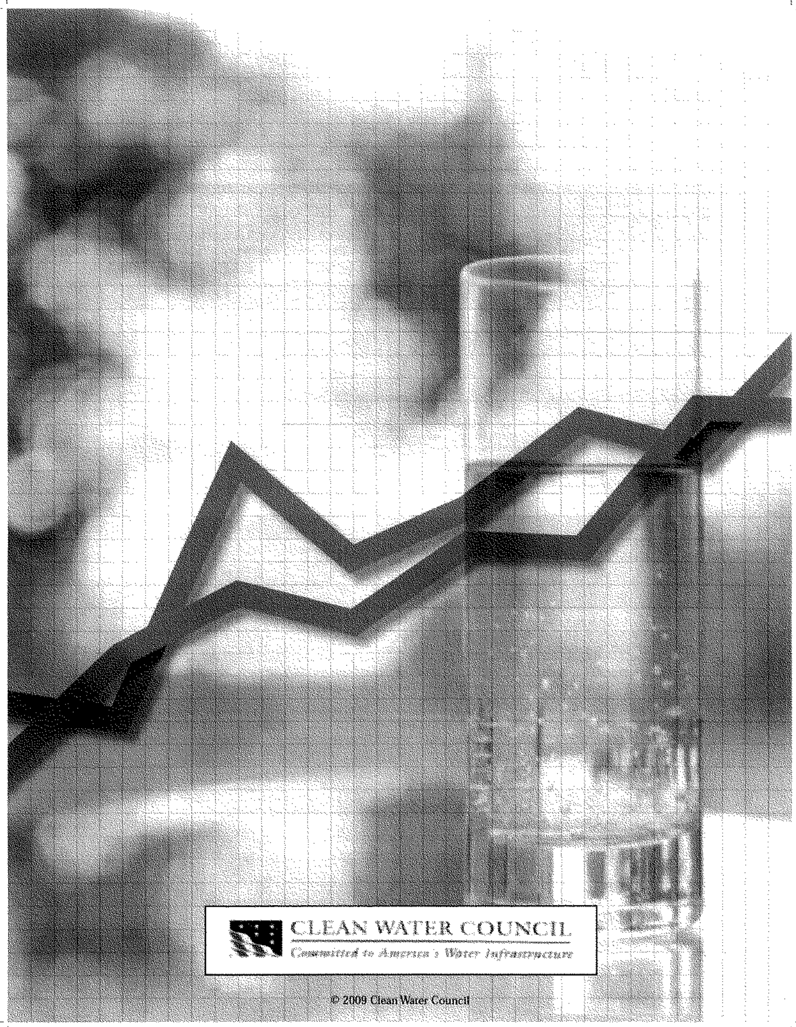
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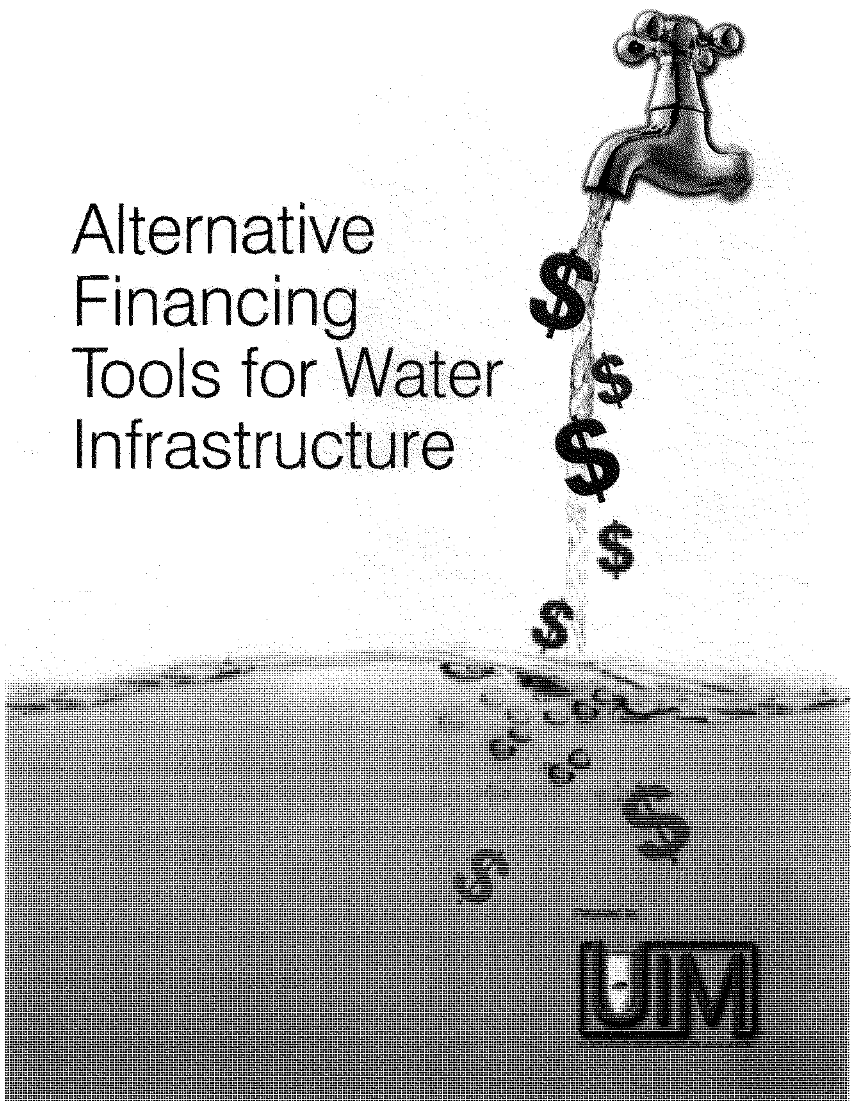
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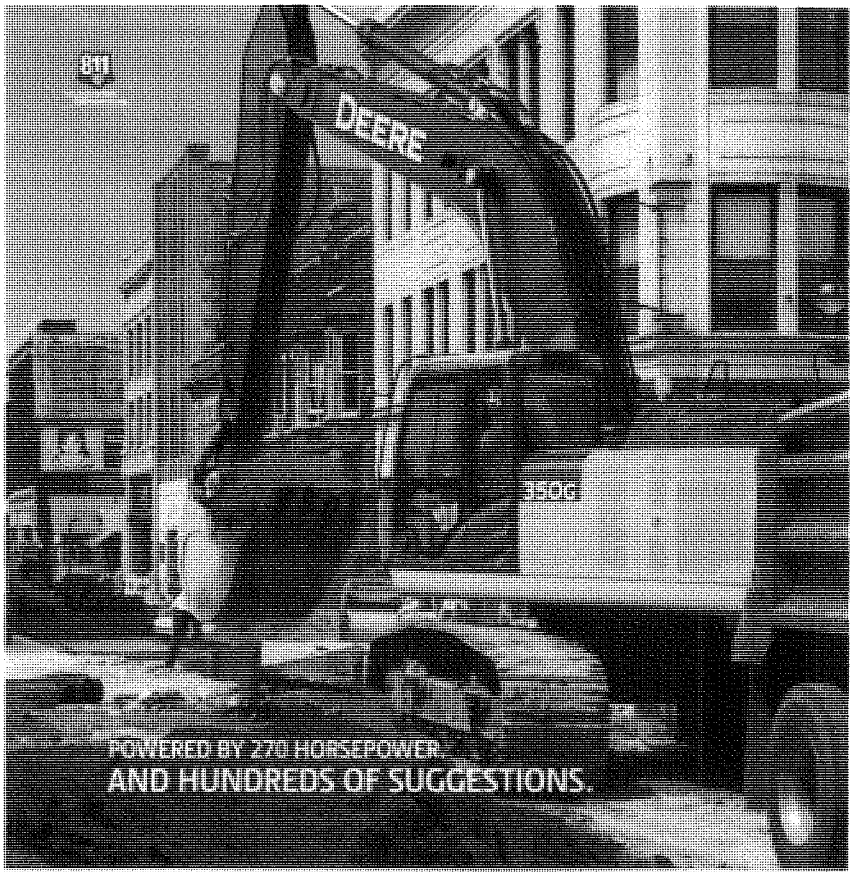

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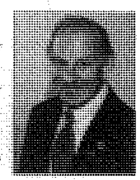
Sustainable Water Infrastructure Investment Act



We are pleased to bring you this special supplement covering alternative financing ideas for our water infrastructure. The focus of this supplement is the Sustainable Water Infrastructure Investment Act, namely House Resolution 1802 and its companion legislation, Senate Bill 939. This legislation would amend the IRS code to open up infrastructure investment in our water systems by private sources. The effect would be to remove the volume cap on Private Activity Bonds. This is bi-partisan legislation introduced by Reps. Geoff Davis (R-Ky.) and Bill Pascrell (D-N.J.) and Sens. Michael Crapo (R-Idaho) and Robert Menendez (D-N.J.). Passage of this legislation would potentially provide for $5 billion in private investment for water infrastructure. Wall Street has continually said that money is waiting on the sidelines to put cash into what many consider to be one of the safest investments out there – water.

The sponsoring Representatives and Senators are working diligently to line up co-sponsors, and can use our help. If your elected officials have not signed on, please contact them immediately. As of Sept. 30, there were 48 co-sponsors in the House and three in the Senate (see page 28 for the complete list).

In addition to Congress, there is broad support from industry, as the following pages will attest. We have contributed pieces from a broad range of individuals and groups representing all facets of the market, including investors, utilities, contractors, labor, equipment manufacturers, dealers, rental houses, engineers, labor and businesses.

The reason is clear: water is a vital resource needed for life. Additionally, it is a key driver for economic growth and sustainability. The more financial tools we have available, the better off we all are.

We would like to thank the organizations who made this special publication possible, namely our sponsors: John Deere, American Water, the National Association of Water Companies, the National Utilities Contractors Association and the Clean Water Council, which is a coalition of 37 underground construction contractors, design professionals, manufacturers, suppliers and other professionals committed to ensuring a high quality of life through sound environmental infrastructure.

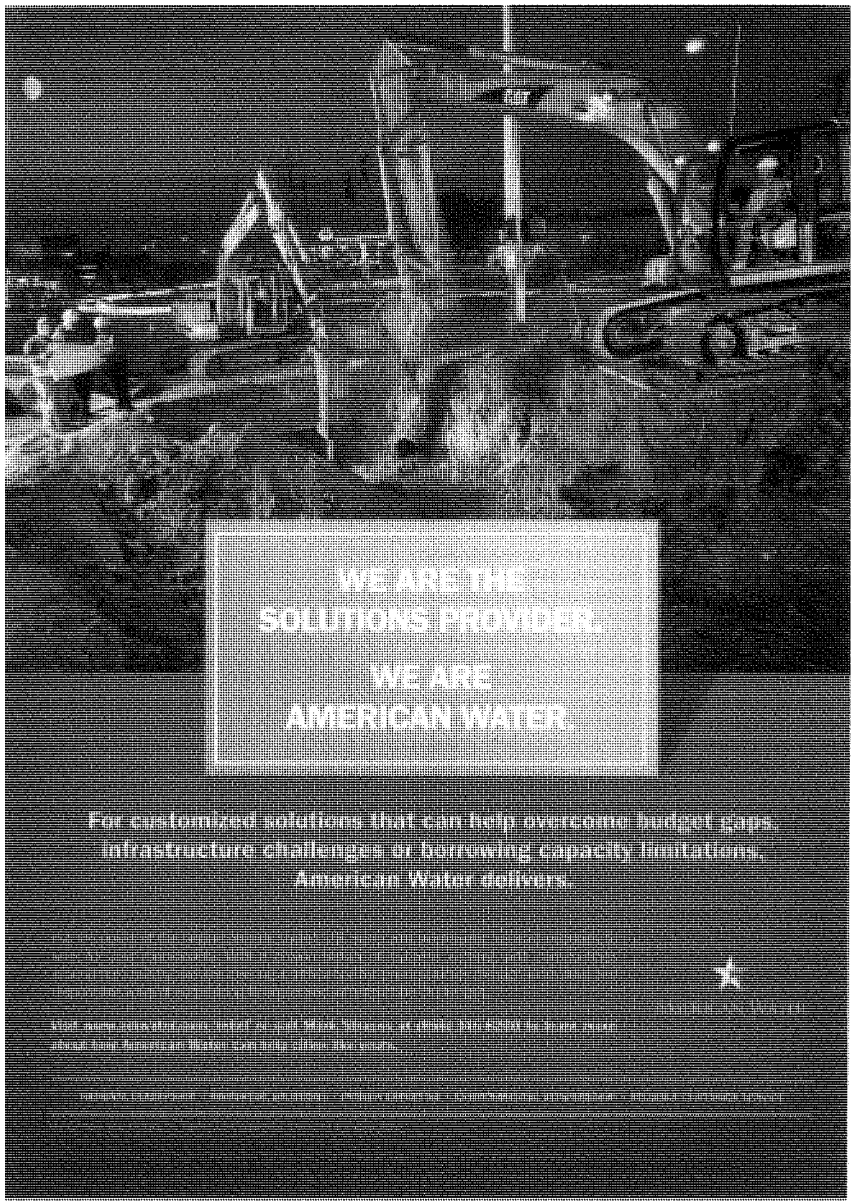
There is much to be done to fix our water infrastructure, but it all centers around money. Please lend you voice in getting this much needed water legislation passed.

Your voice counts!

Bernard P. Krzys
President & Publisher

Alternative Financing Tools for Water Infrastructure

Table of Contents


WE ARE THE
SOLUTIONS PROVIDER.
WE ARE
AMERICAN WATER.
For customized solutions that can help overcome budget gaps,
infrastructure challenges or borrowing capacity limitations,
American Water delivers.

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The Sustainable Water Infrastructure Investment Act has garnered support from a wide range of stakeholders, including contractors, engineers, utilities, elected officials, labor, equipment manufacturers and more. Below is a sampling of letters written to Rep. Bill Pascrell of New Jersey, sponsor of the House bill, in support of the legislation.

Dear Representative Pascrell:

The U.S. Chamber of Commerce, the world's largest business federation representing the interests of more than three million businesses and organizations of every size, sector, and region, believes H.R. 1802, the "Sustainable Water Infrastructure Investment Act," is an important step to enhance the ability of local governments to finance water and wastewater infrastructure projects and create jobs by encouraging private investment.

Private investment in infrastructure frees government dollars for allocation to other troubled areas of the economy and transfers risk away from the public partner to the private entity. Recent studies indicate that every $1 billion invested in water infrastructure generates up to $3.46 billion of total national output, $82.4 million in state and local tax revenue, and supports 28,500 jobs.

Few businesses can survive without sustainable water and wastewater infrastructure.

Now more than ever, the United States needs significant capital investment in water infrastructure.

The Chamber applauds your introduction of this important legislation and looks forward to continuing to work with Congress and the Administration, and interested stakeholders on this important issue.

Sincerely,
R. Bruce Josten
Executive Vice President-Government Affairs
U.S. Chamber of Commerce

Dear Congressman Pascrell:

The National Construction Alliance II supports your legislation, H.R. 1802, the Sustainable Water Infrastructure Investment Act of 2011. The National Construction Alliance II — a partnership between the International Union of Operating Engineers and the United Brotherhood of Carpenters and Joiners — represents nearly 1 million workers, many of whom build the nation's water and wastewater infrastructure.

Your legislation, which will bring water projects out from underneath the Private Activity Bond (PAB) volume cap, will make PABs a key form of financing to replace and upgrade the nation's drinking and wastewater systems. H.R. 1802 will help lower the cost of project financing, which will assist in controlling rates for customers, and it will facilitate more multiyear water projects. This access to new private capital will help utilities that are struggling to finance water and wastewater upgrades, which are in dire need. In its annual report on the nation's infrastructure, the American Society of Civil Engineers (ASCE) gives both drinking water and wastewater infrastructure a D-, just barely above failing. ASCE estimates that $11 billion is needed annually for drinking water upgrades alone.

Most important to the Carpenters and Operating Engineers, H.R. 1802 will create jobs in the hard-hit construction sector. The unemployment rate in construction is currently 15.6 percent, and it reached over 27 percent in February 2010. Our industry is in desperate need of legislation that will help put the tens of thousands of unemployed construction workers back on the job. Your legislation will help achieve this objective by creating an estimated 1.4 million jobs, roughly half of those in the construction sector. Passage of H.R. 1802 will deliver the type of boost that the construction sector needs right now.

PABs have already proven to be an important mechanism for local governments to finance projects such as airports, high-speed intercity rail and solid waste sites. With greater access to this innovative financing, public-private partnerships can be expected to bring more water and wastewater projects to market, creating jobs and reducing the nation's infrastructure deficit.

The National Construction Alliance II endorses the Sustainable Water Infrastructure Investment Act of 2011, H.R. 1802, and we look forward to working with you to enact it into law this Congress.

Thank you for your leadership on creating American jobs. We sincerely appreciate it.

Sincerely,
Raymond J. Poupore
Executive Vice President
National Construction Alliance II

Dear Representative Pascrell:

On behalf of the nation's principal cities represented by The U.S. Conference of Mayors (USCM), I am writing to express strong support for the Sustainable Water Infrastructure Investment Act of 2011 (H.R. 1802). The purpose of the legislation, as you so well state, is to modify the tax code to help local government finance much needed water and wastewater infrastructure and create jobs by encouraging private investment. The USCM has supported similar legislative proposal for over a decade, and we wish to express our thanks to you for continuing to fight for this important legislation. We agree with you that water and wastewater infrastructure is critical to the well being of public health and the nation's economy.

Our Member Cities, in 2005, identified their most pressing water resources management issue is the rehabilitation of an aging infrastructure. Subsequently, our research clearly indicates that local government efforts, in 2008, involved a $100.2 billion expenditure on water and wastewater infrastructure and services. Yet, Congress and the Administration have contributed less than 2 percent to local government to support this effort. At the same time, the U.S. Environmental Protection Agency has promulgated several very costly unfunded federal mandates. EPA has announced plans to develop more regulations that will become a cost burden on the nation's cities. Our mayors are expected to rebuild their existing systems to maintain basic services, but also comply with new and costly regulatory programs. Local government allocation of financial resources to comply with federal water policy is rapidly and significantly diverting resources away from other equally important public needs. Congress set no cap on what cities are expected to spend to satisfy the water laws. EPA has proven to be insensitive to the cost impacts of unfunded mandates. The nation's mayors recognize that this is both ill-advised and unsustainable.

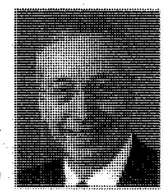
Your legislation would provide some much-needed relief by encouraging local government to work with private capital to deliver a critical public service. A study we published in 2008 indicates that local government investment in water and wastewater infrastructure adds value to the national (and local) economy. That study suggests that every local dollar spent for this purpose generates $9 in direct and indirect income. Every local job created in water and sewer creates 3.68 jobs in the national economy to support that job. Your understanding of the relationship between infrastructure investment and job creation is a welcome sign of leadership in the right direction.

Thank you for sponsoring the Sustainable Water Infrastructure Investment Act of 2011. This minor modification of the tax code will provide an expansion of the tool-box of local government to provide safe, affordable and adequate water and wastewater services and infrastructure for the nation's principal cities in the 21st century.

Sincerely,
Tom Cochran
CEO and Executive Director
The U.S. Conference of Mayors

Making the Case for the Sustainable Water Infrastructure Investment Act of 2011

By Geoff Davis



Water and wastewater infrastructure is critical to our economy. However, budget challenges across the nation combined with an ever-increasing regulatory burden are combining to significantly strain this essential ingredient for development and growth in our communities.

In response I am proud to be the lead Republican sponsor of a bill to help address this problem called the Sustainable Water Infrastructure Investment Act of 2011 (H.R. 1802). Congressman Bill Pascrell (D-N.J.) and I believe this legislation will help make much-needed updates in wastewater infrastructure systems more affordable by encouraging more private investment.

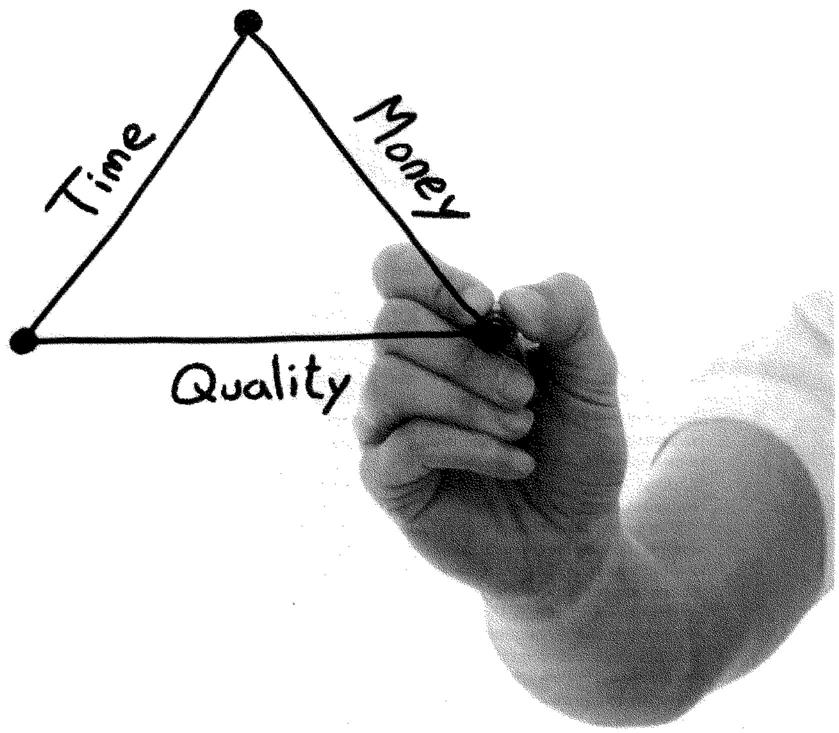
Communities in Kentucky and around the country are struggling to comply with federal water and wastewater regulations, which in turn are leading to increased rates for customers. By encouraging additional resources from private investment to improve and upgrade these communities' water infrastructure, the bill helps alleviate the burdens of costly federal mandates while ensuring reliable water services to communities across the nation.

Specifically, the Sustainable Water Infrastructure Investment Act of 2011 would remove the federally mandated state volume caps on private activity bonds (PABs) for water and wastewater financing. PABs are municipal securities, the proceeds of which are used by private entities to make infrastructure improvements. With a few exceptions, the interest earned on these bonds is excluded from gross income for tax purposes, making them an attractive investment. Congress has already exempted airports, intercity high-speed rail, and solid waste disposal sites from these bond caps. H.R. 1802 would give the same status to water and sewage facilities. By expanding the amount of tax-exempt bonds that can be issued for water infrastructure, this legislation would result in increased private economic investment to upgrade and rebuild aging water infrastructure.

The Sustainable Water Infrastructure Investment Act will help facilitate cost-effective repairs and updates to our water infrastructure. Additionally, increased private investment in our water infrastructure will boost employment opportunities in cities and small communities across America.

It is important to ensure safe water access for all Americans. Passage of H.R. 1802 will encourage necessary private investment to meet our water service challenges in a more affordable manner, improve public health by providing families with reliable access to clean water, and create private-sector jobs for hard-working Americans.

Geoff Davis serves in the U.S. House of Representatives for Kentucky's Fourth District.



NAWC
National Association of Water Companies

www.nawc.org

Value.

It's beautiful when a plan comes together. But what if that plan guaranteed your neighbors could get the same clean water they rely on faster, safer and for less cost. Now that's even better, and something we call value.

We represent water service companies with unbeatable know-how in solving complex water challenges in partnership with municipalities. Officials have praised that experience with innovation, the more efficient design-build-operate (DBO) approach, and the cost-savings that result from having a single entity create and run their public water facilities.

You made the investment. Let it be our job to protect it.

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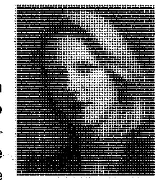
The Keys to the Vault

By Debra Coy

One of the great ironies in the water industry – in addition to the central irony that we generally pay so little for something of such irreplaceable value – is the fact that so many cities are in desperate need of investment in infrastructure while so much money is available, but seemingly just out of reach. We are like blind beggars, still sitting on the same street corner waiting for the same meager handouts, while plentiful food, shelter – and jobs – are being handed out on the next street over.

It does seem to be finally sinking in for the water industry that the meager handouts from Washington are over. The hangover from years of binge government spending will result in a morning after that will last a long time. The efforts to ramp up the State Revolving Funds (SRFs), to get more stimulus money, or to create a trust fund or infrastructure bank that will materially benefit investment in water infrastructure, have all fizzled. They are unlikely to be revived any time soon, despite President Obama's recent brave attempt to jumpstart a new jobs plan that includes an infrastructure bank component. Even if the bank could make it through the toxic swamp that passes for the political process these days, it would likely only be useful for large regional water transmission or storage projects, not the vast array of smaller local projects that need funding.

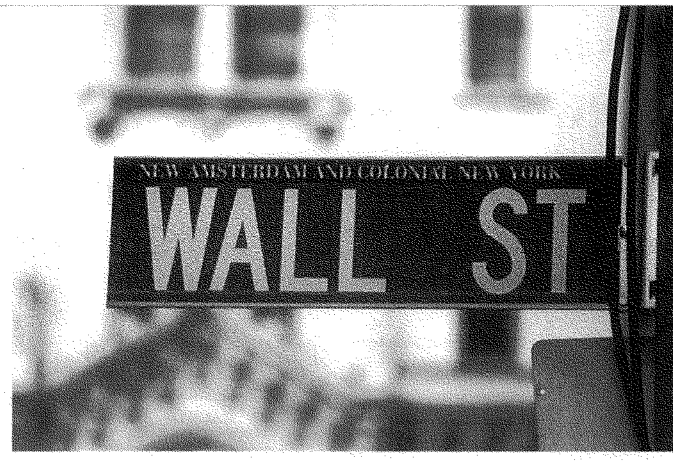
Meanwhile, there are billions of dollars in capital sitting on the sidelines, in the hands of investors who would like nothing better than to put their money into water projects, if only they could figure out how.



In fact, more than $150 billion in capital has been committed to infrastructure via privately managed infrastructure funds over the past five years, with many more billions to follow if enough transactions begin to materialize. Much of this "private equity" is actually public capital – that is, state and local government employee pension funds and university endowments. The California Public Employees Retirement System (CALPERS), for example, voted in September to invest up to $800 million in public and private infrastructure projects in California over the next three years, in addition its overall commitment of $4.5 billion for infrastructure projects across the United States and globally as a way to hedge against inflation. These large institutional investors are reliant on steady, predictable cash flows to meet their payment obligations to members over a long period of time. Amid the turmoil and volatility on Wall Street, they are looking for stability and risk management, rather than high returns.

Water is a particularly attractive asset class for this type of investor. Water rates on average are still relatively low compared to other utilities, giving room for growth over time. The industry is structurally stable, without the competition and volatility experienced in the telecom industry, for example, and assets like water mains and treatment plants have a relatively long life, allowing costs to be spread out over a number of years.

This stability is a key reason why investor-owned water utilities have performed well



during the recent stock market downturn. The largest, American Water Works, has seen its stock price appreciate more than 15 percent year to date, while the S&P 500 index has declined about 5 percent. When these companies issue equity, investors are willing to pay a premium to their asset value, in return for steady dividends and predictable performance over time.

So why aren't investors putting their money to work in municipal water and sewer projects?

There are several reasons, but perhaps the biggest is the reluctance of the industry to leave the zone of comfort – the unwillingness of the beggar to leave the street corner where he's been getting some quarters in his cup. We're used to relying on government subsidies for water, whether through tax-exempt muni bonds or direct grants and loans, and we're not keen to try something new.

Many municipalities fear that the cost of private capital is materially higher than for traditional municipal bonds, which induce investors to accept a lower return by eliminating the tax liability on their investment earnings, though in fact the variance has declined recently. Under pending federal legislation that would remove the cap on private activity bonds, private capital would be put on a level playing field with tax-exempt municipal bonds, removing this disincentive for municipalities to explore public-private partnerships. Partnerships that are incentivized to improve operating efficiencies can also help to reduce costs.

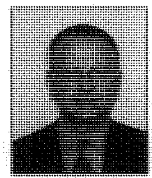
Overall, while it is true that investor capital requires some return – who among us wants to put money in a pension plan or retirement account that won't grow over time? – it is also true that projects can be privately funded without significantly increasing the cost to ratepayers.

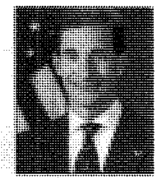
It's time to walk across the street and explore some new alternatives, don't you think?

Debra G. Coy is a principal with Svanda & Coy Consulting, which serves customers in the water sector. She launched her independent consulting practice in 2010 after 20 years covering the water environmental sectors for institutional investors for Wall Street firms, including Janney Montgomery Scott, Schwab Capital Markets and HSBC Securities. She has been recognized as the industry's leading analyst and ran Wall Street's top water conference for more than a decade.

Private Activity for Water Sustainability

By Michael Deane and Ben Grumbles





Everyone has heard a lot about private financing for infrastructure over the past several years from nearly every major news outlet to the President's recent jobs proposal to Congress. Many national and local leaders are looking for the opportunity to infuse public service with private enterprise and tap the financial resources and expertise of the private sector to move public water service forward for our nation's communities. Figures have come out that nearly $180 billion of private capital and infrastructure funds are looking to invest their money in American (or else Chinese) infrastructure projects. The Administration is looking to greatly expand opportunities for public-private partnerships. To this end, most segments of the water industry have rallied around a long-standing proposal to remove the state volume cap on private activity bonds to facilitate private investment and public-private partnerships.

Why is this needed, particularly when water utilities have always been a market darling, most having little difficulty raising money in the capital markets or municipal debt markets? After all, water and wastewater projects usually have a reliable and long-term revenue stream and they rarely default on their debt. We do not have an availability of capital problem; we have a lack of financeable projects due to the unwillingness of entities governing utility rates to establish rates sufficient to attract the needed capital. Year after year we watch as water investments get deferred, denying communities and their residents reliable service and the economic, environmental and public health benefits of sustainable water infrastructure.

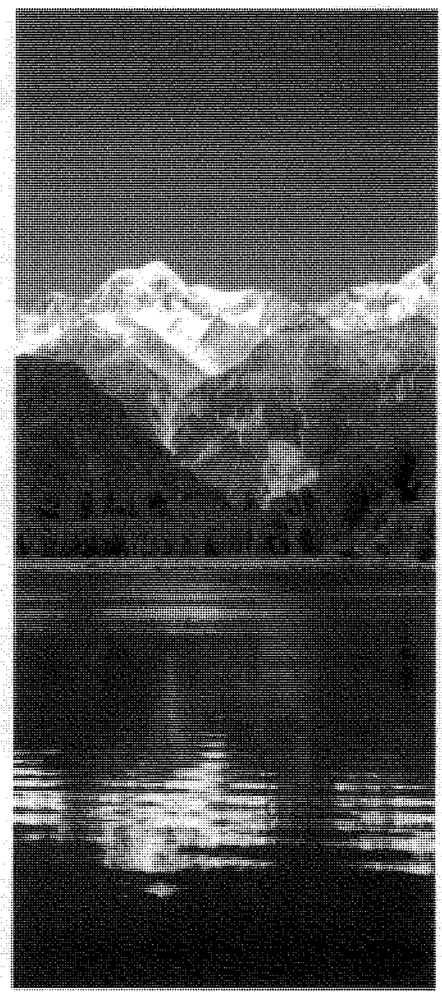
The bi-partisan, bi-cameral proposal currently before Congress that would change the law on tax exempt private activity bond debt has support from nearly 60 water industry groups and leaders and equally as many members of Congress. It could go a long way to solving the access to capital problem that holds up so many water infrastructure projects. All other variables equal, there is a 2 to 3 percent cost of capital difference between private taxable debt and tax-exempt debt that can significantly increase the cost of a project. This small change in legislation could reduce that cost spread and green-light projects that would otherwise remain on the back-burner.

For too many years American communities have suffered from the need to choose between lower-cost, tax-exempt debt or operationally efficient public-private partnerships. Private activity bond reform will enable progressive local officials seeking the best solutions for their utility customers to choose both – a more efficient infrastructure and service delivery along with the tax exemption long available for true public-purpose investments.

This change in legislation could also make an important project delivery method mainstream by putting the "F" in "DBFO." Nearly 2,000 water and wastewater entities in the United States have already seen the value in partnering with the private sector to design, build and operate their public systems. These types of arrangements allow communities to realize greater efficiencies and local leaders to hold the private sector accountable for strict performance measurements. Upon passage of the private activity bond legiuslation, these communities and others could look to their private partner to also bring affordable money to the table, a move that would create an additional level of opportunity to the public sector and facilitate the success of many projects.

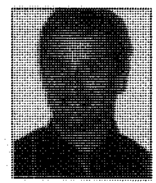
We have long touted this legislation, whether called "Private Activity Bonds" or "Water Enterprise Bonds," as a way to add tools to the toolbox. During these unprecedented financially stressed times, communities need more tools and meaningful choices than ever before. Let's work together to make it happen.

Michael Deane is Executive Director of the National Association of Water Companies and Benjamin H. Grumbles is President of the Clean Water America Alliance.



Public Benefit Through the Private Sector

By Eben M. Wyman



It makes perfect sense when you consider all the factors. Hundreds of billions of dollars needed nationwide to repair and rebuild America's underground water and wastewater infrastructure. National unemployment remains unacceptably high, and unemployment rates in construction have ranged from 13 to 24 percent over the past several years. Talk to construction companies involved in water infrastructure projects and inevitably you'll conclude that unemployment in underground infrastructure construction industries is much higher. Evaluate the potential for job creation and economic impact that comes with these projects and you'll see that investment in water and wastewater infrastructure markets is sound government policy.

However, when you recognize the lack of public dollars available at the federal, state and local levels, you'll see that increased opportunities for robust investment from the private sector must be created. Opening the door for more public-private partnerships for water and wastewater projects through increased use of private activity bonds (PABs) is a simple yet effective and badly needed first step.

Rising Needs, Declining Federal Dollars

The need to invest in America's underground environmental infrastructure is well known and clearly documented. According to the Environmental Protection Agency (EPA) hundreds of billions of dollars will be needed over the next 20 years to address America's wastewater and drinking water infrastructure improvements. At the same time, federal financing for these critical infrastructure projects has been significantly reduced over the past several years.

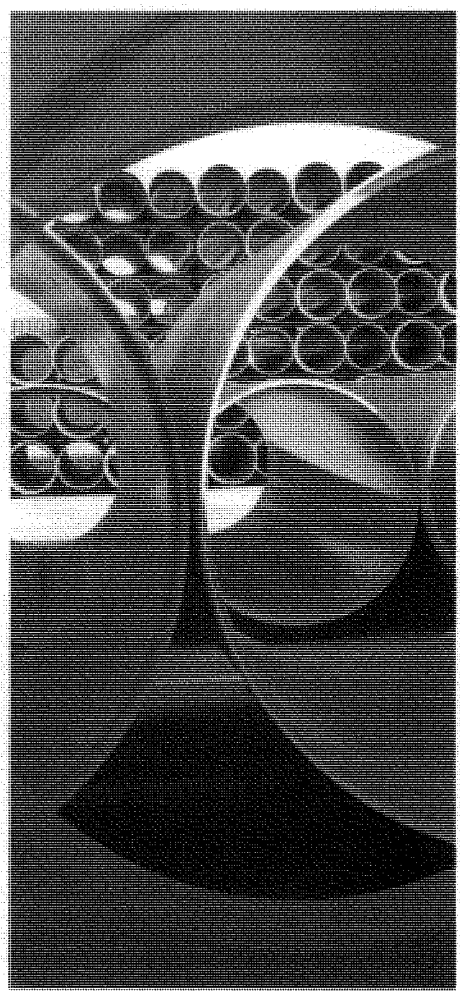
For example, EPA's Clean Water and Drinking Water State Revolving Fund (SRF) programs have been decimated. After absorbing a nearly $1 billion cut in this year's "continuing resolution," the SRF programs are on the chopping block again in Fiscal Year 2012. At a time when financing needs are skyrocketing, construction firms continue to close their doors, the municipal bond market remains in turmoil as public dollars are pared back, innovative financing and significant opportunities for participation from the private sector are needed now more than ever.

Sound Investment Brings Huge Economic Dividends

Investment in water and wastewater infrastructure not only addresses public health and environmental protection concerns, it also creates scores of high-paying jobs, generates significant economic activity and expands the local tax base. In fact, in 2009 the Clean Water Council (CWC) released

Sudden Impact: An Assessment of Short-Term Economic Impacts of Water Wastewater Construction Projects in the United States, which demonstrated the economic benefits that come with these investments. The study found that every $1 billion invested in water and wastewater infrastructure creates up to 27,000 new jobs with average annual earnings of more than $50,000, increases national output (i.e., demand for products and services in other industries) by up to $3.46 billion, and produces more that $1 billion in personal (spending) income. Importantly, a $1 billion investment also generates approximately $82.4 million in state and local tax revenue at a time when states and local communities need it most.

It's also important to note the broad range of jobs that are created when underground environmental infrastructure projects get off the ground. The Sudden Impact study underscored the ripple effect that construction employment offers. In addition to construction jobs, investment in water infrastructure generates measureable employment in 325 standard industry classifications recognized by the US Census Bureau. Scores of jobs are created in industries such as architecture, health care, retail, automotive, res-



taurant, entertainment and accounting, just to name a few.

A Private-Sector Solution

Private activity bonds are a form of tax-exempt financing for state and municipal governments looking to partner with a private entity to "meet a public need," such as construction of a wastewater treatment plant. Use of public-private partnerships makes infrastructure repair and construction more affordable for municipalities. PABs use private capital in lieu of public debt and shift the risk and long-term debt from the municipality to the private partner. The tax-exempt status of the bond provides lower cost financing for investors, which translates to lower costs for local governments and ultimately their customers.

However, federal tax law restricts PABs from reaching their maximum benefit. The Internal Revenue Code limits the amount of PABs that may be issued annually in a state. This "volume cap" is based on the state population – this year the cap was determined by the greater of $95 per resident or $277.82 million. Because water and wastewater projects are "out of sight, out of mind," tax-exempt funding is commonly directed toward more politically attractive projects such as public housing and student loans. As a result, in 2007 only 1.3 percent of all exempt facility bonds were issued to water and wastewater projects.

By lifting the cap on PABs that fund water and wastewater infrastructure projects, it has been estimated that up to $5 billion could be generated in annual private investment. However, no matter how great an idea may be, these days on Capitol Hill the question of "how much does it cost" can obstruct even the best legislative proposals. The last "score" or cost estimate conducted by the Joint Committee on Taxation found that this provision would cost $354 million over the next 10 years. The fact that this "cost" is solely a mild loss of federal tax revenue is significant – the measure doesn't actually "spend" a federal dime.

Legislation to remove water and wastewater infrastructure from under the state volume cap on PABs has broad support both on and off Capitol Hill. The Sustainable Water Infrastructure Investment Act of 2011 (HR 1802 / S 939) is cosponsored by Democrats on the far left as well as strict conservatives on the right. Dozens of business groups also support the legislation, from the Clean Water Council to the U.S. Chamber of Commerce to Operating Engineers and Laborers' unions.

A Model for Future Investment

Just do the math: over the next 10 years the federal government can generate up to $50 billion in private investment in a starving market, put countless Americans back to work in a broad range of industries, and rebuild critical infrastructure by simply getting out of the way. Ceding $354 million in lost tax revenue while acquiring $50 billion in private investment should be more than palatable, especially when considering that a one-year, $5 billion investment will yield $412 million in state and local tax revenue, covering the JCT's 10-year cost estimate.

At a time when all levels of government are scrambling to make ends meet, and policymakers of all stripes are clamoring for more private-sector solutions to job creation, increased use of PABs and other opportunities for public-private partnerships for water infrastructure improvements are needed now more than ever.

Eben Wyman is Vice President of Government Relations for NUCA, representing utility and excavation contractors. NUCA serves as chair of the Clean Water Council (CWC).

CLEAN WATER COUNCIL

America's water and wastewater infrastructure is crumbling. Nationwide financing needs are in the hundreds of billions of dollars while public funding available to repair and rebuild the infrastructure has been virtually cut in half.

Water and wastewater projects create scores of high-paying jobs and generate significant economic activity yet unemployment in the construction industry remains unacceptably high.

Eliminating the state volume cap on private activity bonds that fund water and wastewater projects has the potential to generate $5 billion in annual private investment at very low cost to government and put 130,000 to work in the first year alone!

So, what are we waiting for?

NSSGA

Chaired by the National Utility Contractors Association, the Clean Water Council is a coalition of 39 national organizations representing underground construction contractors, design professionals, manufacturers and suppliers, labor representatives and others committed to ensuring a high quality of life through sound environmental infrastructure.

www.cleanwatercouncil.org

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Working Toward Viable Solutions for the Future

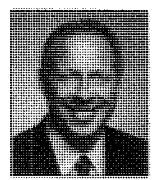
By Walter Lynch

Of all of our needs, water is the single most important. It is a life-essential resource – we need it every day for almost everything we do and there is no substitute. At about a penny a gallon, it's simple to see the true value of water service, but many people don't.

In the United States, water services are often so reliable that many of us do not think twice about what comes out of our faucets or what it's been through to become drinkable. Indeed, for many of us, having access to clean, dependable water is a given, not a luxury. Water is taken for granted and this has led to a real problem with serious consequences.

It's no secret that our nation's deteriorating water and wastewater infrastructure is in critical need of repair, mainly due to the fact that our country has underinvested and has not paid what it really costs to maintain a system of pipes and plants that ensures our health and economic stability.

Many of the systems were built 100 years ago and have reached the end of their functional lifespan. Without renewal or replacement, water pipes in the United States classified as poor, very poor or life-elapsed will increase from 10 percent to 44 percent by 2020. The risks of allowing these systems to lapse are as real as they are alarming. Too often, because many of our water assets are buried beneath the ground, the need to invest in water and wastewater systems is overshadowed by more visible crumbling roads and bridges.



The EPA estimates it will cost upward of $1 trillion over the next 20 years to replace and repair our water and wastewater infrastructures. So who's going to pay this massive bill to replace and repair our water and wastewater infrastructures?

This burden, which would currently fall on the public sector, can be reduced if private-sector investment in water infrastructure is more widely enabled. Some argue this would allow private companies to "own" our water future. Nothing could be further from the truth. Water is a public resource, regulated by federal and state governments. In the face of the enormous strains on local government budgets, we need to enable private-sector investment to help treat and deliver water to consumers.

According to the U.S. Conference of Mayors, local governments spent $93 billion in 2008 on water and wastewater systems. However, there is a critical backlog in replacing old and failing infrastructure across the United States and regardless of the fact that billions of dollars are spent annually on rehabilitating infrastructure, hundreds of billions more are required to prevent infrastructure failures and provide high-quality reliable water service in the future.

Adding to this challenge is the fact that no utility sector is more capital intensive than the water industry. With water-related services nearly twice as capital intensive as electricity and three times as capital intensive as gas, many communities face significant challenges to upgrade their systems, many of which are decades to a century old.

So what can be done to address this? The Sustainable Water Infrastructure Investment Act (SWIIA) of 2011 would remove water and wastewater from the limitations (or caps) that have been placed on private investment through the use of private activity bonds, which provide low-cost financing for water and wastewater projects. Caps placed on private activity bonds in 1986 have never been updated, and the lifting of water projects from state volume caps, as SWIIA calls for, would enable local governments to tap into billions of dollars of much-needed private sector capital.

This will not only address the nation's deteriorating water and wastewater infrastructure, it will also generate thousands of jobs and help stimulate the economy. According to the U.S. Conference of Mayors, $6 billion in infrastructure investment would yield 244,000 jobs annually, and every dollar invested in water infrastructure adds $6.35 to the national economy.

The SWIIA passed the House twice, but failed to reach the Senate floor for a vote in 2010. It was re-introduced as a bipartisan, bicameral act in the 112th Congress by U.S. Representatives Bill Pascrell Jr. (D-N.J.) and Geoff Davis (R-Ky.) and Senators Robert Menendez (D-N.J.) and Mike Crapo (R-Idaho). We are hopeful that the collaborative origins of the bill, as well as the economic benefits it brings to the nation's economy, will assist in its passage.

American Water supports various types of funding to help improve the nation's water and wastewater infrastructure. We are glad to see that funding for infrastructure is on the agenda in Washington, and that the President's proposed America Infrastructure Financing Act, which is based on the Infrastructure Bank that was initially proposed last year by Senators John Kerry (D-Mass.) and Kay Bailey Hutchinson (R-Texas), includes water projects as well as wastewater projects.

It will require a strong commitment now for quality water to be ready at the tap in the future, and for wastewater to be handled in a way that minimizes the "waste" aspect and protects public safety and the environment. The Sustainable Water Infrastructure Investment Act is an important first step for everyone to work together to create viable solutions for the future.

Walter Lynch is president and chief operating officer of regulated operations for American Water, the nation's largest publicly traded water and wastewater utility company serving 15 million people in more than 30 states and parts of Canada.

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Global Demand for Infrastructure and Water

The world faces significant challenges in the coming decades as a result of global trends that include feeding a growing and more affluent population, and developing the infrastructure required to support massive urbanization. World population is expected to climb from nearly 7 billion today to more than 9 billion by 2050. Put another way, we will have at least 30 percent more people to feed, shelter and clothe in the next 40 years without significant additional land, water and other inputs. In order to provide enough food, fiber and fuel to support this growth, agricultural output must double – and do so in a sustainable manner.

Population growth and an increase in global affluence are fueling a migration from rural to urban areas. Perhaps we passed the tipping point in 2007 when, for the first time in human history, more than 50 percent of the world's people lived in urban areas. That figure is expected to reach 70 percent by 2050, when nearly as many people could be residing in cities as live on the entire planet today. Urbanization creates significant demand for new infrastructure.

Access to freshwater and the related infrastructure are essential to support a growing world. Proper management of water resources is essential to closing the agricultural productivity gap and to establishing the conditions for humankind flourishing worldwide. However, water scarcity affects one in three people on every continent of the globe. While agriculture is the largest user of freshwater today, industrial, municipal and environmental uses are increasingly competing for this limited resource. All signs point toward increased competition for freshwater in the future.

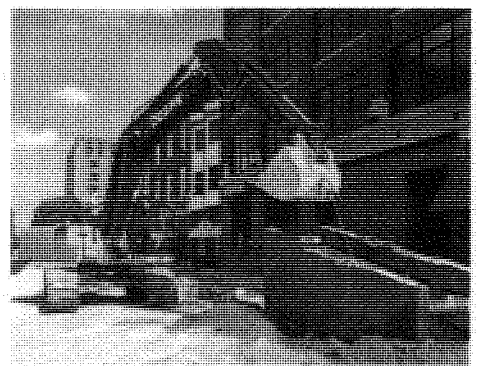
John Deere is strongly and uniquely positioned to help our customers meet global needs for increased agricultural output and new infrastructure by providing premier equipment solutions and related services in agricultural mechanization, agricultural irrigation, construction and forestry. We believe John Deere has an opportunity, and an obligation, to help the world grow in sustainable ways.

United States Water Infrastructure

In the early days of our nation, John Deere's steel plow paved the way for the settlement and the eventual development of much of the United States. Fast forward to today, and we must consider the major challenges we face in nearly every state, county and municipality in the United States. It is one of the most important, often overlooked, support systems for our way of life – water infrastructure. Drinking water, wastewater and stormwater systems ensure our public health, safety and economic livelihood. We have over 2 million miles of pipe in the United States. However, much of our nation's water infrastructure was built generations ago. These systems were not designed and built for such a long service life or to support such a large and prosperous country. Experts agree that many of these old and fragile systems are operating on borrowed time.

A safe, reliable water infrastructure requires maintenance, rehabilitation and – when necessary – replacement. These projects require billions of dollars in investment. Not only are such investments critical in order to provide clean drinking water to our nation's residents, but keeping water flowing to business and industry is essential to the economic viability of our country and its competitiveness.

Much of our current water infrastructure has reached the end of its useful life. Experts estimate that it costs approximately three times as much to replace a water system once it has failed. That is why it is important to invest in our water infrastructure now, before more



systems fail. Unfortunately, projected expenses to maintain and upgrade existing facilities far outpace expected revenues. Many water infrastructure projects were initially constructed and funded using federal grant money which is no longer available

Remove Barriers to Investment in Water Infrastructure

With so many competing demands for federal infrastructure dollars, it is clear that opening doors to additional revenue sources to help rebuild our water infrastructure is sorely needed. As an equipment manufacturer, John Deere has seen financial uncertainty caused by a lack of investment in infrastructure lead to a hesitancy or unwillingness by construction contractors to invest in new construction equipment. Our customers want to know their major capital investments will not be sitting idle while they wait for government to act.

Important legislation has been introduced in the U.S. House and Senate to lift the state volume cap on private activity bonds for water and wastewater infrastructure projects. This legislation has the potential to generate billions in private capital for the infrastructure market at a very low cost to government. This action is a positive step toward rebuilding our broken infrastructure.

Water infrastructure investments create long-term job opportunities for John Deere customers involved in construction and utility work, and the independently owned dealerships which sell and service their equipment throughout the country. Investments in water infrastructure will result in additional demand for John Deere products, strengthening our U.S. manufacturing operations and workforce and providing additional work for our suppliers. The positive impact on job creation in all facets of our industry cannot be overstated.

John Deere is proud to be a trusted partner and to provide the equipment necessary to rebuild our nation's infrastructure. New technologies and equipment are available, with workers standing ready to help build our nation's water systems for the next generation. With unemployment in the construction industry still hovering around 13 percent, clearing the way for new and upgraded water infrastructure projects would assist in putting more than 1.1 million unemployed construction workers back on the job. We are committed to partner with other leaders throughout America in asking Congress to protect our way of life by investing in water infrastructure and removing barriers to additional investments in these critical water systems.

Deere & Company is a world leader in providing advanced products and services and is committed to the success of customers whose work is linked to the land - those who cultivate, harvest, transform, enrich and build upon the land to meet the world's dramatically increasing need for food, fuel, shelter and infrastructure. Since 1837, John Deere has delivered innovative products of superior quality built on a tradition of integrity.

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The Sustainable Water Infrastructure Investment Act:
Improving Our Nation's Underground Infrastructure

By Toby Mack

Our nation's water infrastructure is in desperate need of a major upgrade. A system of outdated pipes delivers water to our homes and businesses. Given the age of our water infrastructure network, it is no surprise that pipes break every day across our country, resulting in traffic delays, boil water alerts, environmental damage, lost productivity, and even fatalities.

The astonishing part is that we willfully continue to neglect one of our nation's greatest resources — clean water. Unfortunately, in the current budget situation, all federal programs, including water infrastructure investments, are on the chopping block. Consequently, we must look to innovative financing mechanisms to ensure that water infrastructure projects continue.

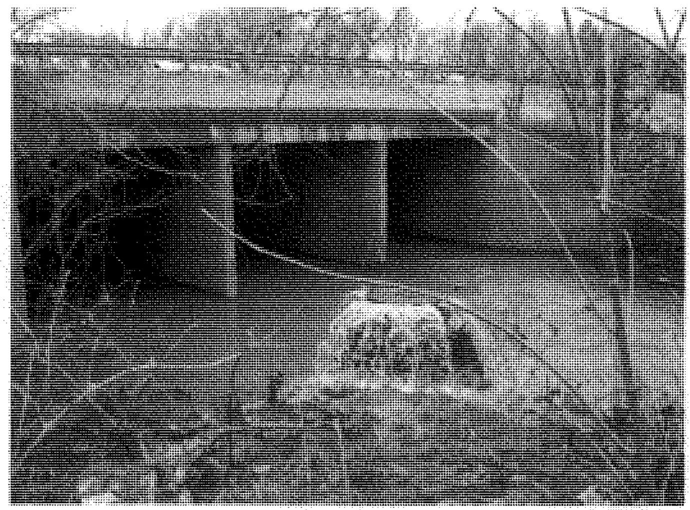
Reps. Geoff Davis (R-Ky.) and Bill Pascrell (D-N.J.) and Sens. Robert Menendez (D-N.J.) and Mike Crapo (R-Idaho) have introduced bipartisan legislation that leverages private-sector investment to put people back to work, create economic growth and rebuild our deteriorating water systems.

The Sustainable Water Infrastructure Investment Act (H.R. 1802, S. 939) would remove the state volume cap on private activity bonds (PABs) -- or exempt facility bonds -- that fund water and wastewater infrastructure projects. Removing the PAB volume cap will increase private investment in water infrastructure to address years of underfunding. According to estimates, the legislation could generate as much as $5 billion annually in incremental private capital for water infrastructure projects with a nominal cost to the federal government.

The broad reach of water infrastructure investment cannot be overstated. A 2008 Associated Equipment Distributors (AED)-National Utility Contractors Association (NUCA) study found that on average, at least 12 percent of a water utility project bid is attributable to the purchase, rental, leasing and dealer repair of construction equipment. AED estimates that the Sustainable Water Infrastructure Investment Act will provide equipment distributors $600 million annually in market opportunity — a significant boost to an industry that has struggled to recover from the recession.

The bang for your buck from water infrastructure investment goes beyond the construction sector. In fact, according to a recent study by the Clean Water Council, of which AED is a member, a $1 billion national investment supports 20,000 to 26,669 jobs. These opportunities are spread across the economy with nearly half the jobs in industries other than water and wastewater construction, demonstrating the broad reach of water infrastructure investment.

Water infrastructure investment is not just about job creation and economic



growth. There are clear needs across the country. The American Society of Civil Engineers gave the nation's drinking water and wastewater infrastructure a "D-minus," the lowest grade of any national infrastructure category.

Last year, the Environmental Protection Agency (EPA) released The Clean Watersheds Needs Survey 2008 (CWNS), documenting a $43.4 billion (17 percent) increase in needs over the 2004 CWNS report. The EPA estimates that as of Jan. 1, 2008, nationwide capital investment needs for wastewater pollution control are $298.1 billion. The figure includes $192.2 billion for publicly owned wastewater pipes and treatment facilities, $63.6 billion for combined sewer overflow corrections, and $42.3 billion for stormwater management.

Our wastewater needs are in addition to the $334.8 billion investment EPA estimates is necessary to repair and rebuild our nation's drinking water infrastructure in the most recent Drinking Water Infrastructure Needs Survey and Assessment released in 2009.

Not only will investing in water infrastructure help the nation's economic recovery and reverse stubborn unemployment in the construction industry, it will also improve the health, quality of life and environment for all Americans. Consequently, AED has made the Sustainable Water Infrastructure Investment Act one of our top legislative priorities for the 112th Congress.

With the plight of the nation's water infrastructure network growing bleaker every day, we must invest now to prevent further deterioration of our pipe and sewer systems. AED looks forward to working with industry groups, lawmakers and all interested parties to enact this important legislation.

Toby Mack is President & CEO of the Associated Equipment Distributors.

Raising the Grades on America's Water Systems

By Andrew W. Herrmann

The American Society of Civil Engineers' 2009 Report Card for America's Infrastructure gave the nation's wastewater and drinking-water systems identical grades of D–, marking them as systems in disrepair.

Aging systems discharge billions of gallons of untreated wastewater into U.S. surface waters each year. The U.S. Environmental Protection Agency estimates that the nation must invest $390 billion over the next 20 years to update or replace existing systems and build new ones to meet increasing demand.

In the 2009 Report Card, ASCE estimated that the physical condition of many of the nation's 30,000 wastewater treatment and collection facilities was poor due to a lack of investment in plants, equipment and other capital improvements over the years, while federal funding under the Clean Water Act State Revolving Loan Fund (SRF) program had remained flat for more than a decade. Federal assistance has not kept pace with the needs, yet virtually every authority agrees that funding needs remain very high, a condition that has not improved in the last two years.

The EPA "Clean Water Needs Survey" for 2008 put the total wastewater and stormwater management needs for the nation at $298 billion as of Jan. 1, 2008. This amount includes $192 billion for wastewater treatment plants, pipe repairs, and buying and installing new pipes; $63.6 billion for combined sewer overflow correction; and $42.3 billion for stormwater management. Small communities have documented needs of $22.7 billion.

In addition to the $298 billion in wastewater and stormwater needs, the report documented needs of $22.8 billion for nonpoint source pollution prevention and $23.9 billion for decentralized wastewater (septic) systems. An estimated $334 billion and $81.5 billion in needs are potentially eligible for assistance from EPA, according to the agency.

America's drinking-water systems do not fare any better. Drinking water systems across the country face an annual shortfall of at least $11 billion to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations. This does not account for growth in the demand for drinking-water over the next 20 years.

Leaking pipes lose an estimated seven billion gallons of clean drinking-water a day. Although Americans still enjoy some of the best tap water in the world, the costs of treating and delivering that water where it is needed continue to outpace the funds available to sustain the system.

Federal funds contributed to the drinking water and wastewater revolving funds have ensured efficient system-wide planning and continuing management of sustainable water infrastructure since 1987. With the nation facing a $400 billion to $500 billion investment gap in its wastewater and drinking water infrastructure over the next 20 years, now is not the time to cut federal investments in public health.

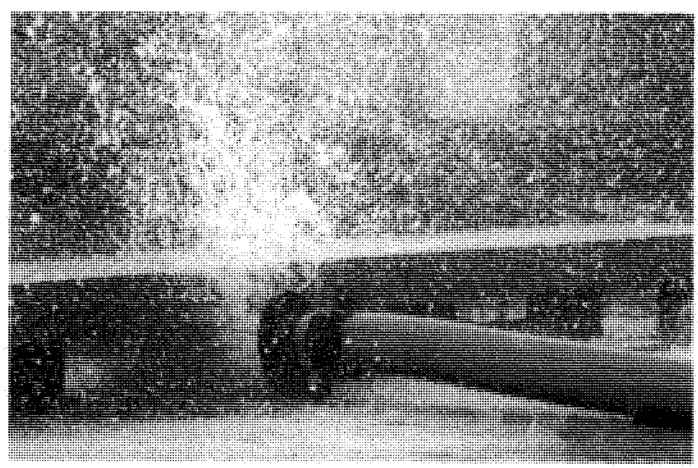
To begin with, Congress needs to reinvigorate the state revolving fund programs for wastewater and drinking water. Lawmakers need to provide authority for EPA to spend at least $20 billion in new federal investments for wastewater and $15 billion for drinking water infrastructure over a five-year period.

Another promising source of financing over the long term are private activity bonds. The Internal Revenue Code states that qualified private activity bonds are tax-exempt bonds issued by a state or local government, the proceeds of which are used for a defined qualified purpose by an entity other than the government issuing the bonds. For a private activity bond to be tax exempt, 95 percent or more of the net bond proceeds must be used for one of the several qualified purposes. But the IRC places a cap on these bonds on a state-by-state basis. Drinking water and wastewater infrastructure are a "qualified purpose," but the federal cap limits the use of these bonds.

In 2008, EPA estimated that lifting the cap on private activity bonds for wastewater and drinking water systems could raise an estimated $5 billion annually for these critical infrastructure systems. These bonds would complement local efforts to move toward full-cost pricing for wastewater and drinking water services and thereby help localities become self-financing, which would reduce the need for future federal expenditures. Congress should pass pending legislation (H.R. 1802/S. 939) to remove the state cap on private activity bonds for drinking water and wastewater systems.

The case for increased federal investment is compelling. Clean and safe water should be a national priority, and if we fail to meet the investment needs of the next 20 years, we risk reversing the public health, environmental and economic gains of the past three decades.

Andrew W. Herrmann is a Principal of Hardesty & Hanover LLP, a transportation consulting engineering firm founded in 1887 and headquartered in New York City, and is President-Elect of the American Society of Civil Engineers (ASCE).



Harnessing Private Investment for Infrastructure

Congress should enact the Sustainable Water Infrastructure Investment Act (S. 939/H.R. 1802) and remove the state volume cap on the amount of private activity bonds that can be issued by state and local governments to finance public purpose water and wastewater facilities. The bill would cost the federal government an estimated $354 million in lost revenue to the Treasury, but unleash an estimated $50 billion in private capital to support public projects over 10 years.

The bill will help to address the $500 billion that will be necessary to replace and improve safe drinking water and wastewater treatment facilities over the next 20 years. It is the first step toward harnessing private investment to address crumbling infrastructure and empowering state and local governments to meet the needs of expanding populations.

Fiscal restraints have caused federal spending on water infrastructure to retract in the last decade, with the need amounting to billions of dollars, while funding has declined to the millions. In the fiscal year 2012 funding bill, the House has proposed reducing the Clean Water State Revolving Fund to $689 million and the Drinking Water State Revolving Fund to $829 million, which would fund these accounts at fiscal year 2008 spending levels. Even as the legislature proposes reducing the funding available to state and local governments, the need continues to grow – the EPA's 2008 Needs Assessment was $298.1 billion for wastewater projects and the 2007 estimate for drinking water was $334.8 billion.

Legislators need to consider a new approach to water infrastructure projects that will make funding less dependent on traditional grant programs and relieve the burden on local communities who are in urgent need of providing safe, clean drinking water to their residents.

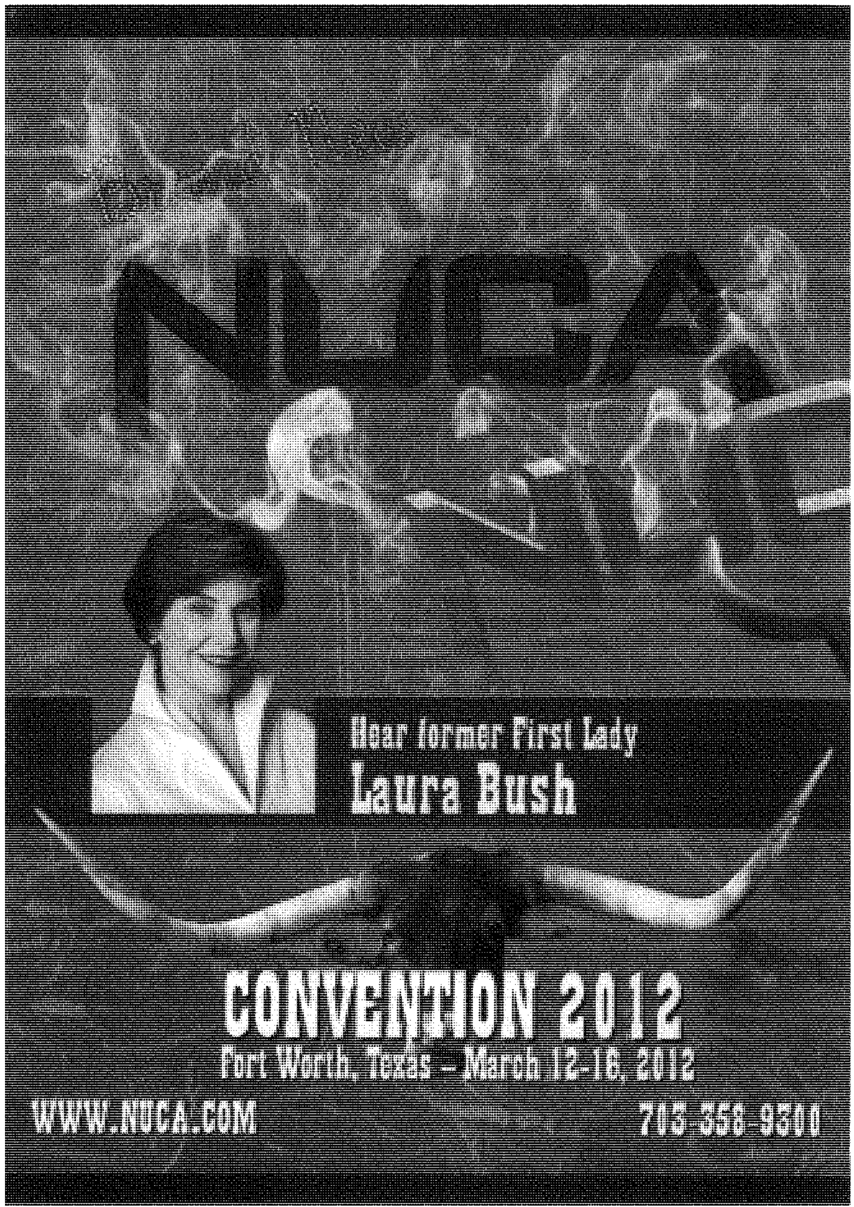
The Sustainable Water Infrastructure Investment Act was introduced in the House by Reps. Bill Pascrell (D-N.J.) and Geoff Davis (R-Ky.), and in the Senate by Sens. Robert Menedez (D-N.J.) and Mike Crapo (R-Idaho). The legislation has gained considerable support within the political spectrum, including Reps. Ron Paul (R-Texas), who favors small government, and Earl Blumenauer (D-Ore.), who is a proponent of establishing a trust. Both the U.S. Chamber of Commerce and the U.S. Conference of Mayors have endorsed the bill because of the potential benefits of private investment in water infrastructure, which is estimated to contribute $3.46 billion to total national output, $82.4 million in state and local tax revenue, and 28,500 new construction jobs for every $1 billion invested.

United Rentals, a leader in the construction equipment rental industry, understands the importance of the Sustainable Water Infrastructure Investment Act. While the equipment rental industry is growing this year despite the still-struggling U.S. economy, it hasn't been easy. Construction customers, one of United Rentals' primary end markets, are still seeing projects stalled or postponed for lack of funding. Construction is considered to be the backbone of America, and yet unemployment in the construction industry has been consistently above the national average, with 13.2 percent unemployed in August 2011, while the national average for unemployment overall was 9.1 percent.

Continued growth in the construction equipment rental industry, and a return to growth in construction, is dependent in part on sustainable funding for infrastructure projects, including water.

Providing disciplined, private investment, as outlined under the bill, will help stabilize funding for water projects, allow local and state governments to repair struggling systems, plan for and expand infrastructure, and hire more than a million new workers.

Founded in 1997, United Rentals Inc. is the largest equipment rental company in the world, with an integrated network of more than 550 rental locations in 48 states and 10 Canadian provinces. Its diverse customer base includes construction and industrial companies, utilities, municipalities and homeowners.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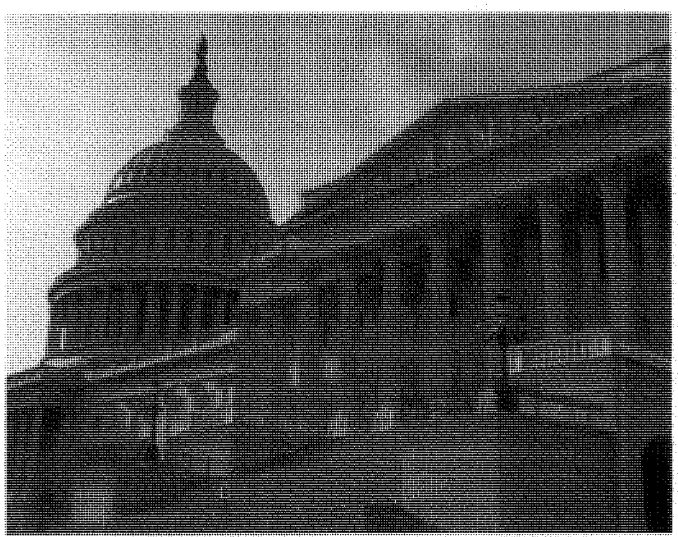


The Sustainable Water Infrastructure Investment Act of 2011, introduced in the House as H.R. 1802 and in the Senate as S. 939, has broad support among Democrats and Republicans. The measure would remove the state cap on private activity bonds for water and wastewater infrastructure, therefore opening the door for an added revenue stream. The following list shows the Congressmen and Senators who have signed on as supporters of this legislation.

H.R. 1802

SPONSOR

Rep. Pascrell, Bill, Jr. [NJ-8]
(Introduced 5/10/2011)

COSPONSORS (48)

(As of 9/30/2011)

Rep. Berkley, Shelley [NV-1]
Rep. Blumenauer, Earl [OR-3]
Rep. Brown, Corrine [FL-3]
Rep. Carson, Andre [IN-7]
Rep. Castor, Kathy [FL-11]
Rep. Cicilline, David N. [RI-1]
Rep. Coble, Howard [NC-6]
Rep. Connolly, Gerald E. "Gerry" [VA-11]
Rep. Costello, Jerry F. [IL-12]
Rep. Critz, Mark S. [PA-12]
Rep. Davis, Geoff [KY-4]
Rep. DeFazio, Peter A. [OR-4]
Rep. Duncan, John J., Jr. [TN-2]
Rep. Filner, Bob [CA-51]
Rep. Garamendi, John [CA-10]
Rep. Gerlach, Jim [PA-6]
Rep. Hanna, Richard L. [NY-24]
Rep. Hastings, Alcee L. [FL-23]
Rep. Higgins, Brian [NY-27]
Rep. Holden, Tim [PA-17]
Rep. Johnson, Eddie Bernice [TX-30]
Rep. Kildee, Dale E. [MI-5]
Rep. Langevin, James R. [RI-2]
Rep. Larsen, Rick [WA-2]
Rep. Larson, John B. [CT-1]
Rep. Lewis, John [GA-5]
Rep. LoBiondo, Frank A. [NJ-2]
Rep. McDermott, Jim [WA-7]
Rep. Meehan, Patrick [PA-7]
Rep. Meeks, Gregory W. [NY-6]
Rep. Moran, James P. [VA-8]
Rep. Napolitano, Grace F. [CA-38]
Rep. Neal, Richard E. [MA-2]
Rep. Paul, Ron [TX-14]
Rep. Rahall, Nick J., II [WV-3]
Rep. Rangel, Charles B. [NY-15]
Rep. Ross, Dennis [FL-12]
Rep. Ross, Mike [AR-4]
Rep. Rothman, Steven R. [NJ-9]
Rep. Ryan, Tim [OH-17]
Rep. Schwartz, Allyson Y. [PA-13]
Rep. Shuster, Bill [PA-9]
Rep. Sires, Albio [NJ-13]
Rep. Sutton, Betty [OH-13]
Rep. Tonko, Paul [NY-21]
Rep. Turner, Michael R. [OH-3]
Rep. Welch, Peter [VT]
Rep. West, Allen B. [FL-22]

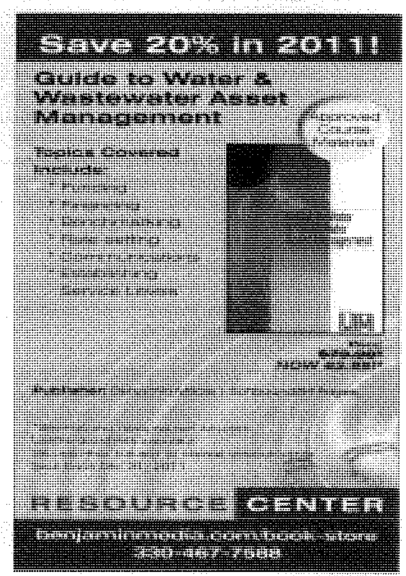
S. 939

SPONSOR

Sen. Menendez, Robert [NJ]
(Introduced 5/10/2011)

COSPONSORS (3)

Sen. Crapo, Mike [ID]
Sen. Whitehouse, Sheldon [RI]
Sen. Wicker, Roger F. [MS]



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Question and Answer:
Rep. Bill Pascrell

Bill Pascrell Jr., the New Jersey congressional representative for New Jersey's Eighth District, sat down with Benjamin Media President and Publisher Bernie Krzys at the National Utility Contractor Association's Washington Summit in May to answer questions about the Sustainable Water Infrastructure Investment Act. Pascrell introduced the legislation in the House along with Rep. Geoff Davis of Kentucky.

Below is a transcription of that interview:

Krzys: Tell us about HR-1802, which is a resolution involving exempt facility bonds.

Pascrell: Geoff Davis (Ky.) is a co-sponsor with me. I'm the Democrat and he's the Republican. And we have similar legislation in the Senate (S. 939), which I asked Bob Menendez (D-N.J.) to take and Sen. Mike Crapo (R-Idaho) as well. So we have bi-partisan support in each of the houses for this infrastructure legislation, which I think is going to be beneficial.

Krzys: It strikes me that this is such a no-brainer. But a lot of things in Washington seem to be no-brainers until you try to start to get them passed.

Pascrell: Well we've passed this twice in the 110th Congress. And the Senate tried to fit it in with one of its tax bills, and it never quite got there. We've been trying to work on this for 10 years, and it's had bipartisan support every time. I think this is a great way for us to fix our water infrastructure, our sewer infrastructure — which is falling apart. The government itself estimates that there's about $500 billion worth of work that has to be done. On this particular infrastructure legislation which provides for private bonds, the bonding can exceed the caps so that we can have this private bonding. When you consider that we're losing about 25 percent of our treated water because of the repairs that need to be done, that's pretty incredible. People talk about waste throughout the federal government, this is waste throughout the United States. If we don't correct that situation — and it's not getting any better — then it's going to cost more money. Every billion dollars that is invested into the water infrastructure system of this country creates over 28,000 jobs. I think that's a pretty remarkable figure. These private bonds are tools that we should be using. This will bring $50 billion, we've calculated, in private investment. So it's certainly a drop in the bucket in terms of what we need of $500 billion, but it's a pathway to that goal.

Krzys: In this particular economic situation that we're in right now, this is going to create so many jobs through the construction market when there is now almost 20 percent unemployment in construction.

Pascrell: You're talking about over 1.5 million jobs. That's a lot of jobs. You have to get the construction folks back to work. They'll be working on meaningful projects. We're losing all of this wonderful resource: clean water. So this is a double-win.

Krzys: When you dig up pipes that have been in the ground, it's amazing what you see.

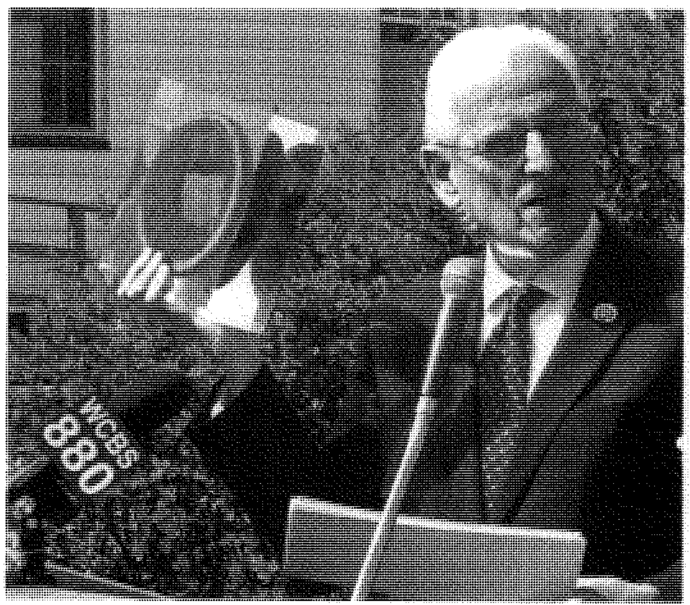
Pascrell: When you start digging, then you find other problems. Or you create other problems. So we have to try and get a handle on this. We don't have a handle on it now. So I hope the legislation moves this year.

Krzys: How did you feel about getting this passed through Congress this year?

Pascrell: I felt enthusiastic and optimistic about it every year. There needs to be more cooperation on the Senate-side. I think we're at that point. I think Sen. Menendez, once he puts his hands around something he'll tend to run with it, and same with Sen. Crapo. So I'm very optimistic, I don't think falsely so. I think it's real.

Krzys: There seems to be more public interest in water than ever. There even seems to be more willingness to consider rate increases, which is surprising.

Pascrell: We have to continue to respond to the problems that exist in the system that provide clean water for our sons and daughters and our grandkids, then we have to take care of it. It doesn't heal itself.



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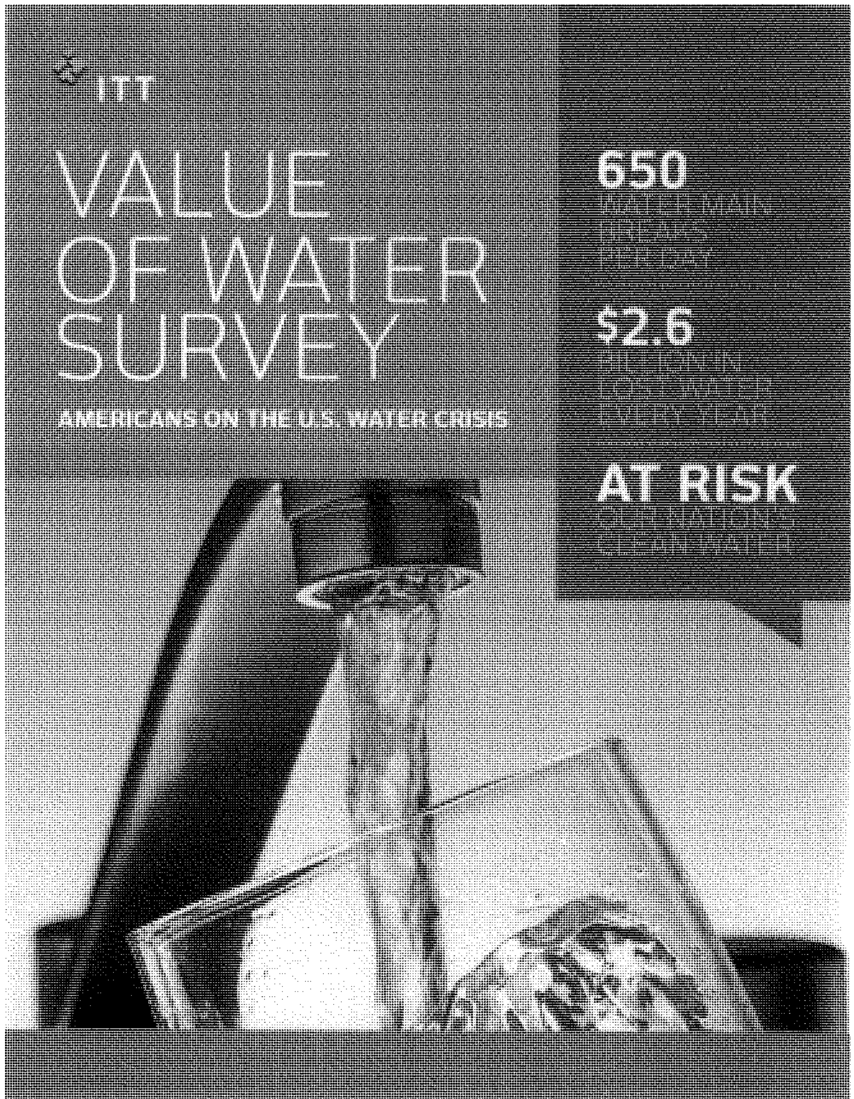
CLEAN WATER COUNCIL

JOHN DEERE

NAWC National Association of Water Companies

NUCA REPRESENTING UTILITY & EXCAVATION CONTRACTORS


ITT
VALUE OF WATER SURVEY
AMERICANS ON THE U.S. WATER CRISIS
650
WATER MAIN BREAKS PER DAY
$2.6
BILLION IN LOST WATER EVERY YEAR
AT RISK
OUR NATION'S CLEAN WATER

BACKGROUND

Water has for too long been absent from the national debate on infrastructure. Hidden underground, the deterioration of our nation's water pipes and treatment systems has become an unseen crisis. In an era of water scarcity and tight budgets, we can no longer afford to lose nearly two trillion gallons of clean water, at an annual cost of $2.6 billion, to broken and leaking pipes every year.

Americans agree.

ITT's nationwide survey on the value of water details what Americans think should be done about this crisis—and who should pay for it.

EXECUTIVE SUMMARY

95% of American voters value water over any other service they receive, including heat and electricity

Our nation's industrial and agricultural businesses—among the heaviest water users—rank it second, after only electricity

About three out of four American voters and businesses* say disruptions in the water system would have direct and personal consequences

Too many take clean water for granted: 69% of voters, 72% of businesses*

When asked, U.S. voters and businesses* do express concern about our nation's water.

- Nearly one in four American voters is "very concerned" about the state of the nation's water infrastructure
- 29% percent of voters agree that water pipes and systems in America are crumbling and approaching a state of crisis
- 80% of voters say water infrastructure needs reform; about 40% say major reform

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

EXECUTIVE SUMMARY

People understand that fixing our nation's water infrastructure problems is a shared responsibility:

- 85% of voters, 83% of businesses* agree federal, state and local governments should invest money in upgrading our water pipes and systems
- 79% of voters, 75% of businesses* agree and think government officials need to spend more time addressing water issues
- Both citizens and businesses* understand and accept responsibility
- 63% of American voters, and 57% of businesses* say they are willing to pay a little more each month to upgrade our water system

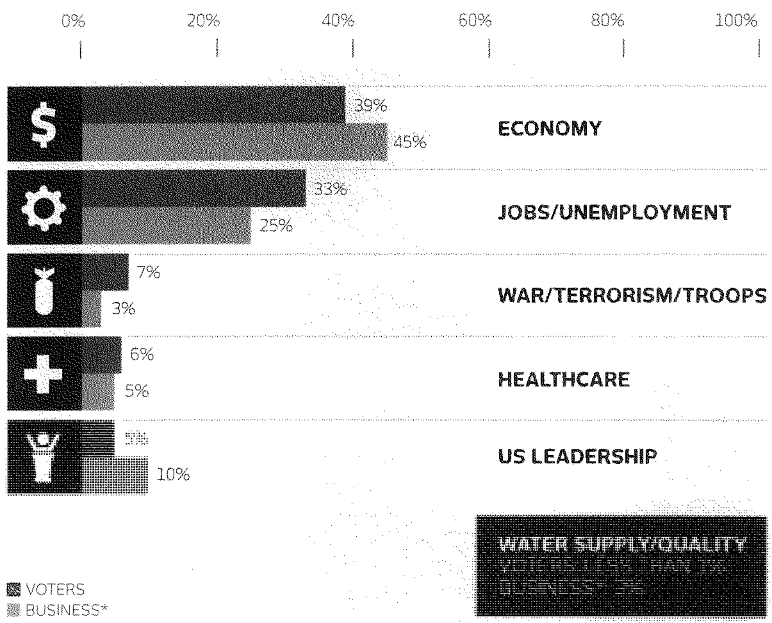
People everywhere are willing to pay more, regardless of region, residence, gender, age or political affiliation

- Voters are willing to pay on average $6.20 more per month
- If we took them up on their offer, the United States could invest about $5.4 billion more per year in our nation's water infrastructure**
- This is more than four times the FY09 federal investment in our nation's drinking water systems

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY
**BASED ON 2010 CENSUS U.S. BUREAU PROJECTIONS: 114,200,000 U.S. HOUSEHOLDS

TABLE OF CONTENTS

ECONOMY AND JOBS TOP AMERICANS' CONCERNS



DON'T KNOW
VOTERS: 4%
BUSINESS*: 2%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q8: In your opinion, what is the most important issue facing the United States today? (Coding of open-ended responses) / Base–Voters: 1,003; Business*: 502

BUT INFRASTRUCTURE ISSUES NEED TO BE ADDRESSED AT THE SAME TIME AS OTHER PROBLEMS

47% VOTERS

55% BUSINESS*

The state of our nation's infrastructure is a serious problem that needs to be addressed immediately and prioritized with other important issues such as the economy and the war in Afghanistan

48% VOTERS

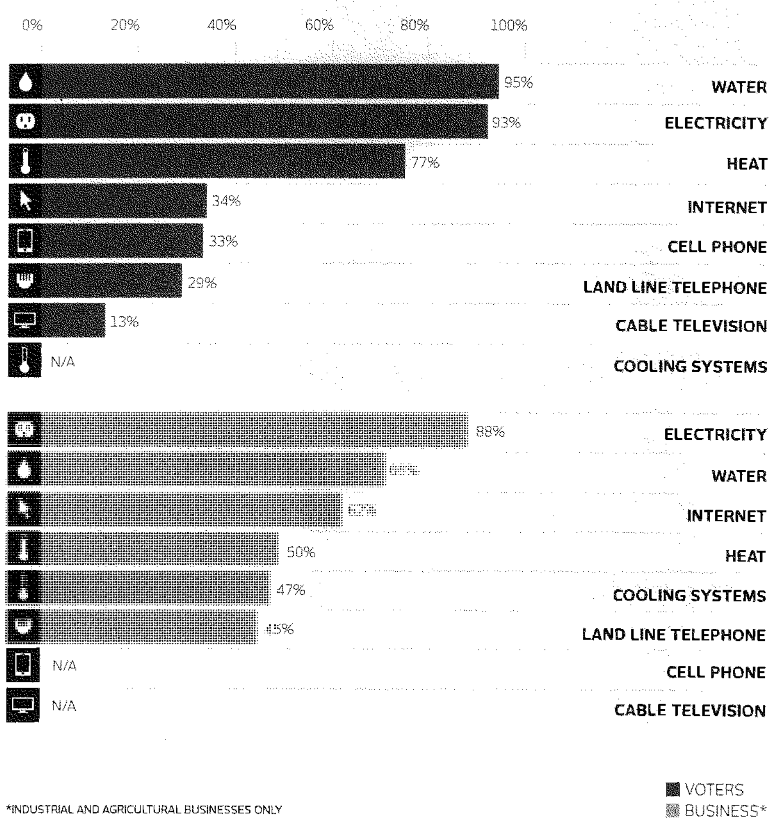
41% BUSINESS*

Our nation is facing too many challenges right now such as the economy, the war in Afghanistan and health care, and we really need to be focusing on those issues and not get distracted with less important things such as our nation's infrastructure

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q9A: Which statement comes closer to your view? / Base–Voters: 577; Business*: 502

VOTERS VALUE WATER MORE THAN ANY OTHER SERVICE; BUSINESSES* RANK IT SECOND

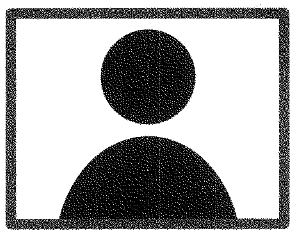


*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q10–17: How important is this service to you personally/your company? / Base–Voters: 1,003; Business*: 502

...AND BELIEVE WASTE DRIVES U.S. WATER SHORTAGES

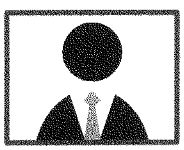
PEOPLE ARE WASTING TOO MUCH WATER



VOTERS
59%

BUSINESS*
57%

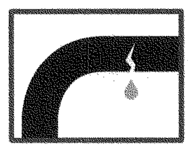
BUSINESSES* ARE USING/WASTING TOO MUCH WATER



VOTERS
31%

BUSINESS*
29%

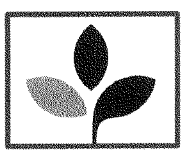
OUR PIPES ARE OLD AND LEAKING TOO MUCH WATER



VOTERS
23%

BUSINESS*
28%

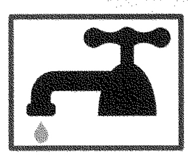
AGRICULTURE IS USING/WASTING TOO MUCH WATER



VOTERS:
21%

BUSINESS*
18%

U.S. JUST DOESN'T HAVE ENOUGH WATER



VOTERS:
14%

BUSINESS*
17%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q51. Why do you think so many states could be facing water shortages? / Base–Voters: 1,003; Business*: 502

BUT THEY STILL TAKE CLEAN WATER FOR GRANTED

"I generally take my access to clean water for granted."

69% OF VOTERS AGREE

72% OF BUSINESSES* AGREE

"I don't really worry about the water that comes out of the tap because it is generally clean and unpolluted."

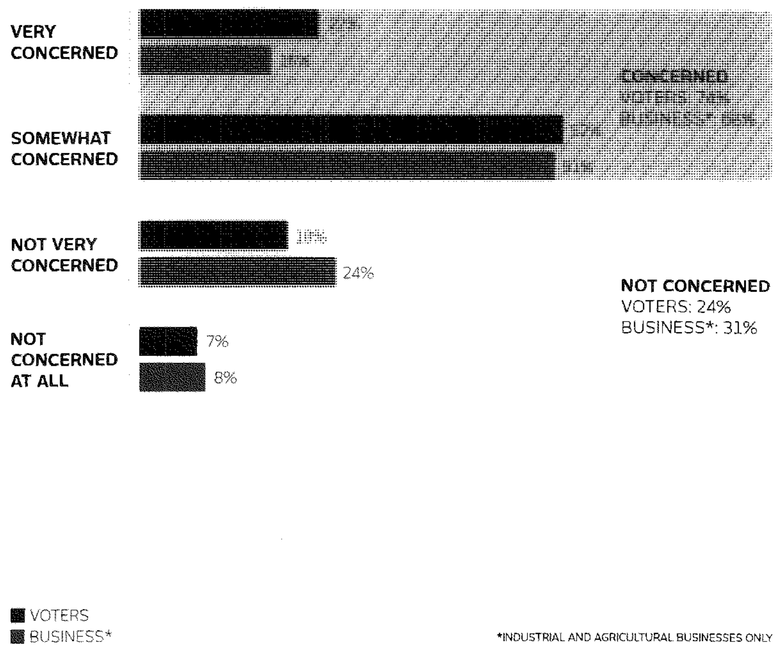
68% OF VOTERS AGREE

78% OF BUSINESSES* AGREE

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q26/27: Do you...strongly agree, somewhat agree, somewhat disagree, strongly disagree?
Base–Voters: 1,003; Business*: 502

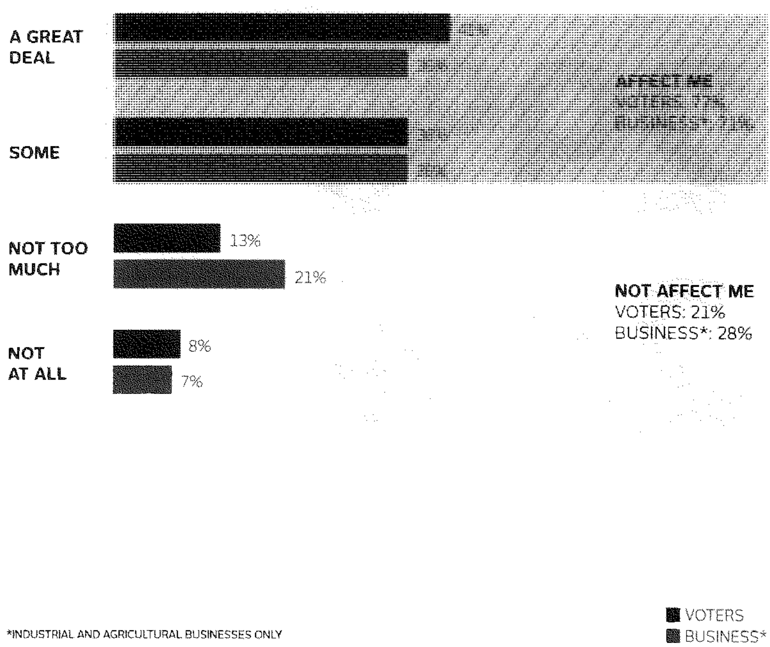
PEOPLE ARE CONCERNED ABOUT THE STATE OF AMERICA'S WATER INFRASTRUCTURE...



*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q46: How concerned are you about the state of America's water infrastructure system?
Base–Voters: 1,003; Business*: 502

...AND BELIEVE THAT DISRUPTIONS IN THE SYSTEM WOULD HAVE DIRECT AND PERSONAL CONSEQUENCES



*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q47: If there were problems with our nation's water infrastructure system, how much do you think it would affect you personally? Base–Voters: 1,003; Business*: 502

A SHARED RESPONSIBILITY

MANY AMERICANS BELIEVE OUR NATION FACES AN IMPENDING WATER INFRASTRUCTURE CRISIS

Water pipes and systems in America are crumbling and approaching a state of crisis.

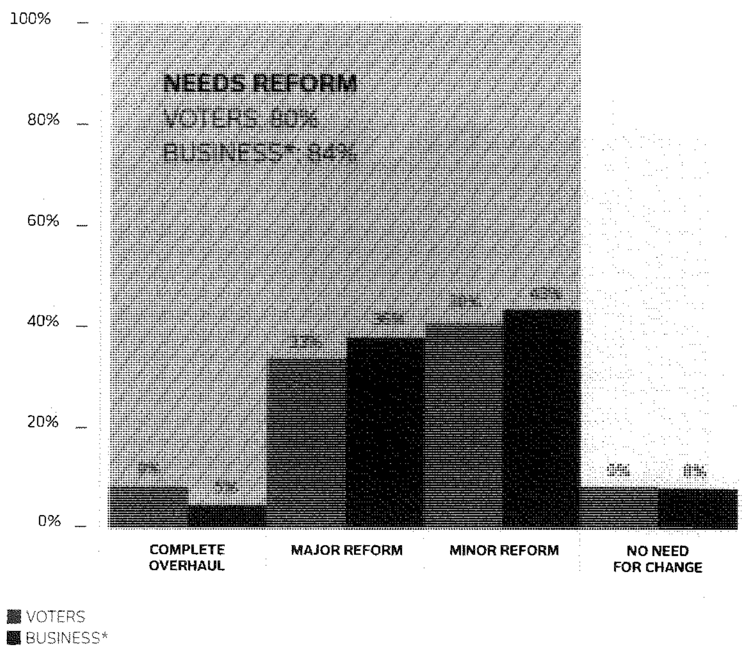
29% OF VOTERS STRONGLY AGREE

24% OF BUSINESSES* STRONGLY AGREE

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q29: Do you...strongly agree, somewhat agree, somewhat disagree, strongly disagree?
Base–Voters: 1,003; Business*: 502

AMERICANS BELIEVE REFORM IS NEEDED...



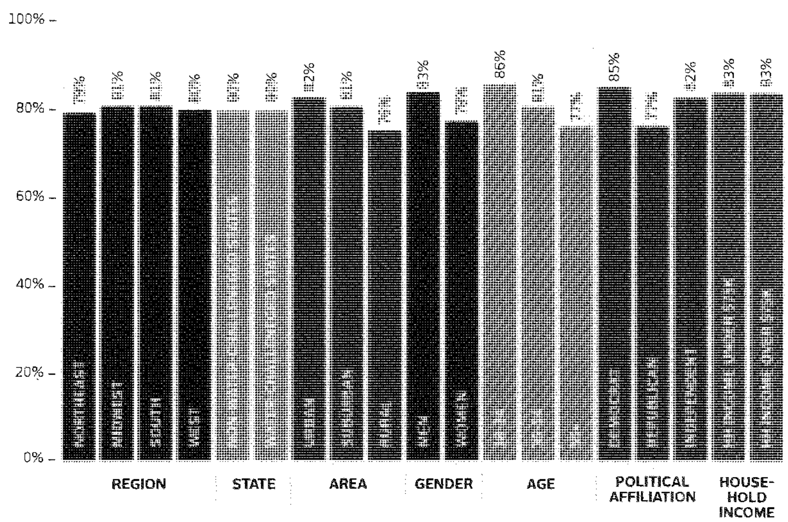
DON'T KNOW
VOTERS: 11%
BUSINESS*: 8%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q45: Now, thinking about the water infrastructure system in America, would you say it needs a complete overhaul, major reform, minor reform, or is there no need for change? / Base–Voters: 1,003; Business*: 502

...REGARDLESS OF REGION, RESIDENCE, AGE OR POLITICAL AFFILIATION

Reform of the nation's water infrastructure is needed.



Q45: Now, thinking about the water infrastructure system in America, would you say it needs a complete overhaul, major reform, minor reform, or is there no need for change? / Base–Voters: 1,003

GOVERNMENT MUST LEAD THE SEARCH FOR SOLUTIONS

Who would you hold accountable for fixing water infrastructure problems?

	VOTERS	BUSINESS*
Government	[illegible]	[illegible]
Local & municipal govts	36%	50%
State govts	26%	22%
Federal govt	25%	17%
Business* & industry	5%	6%
All of the above	2%	2%

85% OF VOTERS AGREE

83% [illegible]

Federal, state and local governments should invest money in upgrading our water pipes and systems

79% OF VOTERS AGREE

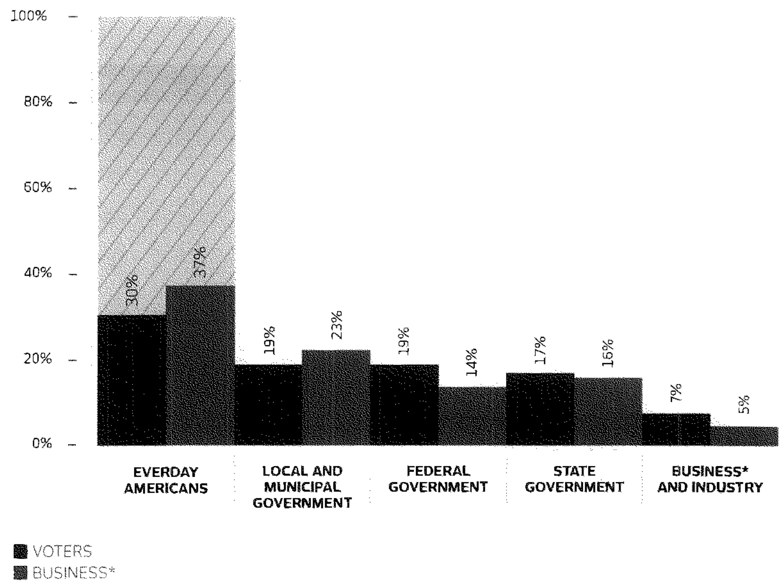
75% [illegible]

Think our government officials need to spend more time addressing water issues

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q48: If there were problems with our nation's water infrastructure system, who would you hold accountable forfixing these problems?
Q31/32: Do you...strongly agree, somewhat agree, somewhat disagree, strongly disagree? / Base–Voters: 1,003; Business*: 502

...BUT EVERYDAY AMERICANS MUST SHARE RESPONSIBILITY



DON'T KNOW
VOTERS: 5%
BUSINESS*: 3%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q49: If our water infrastructure system needed to be repaired and upgraded to continue to bring clean water to American households/ and businesses*), who do you think should be responsible for paying for these improvements?
Base-Voters: 1,003; Business*: 502

AMERICANS AND U.S. BUSINESSES* ARE WILLING TO DO THEIR PART

Would you be willing to pay a little more each month in your water bill to upgrade our water system to ensure long-term access to clean water?

YES
63% Voters
57% Business*

NO
30% Voters
36% Business*

DON'T KNOW
7% Voters
8% Business*

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q43: Would you/Do you think your company would be willing to pay a little more money each month in your/ its water bill to upgrade our water system to ensure that we have long-term access to clean water? / Base–Voters: 1,003; Business*: 502

TWO-THIRDS OF AMERICAN VOTERS ARE WILLING TO PAY AN AVERAGE OF $6.20 MORE PER MONTH

$6.20

AMOUNT VOTERS ARE WILLING TO PAY MORE, PER MONTH

AVERAGE PERCENTAGE INCREASE OVER CURRENT WATER BILL

11%

An increase of only 11% by 63% of American households alone would lead to increased investment in our nation's water infrastructure by more than $5 billion per year*

Of the 57% of businesses** willing to pay more now, the average acceptable increase is 7%

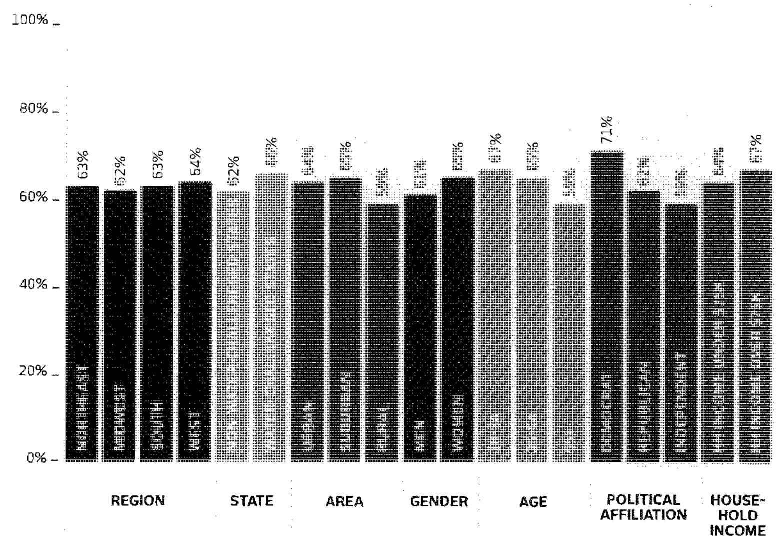
*BASED ON 2010 CENSUS U.S. BUREAU PROJECTIONS: 114,200,000 U.S. HOUSEHOLDS

**INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q40/41: How much would you say you/your company pays on average each month for your water bill?
Q44: How much more money would you/do you think your company would be willing to pay each month to upgrade our water system to ensure that we have long term access to clean water? / Base–Voters: 1,003; Business**: 502

PEOPLE ARE WILLING TO PAY MORE REGARDLESS OF REGION, RESIDENCE, GENDER, AGE, POLITICAL AFFILIATION OR INCOME LEVEL

I am willing to pay a little more in my water bill each month.



EDUCATION HEIGHTENS CONCERN

AMERICANS ARE RESPONSIVE TO THE FACTS

% CONVINCING (VERY/ SOMEWHAT)	VOTERS	BUSINESS*
As a result of blocked or broken pipes, every year up to 10 billion gallons of raw sewage are released into our waterways.	88%	84%
In 2009 *The New York Times* reported that [since 2004,] 62 million Americans have been exposed to drinking water that does not meet government health guidelines.	82%	75%
Each year there are about 240,000 water main breaks in the United States, or about 650 every single day. This causes the country to lose roughly 7 billion gallons of water every day—enough to supply water to the entire state of California.	86%	81%
According to the Congressional Budget Office, the gap between what we need to invest and what we actually invest in our nation's water infrastructure is about [$19 billion] each year. This means that we are drinking water from pipes that are 50 to 100 years old, leading to more pipes breaking and increased chances for contaminated water.	86%	79%
Poorly maintained sewage systems are a serious public health concern. More than [illegible] illnesses each year are attributed to exposure to recreational water that was contaminated by sanitary sewer overflows.	86%	80%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q53-61: How convincing of a reason is this to fix America's water infrastructure system?
Base–Voters: 1,003; Business*: 502

AMERICANS ARE RESPONSIVE TO THE FACTS

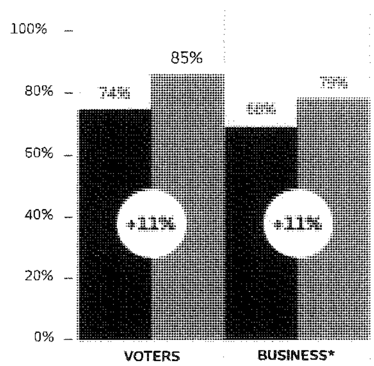
% CONVINCING (VERY/ SOMEWHAT)	VOTERS	BUSINESS*
According to the U.S. Environmental Protection Agency, if the United States decreased our residential, commercial and industrial water leaks by only 0.5%, we would save 270 million gallons of water a day and 150 million kilowatt hours of electricity annually. That's enough electricity to power 300,000 energy efficient refrigerators for 1 year.	86%	82%
Sewage plants built during the early 1970s with federal Clean Water Act grants are reaching overcapacity and approaching the end of their life cycles. As a result, sewage systems in many states are struggling to handle heavy rains, spilling human waste into local waterways.	89%	86%
Many of our current water pipes and treatment systems are more than 50 years old, but since many of these systems were built, the U.S population has more than doubled. For example, California's system was designed to supply water to 16 million people. But now it struggles to serve 38 million people, and California is expected to grow by an additional 12 million people by 2040. This trend of overburdened water supply systems is repeating itself in states all over the country.	87%	82%
Most of the pipes that make up our country's water infrastructure have a lifespan of 50 to 100 years, but some US cities have water pipes and treatment systems that are close to 200 years old, meaning our water infrastructure system is literally crumbling with age.	87%	83%

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q53-61: How convincing of a reason is this to fix America's water infrastructure system?
Base–Voters: 1,003; Business*: 502

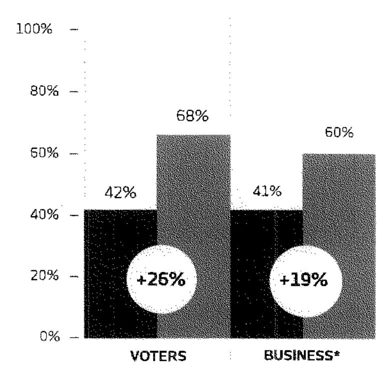
EDUCATION HEIGHTENS CONCERN

Concerned about the state of America's water infrastructure system:



PRE-INFO EXPOSURE
POST-INFO EXPOSURE

The water infrastructure system in America needs a complete overhaul or major reform:



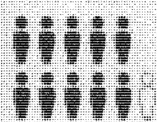
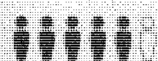
PRE-INFO EXPOSURE
POST-INFO EXPOSURE

*INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY

Q46/63: How concerned are you about the state of America's water infrastructure system?
Q45/52: Now, thinking about the water infrastructure system in America, would you say it needs a complete overhaul, major reform, minor reform, or is there no need for change? / Base–Voters: 1,003; Business*: 502

METHODOLOGY

1605-person telephone survey
82 questions
Fielded August 6–September 3, 2010*

VOTERS:	Number of people: 	Margin of Error = +-/-3.1% at the 95% confidence level	Representative of 2006 voting population on key demographic variables
BUSINESS** WATER CONSUMERS:	Number of people: 	Margin of Error = +-/-4.26% at the 95% confidence level	Facilities or operations managers at industrial or agricultural companies
COLLEGE STUDENTS:***	Number of people: 	Margin of Error = +-/-9.8% at the 95% confidence level	Even mix of Freshmen, Sophomores, Juniors, Seniors

*NOTE THAT SURVEY FIELDING COMPLETED PRIOR TO THE OBAMA ADMINISTRATIONS INFRASTRUCTURE FINANCING PROPOSAL
**INDUSTRIAL AND AGRICULTURAL BUSINESSES ONLY
***NOT INCLUDED IN THIS REPORT ANALYSIS

 =100

ABOUT ITT

ITT Corporation is a high-technology engineering and manufacturing company operating on all seven continents in three vital markets: water and fluids management, global defense and security, and motion and flow control. With a heritage of innovation, ITT partners with its customers to deliver extraordinary solutions that create more livable environments, provide protection and safety and connect our world. Headquartered in White Plains, N.Y., the company reported 2009 revenue of $10.9 billion.

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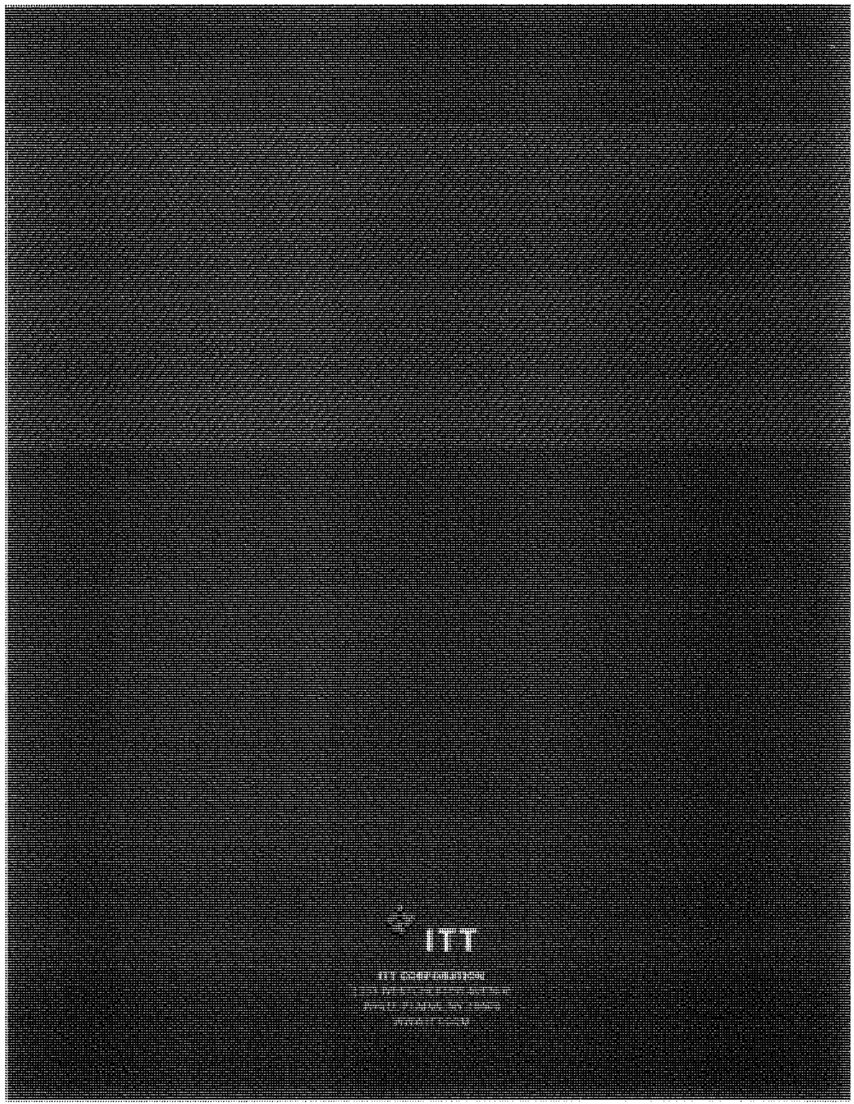
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A CBO STUDY

Future Investment in Drinking Water and Wastewater Infrastructure

November 2002

The Congress of the United States ■ Congressional Budget Office

Notes

Numbers in the text and tables may not add up to totals because of rounding.

Unless otherwise indicated, all costs referred to are in 2001 dollars.

Cover photo shows chlorine contact tanks at a wastewater treatment plant within the Delta Diablo Sanitation District, Antioch, California. ©Paul Cockrell.

Preface

According to experts from the Environmental Protection Agency and various nonfederal groups, the nation's drinking water and wastewater systems face increasing challenges over the next several decades in maintaining and replacing their pipes, treatment plants, and other infrastructure. But there is neither consensus on the size and timing of future investment costs nor agreement on the impact of those costs on households and other water ratepayers.

The Congressional Budget Office (CBO) has analyzed those issues at the request of the Chairmen and Ranking Members of the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure and the Subcommittee on Environment and Hazardous Materials of the House Committee on Energy and Commerce. This study provides background information on the nation's water systems, presents CBO's estimates of future costs for water infrastructure under two scenarios—a low-cost case and a high-cost case—and discusses broad policy options for the federal government. In keeping with CBO's mandate to provide objective, impartial analysis, this report makes no recommendations.

The study was written by Perry Beider and Natalie Tawil of CBO's Microeconomic and Financial Studies Division, under the supervision of David Moore and Roger Hitchner. Many people within CBO and outside it provided valuable assistance; they are acknowledged in Appendix D.

Dan L. Crippen
Director

November 2002

This study and other CBO publications
are available at CBO's Web site:
www.cbo.gov

CONTENTS

Tables

Figures

Boxes

Summary

Water industry authorities and analysts believe that maintaining the nation's high-quality drinking water and wastewater services will require a substantial increase in spending over the next two decades. They point to many types of problems with existing water infrastructure, including the collapsed storm sewers in various cities, the 1.2 trillion gallons of water that overflows every year from sewer systems that commingle stormwater and wastewater, and the estimated 20 percent loss from leakage in many drinking water systems.

But the amount of money needed for future investment in water infrastructure is a matter of some debate, and various estimates have been developed. The "needs surveys" of drinking water and wastewater systems conducted periodically by the Environmental Protection Agency (EPA) provide one measure of potential investment costs. Others are offered by groups such as the Water Infrastructure Network (WIN) and the American Water Works Association. The Congressional Budget Office (CBO) has also analyzed future costs for water infrastructure and presents its estimates here as low-cost and high-cost scenarios, illustrating the large amount of uncertainty surrounding those future costs.

In the debate about future investment in water systems, both the amount of money that will be needed and the source of those funds are at issue. Advocates of more federal spending have argued that estimates of the difference between future costs and some measure of recent spending—the "funding gap"—justify increased federal support. However, higher future costs could be funded from many sources and are not necessarily a federal responsibility.

The federal government currently supports investment in water systems through several programs. They include state revolving funds (SRFs) for wastewater and drinking water, which receive capitalization grants through appropriations to EPA; loan and grant programs of the Department of Agriculture's Rural Utilities Service; and the Community Development Block Grants administered by the Department of Housing and Urban Development. Notwithstanding those and various smaller programs, the large majority of the funding for drinking water and wastewater services in the United States today comes from local ratepayers and local taxpayers.

Ultimately, society as a whole pays 100 percent of the costs of water services, whether through ratepayers' bills or through federal, state, or local taxes. Federal subsidies for investment in water infrastructure can redistribute the burden of water costs from some households to others. However, subsidies run the risk of undermining the incentives that managers and consumers have to make cost-effective decisions, thereby retarding beneficial change in the water industry and raising total costs to the nation as a whole.

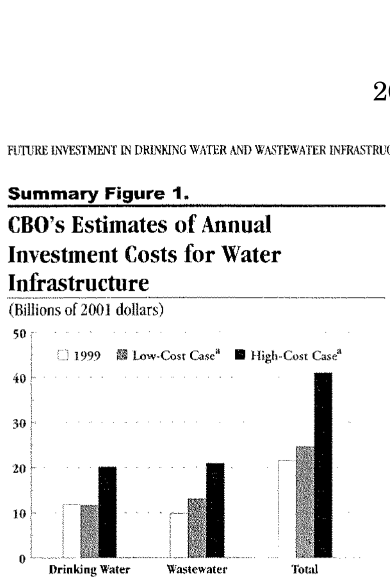
CBO's Estimates of Future Costs for Water Infrastructure

CBO estimates that for the years 2000 to 2019, annual costs for investment will average between \$11.6 billion and \$20.1 billion for drinking water systems and between \$13.0 billion and \$20.9 billion for wastewater systems (*see Summary Figure 1*).

Summary Figure 1.

CBO's Estimates of Annual Investment Costs for Water Infrastructure

(Billions of 2001 dollars)



Source: Congressional Budget Office.

a. Average annual costs for the 2000 to 2019 period.

CBO also projects that annual costs over tbe period for operations and maintenance (O&M), which are not eligible for aid under current federal programs, will average between $25.7 billion and $31.8 hillion for drinking water systems and between $20.3 billion and $25.2 billion for wastewater systems. (Unless otherwise noted, all costs in this study are in 2001 dollars.) For its estimates, CBO chose the 2000 to 2019 period to simplify comparisons with earlier estimates developed by the Water Infrastructure Network, a coalition of groups representing service providers, elected officials, engineers, construction companies, and environmentalists. Data on actual spending in 2000 and 2001 are not yet available.

CBO's estimates of future investment and O&M spending under two different scenarios—a low-cost case and a high-cost case—are intended to span the most likely possibilities that could occur. The range of estimates reflects the limited information available at the national level about existing water infrastructure. For example, there is no accessible inventory of the age and condition of pipes, even for the relatively few large systems that serve most of the country's households. That lack of adequate system-specific data compounds the uncertainty inherent in projecting costs two decades into the future. Indeed, given the limitations of the data and the uncertainty about how future technological, regulatory, and economic factors might affect water systems, CBO does not rule out the possibility that the actual level of investment required could lie outside of the range it has estimated.

Under each scenario, the estimates are intended to represent rhe minimum amount that water systems must spend (given the scenario's specific assumptions) to maintain desired levels of service to customers, meet standards for water quality, and maintain and replace theit assets cost-effectively. However, the estimates exclude certain categories of investment. Because water systems are still developing estimates of the costs for increasing security in the wake of the September 11 attacks, the estimates do not include those expenses—but preliminary teports suggest that security costs will be telatively small compared with the other costs for investment in inftastructure. Also excluded from the estimates is investment by drinking water systems to serve new or future customers. Such projects are generally not eligible for assistance from the SRFs and, hence, are not covered in EPA's needs survey.

CBO's estimates measure investment spending in costs as financed rather than in current resource costs, the yardstick that economists typically use. Costs as financed comprise the full capital costs of investments made out of funds on hand—that is, on a pay-as-you-go basis—during the time period being analyzed and the debt service (principal and interest) paid in those years on new and prior investments that were financed through borrowing. In contrast, current resource costs include the investments' capital costs, regardless of how they are paid for, and exclude payments on past investments. Current resource costs are more suitable than other measures of investment for analyzing whether society is allocating resources efficiently—for example, in assessing the costs and benefits of water-quality regulations. But CBO's present analysis takes goals for water quality and services as a given and focuses on the financial impact of meeting those goals. For that purpose, measuring costs as financed is more useful than measuring current resource costs because the former better indicates the burden facing water systems and their ratepayers at a given time.

Summary Table 1.

Assumptions Used in CBO's Low-Cost and High-Cost Cases

	Low-Cost Case	High-Cost Case
Capital Factors		
Savings from Increased Efficiency by Drinking Water and Wastewater Systems (Percent)	15.0	5.0
Drinking Water Systems		
Annual percentage of pipes replaced	0.6	1.0
Average annual cost for regulations not yet proposed (Billions of 2001 dollars)	0	0.53
Wastewater Systems		
Annual percentage depreciation	2.7	3.3
Share of investments in EPA's needs survey for replacing existing capital (Percent)	25.0	15.0
Average annual cost for abating combined sewer overflows (Billions of 2001 dollars)	2.6	5.4
Financing Factors		
Real (Inflation-Adjusted) Interest Rate (Percent)	3.0	4.0
Repayment Period	30 years	25 years
Pay-As-You-Go Share of Total Investment (Percent)	15.0	30.0

Source: Congressional Budget Office.

How CBO Derived Its Estimates

CBO derived its estimates of investment following the basic approach—including the major sources of data and supplementary models—used by WIN, which projected costs for both physical capital and interest on loans and bonds. Within that approach, CBO's two cases differ in the values for six assumptions about physical capital requirements and for three assumptions about financing costs (*see Summary Table 1*). The assumptions most responsible for the difference in the two scenarios' estimated costs are those about the rate at which drinking water pipes are replaced, the savings associated with improved efficiency, the costs of controlling what are termed combined sewer overflows (CSOs), and the repayment period.[1] (*Summary Box 1* discusses how CBO derived its estimates of O&M costs and compares them with WIN's estimates.)

1. A "combined" sewer system is one that commingles stormwater with household and industrial wastewater. About 5 percent of publicly owned wastewater systems have combined sewers; the rest have separate "sanitary" sewers. Both types of systems can overflow, particularly during a period of heavy rainfall, discharging the excess flow directly into receiving waters.

To estimate physical capital requirements for drinking water and wastewater systems, CBO started with data collected by EPA in its needs surveys and—because the surveys do not adequately cover the full 20-year period—supplemented them with estimates derived from simple models. According to EPA, many drinking water systems have responded to the surveys on the basis of planning documents covering just one to five years, and many wastewater systems plan their investments over a time span of five or 10 years.

The methods CBO used to supplement EPA's survey data differed for drinking water and wastewater systems. For drinking water systems, CBO replaced EPA's data on investments in pipe networks with larger estimates based on a study by Stratus Consulting for the American Water Works Association (AWWA). The Stratus study estimated the need for replacing pipes on the basis of some national-level data and assumptions about the number of drinking water systems nationwide (classified by size and region), the miles of pipe per system, the distribution of pipe mileage by pipe size, the replacement cost of pipes of each size, and the replacement rate.

Summary Box 1.

Estimates of Costs for Water Systems' Future Operations and Maintenance

The Congressional Budget Office (CBO) used relatively simple methods to estimate water systems' future spending on operations and maintenance (O&M). For both drinking water and wastewater systems' O&M in the high-cost case, CBO extrapolated a linear trend from real (inflation-adjusted) spending on O&M over the 1980-1998 period. For the low-cost case, it started with that same linear trend but adjusted it downward to reflect savings from improved efficiency phased in over 10 years, beginning at 2 percent in 1995 and reaching 20 percenr by 2004. Thus, only one factor distinguishes the estimates under the two scenarios—which, as a result, probably do not capture as much of the uncertainty surrounding future O&M costs as do CBO's more-detailed models of capital investment.

Estimates of annual O&M costs by the Water Infrastructure Network (WIN)—$29 billion for drinking water and $24 billion for wastewater—are roughly in the middle of the ranges spanned by CBO's two cases. Because CBO and WIN used the same basic approach of extrapolating a future trend from existing data on O&M spending, and both WIN's analysis and CBO's low-cost case assume savings of 20 percent from efficiency gains, one might expect the two sets of estimates to be similar. However, WIN used different spans of data for extrapolation than CBO did (from 1985 to 1994 for drinking water and from 1972 to 1996 for wastewater); used a construction cost index (which might not correspond well to the types of expenditures associated with O&M) to convert the data to real dollars instead of the more general price index for gross domestic product that CBO used; and phased in the efficiency savings two years later. Moreover, for wastewater, WIN extrapolated its trend not from data on O&M spending itself but rather from data on O&M spending per dollar of net capital stock. Although a water system's capital stock is plausibly related to its O&M costs, there is no clear reason for associating each additional dollar of capital stock with an increasing (rather than a steady) amount of additional O&M spending.

In analyzing capital costs for wastewarer systems, CBO distinguished between projects to replace existing infrastructure and other invesrmenrs. It estimated replacement costs for each year of the 2000-2019 period by multiplying the estimated net capital stock in that year by a constant rate of depreciation. CBO assumed that the cosr of other investments in each year equals rhe average annual amount reported in EPA's needs survey, with two adjustments. One adjustment substitured EPA's more recenr estimate of the costs of correcting sanitary sewer overflows (SSOs) for the survey's reported needs for repairing and replacing sewers. Because some unidentified portion of the needs reported in the survey and in the later analysis of SSO costs represented amounts to replace existing infrastructure, the second adjustment reduced the sum of those needs to avoid double-counting.

CBO calculated interest costs for investmenrs made during the 2000-2019 period using assumptions about interest rates, borrowing terms, and the share of investmenrs paid for through borrowing rather than on a pay-as-you-go basis. However, much of the principal and interest on investments financed during the period will nor be paid until after 2019. To measure investments from 2000 to 2019 in costs as financed, CBO focused only on the debt service paid during the period, whether on newly built projects or on those built before 2000. (As discussed later, that approach differs from WIN's.)

Within the basic approach, CBO selected contrasting assumptions for its low-cost and high-cost cases (shown in *Summary Table 1* on page xi) by examining analyses by other estimators and consulting with indusrry experts. For example, the assumptions used for the costs of controlling CSOs reflecr views from EPA and rhe CSO Partnership, a coalition of communities that have such overflows and firms that design such controls. In particular, the low-cost case uses EPA's estimate of the cost of conrrolling 85 percenr of rainwater and snowmelt, whereas the high-cost case reflects the CSO Partnership's belief that costs will be roughly twice as high unless states revise standards addressing water quality to allow less expensive controls. Similarly, the values assumed in the two scenarios for the pay-as-you-go share of investment are hased on CBO's expectation that systems will increase their use of borrowing as they try to restrain rates in tbe face of rising investment costs, but they reflect different views among experts about how much and how quickly the use of pay-as-you-go financing will decline.

Comparing Current Spending and Future Costs

As noted earlier, part of the policy debate on investment in water infrastructure has focused on the difference hetween current spending and future costs and on how that difference could affect household ratepayers. However, the available data on current spending, collected for the Census Bureau's Survey of State and Local Government Finances, shed limited light on the issue hecause they do not measure spending in costs as financed. The census data identify rhe current interest payments only of drinking water systems and not of wastewater systems. Further, the data include the capital costs of all investment in a given year—whether the burden of those projects falls on ratepayers in that year or is being deferred through borrowing—and exclude the principal being repaid on previous horrowing.

For 1999, the latest year for which information is available, CBO's best estimates of investment spending are \$11.8 billion for drinking water and \$9.8 billion for wastewater, measured in costs as financed. To develop those estimates, CBO had to make many assumptions—for example, about rhe extent to which water systems had borrowed to finance investments over the previous 20 years. Different assumptions could have increased or decreased the results, perhaps hy 20 percent.

The difference between those estimates of 1999 investment spending and projected average annual investment from 2000 ro 2019 under the low-cost case is close to zero for drinking water systems and is \$3.2 billion for wastewater sysrems. Together, the future costs for hoth types of systems represent growth of 14 percent from the 1999 levels. That result contradicts the conventional wisdom that the nation's water systems will soon be straining to fund a large increase in investment. Nevertheless, CBO considers that result reasonable, given the uncertainty about the condition of the existing infrastructure, the prospects for cost savings from improved efficiency, and the possibility that water systems will fund more of their investment through borrowing and will horrow for longer rerms. Under the high-cost case, the esrimated increases average \$8.3 billion per year for drinking water and \$11.1 billion for wastewater, together representing growth of about 90 percent over the estimated levels for 1999.

Comparing CBO's Estimates with Those of Others

When measured in comparable terms, WIN's estimates are similar to those of CBO's high-cost case. In contrast, estimates obtained from "bottom-up" studies (those that derive national rotals from data on individual systems) are even lower than the ones CBO projects in its low-cost case.

Comparing CBO's and WIN's Estimates

CBO's estimates of future investment in water infrastructure are not directly comparahle with those of the coalition because the latter are not measured in costs as financed. WIN's published estimates comprise rotal capital costs associated with all investments—whether funded on a pay-as-you-go basis or through debt—during the 2000-2019 period and all interest paid over time on those investments. Thus, they differ from costs-as-financed estimates because they include debt service (principal and interest) paid after 2019 on investments during the two decades instead of debt service paid during that time on pre-2000 investments. That difference is important because the amounts of investment that were financed yearly from 1980 through 1999, and that continue to he paid off from 2000 to 2019, are smaller than the new amounts rhat the analyses project will be financed during the latter period.

An additional factor complicates comparing CBO's and WIN's estimates. WIN's measure of current spending differs from its measure of future costs, so its estimates of the increased costs are inconsistent. In particular,

Summary Table 2.

Estimates of Average Annual Costs for Investment in Water Systems, Including Financing, 2000 to 2019

(In billions of 2001 dollars)

	Drinking Water	Wastewater	Total
CBO[a]	11.6 to 20.1	13.0 to 20.9	24.6 to 41.0
Water Infrastructure Network			
As published	26.3	24.2	50.5
In costs as financed	21.4	18.9	40.3
Increase in Investment Above Recent Level			
CBO (Using a 1999 baseline)[a]	-0.2 to 8.3	3.2 to 11.1	3.0 to 19.4
Water Infrastructure Network			
As published[b]	12.2	13.5	25.7
In costs as financed[c]	9.4	9.2	18.6

Sources: Congressional Budget Office; Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

a. Ranges are defined by CBO's low-cost and high-cost scenarios.
b. Relative to a 1996 baseline.
c. CBO's approximation of WIN's results using a 1999 baseline.

WIN's measure of current spending includes the interest paid in the current year on past investments in drinking water infrastructure and does not include interest on investments in wastewater infrastructure. Again, however, its measure of costs for future years includes all subsequent interest payments on investments made in each such year.

Using more-detailed results provided by WIN's analysts, CBO found that measuring future investment in costs as financed reduces WIN's estimates of average annual needs from \$26.3 billion to \$21.4 billion for drinking water and from \$24.2 billion to \$18.9 billion for wastewater—an overall reduction of 20 percent (*see Summary Table 2*).[2] CBO also recalculated the coalition's estimates of the difference between current spending and average annual future needs—the so-called funding gap—in costs as financed. (To do so, however, CBO had to approximate WIN's estimate of current debt service, a key component of current spending in costs as financed, because not enough information was available to calculate it directly.) Again, the revised estimates are lower—\$9.4 billion instead of \$12.2 billion for drinking water and \$9.2 billion instead of \$13.5 billion for wastewater, for a combined reduction of 25 percent.

The reductions that result from measuring investment volume in costs as financed bring WIN's estimates close to those of CBO's high-cost case: the coalition's figures are somewhat higher for drinking water and a little lower for wastewater. The similarity in the two sets of estimates is not surprising, given that CBO and WIN used the same basic modeling approach and that the specific assumptions used in CBO's high-cost scenario either duplicate those in WIN's analysis—both assume that 1 percent of drinking water pipes and 3.3 percent of wastewater capital will be replaced annually—or differ in ways that tend to offset each other. Thus, CBO's high-cost case does not provide independent support for WIN's esti-

2. Those comparisons express all costs in 2001 dollars. As originally published, WIN's annual estimates of future spending were in 1997 dollars and totaled \$24 billion for drinking water systems and \$22 billion for wastewater systems. See Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

Summary Table 3.

Estimates of Average Annual Costs for Investment in Water Systems, Measured as Capital Resource Costs, 2000 to 2019

(In billions of 2001 dollars)

	Drinking Water	Wastewater	Total
CBO[a]	12.0 to 20.5	14.9 to 22.3	26.9 to 42.7
Water Infrastructure Network	20.9	19.2	40.1
Environmental Protection Agency			
Clean Water Needs Survey[b]			
As pnblished	n.a.	7.3	n.a.
Adjusted for more recent estimate of costs to control sanitary sewer overflows	n.a.	11.4	n.a.
Drinking Water Infrastructure Needs Survey[c]			
As published	8.0	n.a.	n.a.
Adjusted for underreporting	11.1	n.a.	n.a.
American Water Works Association[d]	8.5	n.a.	n.a.

Sources: Congressional Budget Office; Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997); Environmental Protection Agency, Office of Water, *Drinking Water Infrastructure Needs Survey: Second Report to Congress*, EPA 816-R-01-004 (February 2001); American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Denver, Colo.: AWWA, May 2001); Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

Note: n.a. = not applicable.

a. Ranges reflect CBO's low-cost and high-cost cases.
b. Estimate for 1996 through 2015.
c. Estimate for 1999 through 2018.
d. Estimate for 2000 through 2029.

mates but instead suggests that to obtain estimates of that magnitude requires making relatively pessimistic assumptions.

Comparing CBO's Estimates and Estimates from Bottom-Up Studies

Support for lower estimates of investment costs comes from bottom-up studies by EPA and the AWWA. Those studies measure investment in current resource costs—again, total capital costs regardless of financing but without including interest costs. So comparing their estimates with CBO's and WIN's projections requires that those projections also be expressed in terms of resource costs.

When the results are measured comparably, the estimates from CBO's low-cost case are above those from EPA's and AWWA's studies, even after some (perhaps incomplete) adjustments to EPA's estimates to try to correct for the surveys' limitations in capturing investments over the full 20-year horizon (*see Summary Table 3*).

- EPA's latest available wastewater survey, conducted in 1996 and published in 1997, estimated that average annual needs were $7.3 billion per year.[3] Substituting EPA's later projection of costs for controlling sanitary sewer overflows raises the estimate to $11.4 billion.

- For drinking water, EPA's 1999 needs survey (published in 2001) estimated average annual needs of $8.0

3. Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997).

billion; if the amount of underreporting in that survey equals the amount that EPA found in follow-up visits to 200 medium-sized and large systems after the initial 1995 needs survey, then the estimate of $8.0 billion can be scaled up to $11.1 billion.[4]

- The AWWA conducted a detailed engineering analysis of the needs of 20 medium-sized and large drinking water systems; extrapolating from that admittedly small base to national totals, the association estimated that average annual needs cost $8.5 billion.[5]

Water Costs in Household Budgets

How might future costs of investment in water infrastructure and of operations and maintenance affect household budgets? CBO estimates that in the late 1990s, total household bills for drinking water and wastewater services combined represented 0.5 percent of household income nationwide. By 2019, CBO projects, household water bills will account for 0.6 percent of national household income under the low-cost scenario and 0.9 percent under the high-cost scenario. According to the best available international data, such shares would not be high compared with the income shares devoted to household water bills in many other industrialized countries.[6]

CBO's estimates assume steady levels of support financed by taxpayers and constant shares of water costs paid by household and nonhousehold ratepayers. Any changes in those levels or shares would shift the form of the impact on household budgets but would not change the average impact nationwide, since households ultimately pay 100 percent of water costs, whether through water bills, taxes, or the costs of other goods and services produced using water.

National shares, however, can obscure important differences among households; thus, they shed only limited light on the argument, made by advocates of boosting federal aid for water infrastructure, that water bills will otherwise become "unaffordable" for many households. Accordingly, CBO went beyond national averages to examine the current distribution of household water bills relative to income and to project future distributions.

Specifically, CBO analyzed the current distribution using a national sample of annualized water bills reported by approximately 2,800 households; those households participated for a year in the Consumer Expenditure Interview Survey some time between the third quarter of 1997 and the first quarter of 1999. CBO's analysis of the data included imputing expenditures for the 39 percent of respondents who did not report their own bills by using data from households with comparable incomes.[7] To project the distributions forward to 2019, CBO scaled up the individual water bills to reflect estimated costs in the two scenarios and extrapolated household income to reflect growth in real income and population.

The results of CBO's analysis can be characterized in several ways, with different measures highlighting different features of the distributions. One summary measure that has received significant attention in discussions of future water costs is the proportion of households whose water bills exceed 4 percent of their income. But 4 percent has no economic significance as the point at which household water bills become "unaffordable," so the measure is no better (or worse) than many others.

In terms of that particular measure, CBO estimates that in the late 1990s, 7 percent of U.S. households spent more than 4 percent of their income on water bills. An

4. Environmental Protection Agency, Office of Water, *Drinking Water Infrastructure Needs Survey: Second Report to Congress*, EPA 816-R-01-004 (February 2001).

5. American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Denver, Colo.: AWWA, May 2001).

6. International data are limited to average direct billing costs for typical levels of water use. See Organization for Economic Co-operation and Development, Environment Directorate, Environment Policy Committee, *Household Water Pricing in OECD Countries*, ENV/EPOC/GEEI(98)12/FINAL (Paris: OECD, 1999).

7. That imputation may overstate water costs since most nonreporting households are likely to be apartment dwellers (who do not receive separate water bills), and water use per capita is generally lower in multifamily units than in single-family homes.

additional 16 percent of U.S. households had expenditures greater than 2 percent of their income; 25 percent were spending less than 2 percent but more than 1 percent, and 51 percent were spending no more than 1 percent (*see Summary Figure 2*). If the additional burdens associated with CBO's low-cost and high-cost estimates led to uniform percentage increases in ratepayers' bills, 10 percent to 20 percent of U.S. households might be spending more than 4 percent of their income on water bills in 2019; an additional 19 percent to 23 percent might be spending more than 2 percent.

In the WIN coalition's estimates, water bills account for a much larger share of household budgets, both now and in the future. In 1997, WIN estimates, 18 percent of households spent more than 4 percent of their income on water services; it foresees 22 percent of households having bills at that level by 2009 (halfway through the 2000-2019 period) and a third or more of the population experiencing such costs as rates continue to rise.[8]

Apparently, the discrepancy between WIN's estimate of 18 percent for 1997 and CBO's estimate of 7 percent for the late 1990s derives primarily from the use of different data on household water costs. CBO analyzed actual bills based on water use by households; WIN, however, calculated household water bills using data on charges in 1997 among systems in Ohio for 250 gallons per day. WIN chose to use those charges because, according to the 1990 census, Ohio households' drinking water bills relative to their income matched well those for U.S. households as a whole. (The 1990 census did not have data on household wastewater expenditures.) However, if household water bills nationally cannot be accurately characterized on that basis, then WIN's results may not be representative. If, for example, low-income households tend to use less than 250 gallons per day, then, other things being equal, WIN's estimates overstate the number of households with water bills claiming more than 4 percent of their income.

8. Water Infrastructure Network, *Clean and Safe Water for the 21st Century*, pp. 3-4 and 3-5.

Rationales for Federal Involvement in Water Services

Economic principles suggest that the federal government's intervention in drinking water and wastewater markets may be able to increase the cost-effectiveness of providing and using water when state and local governments and water systems do not have adequate incentives to account for effects that their practices may have on third parties. This CBO study focuses on federal financial support; of course, the federal government also intervenes in water markets through its role in establishing water-quality standards under the Clean Water and Safe Drinking Water Acts. Whether current standards promote the economically efficient use of society's resources is an important question but is not addressed here.

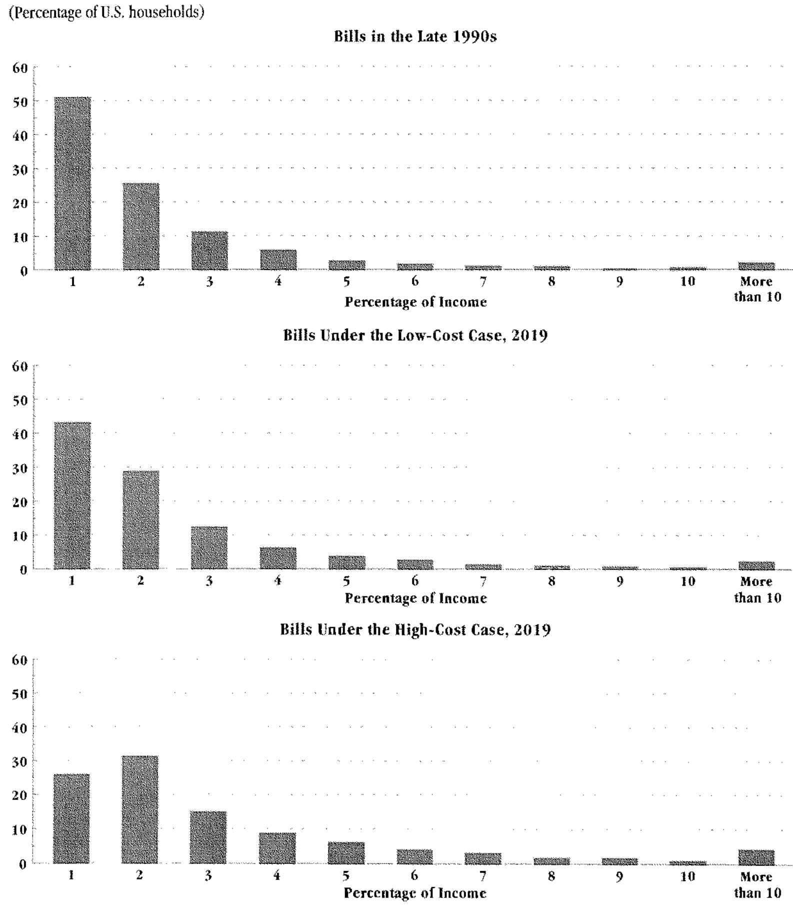
One opportunity for federal funding to improve cost-effectiveness may be by supporting research and development (R&D). Nonfederal entities measure potential R&D expenditures only against the benefits that they themselves could realize, ignoring gains that might accrue to others. Without federal involvement, therefore, funding for the development of new technologies is likely to be lower than is optimal. But determining the right level of federal support in practice is a challenge. It depends on the returns to investment in R&D, which are typically difficult to predict, and the extent to which nonfederal entities reduce their R&D expenditures in response to federal funding.

A similar case might also be made in favor of federal support for disseminating "best management practices." The argument is not simply that such practices can help water systems reduce their costs, although that appears to be true. (On the basis of 136 assessments of water systems since 1997, the consulting firm EMA Associates found that adherence to best practices could reduce operational costs by an average of 18 percent.) Rather, the crux of the argument is the possibility that federal costs for gathering and disseminating information about widely applicable practices would be lower than the total costs that individual system managers would incur in seeking out relevant information. If so, then taxpayer-funded support might yield cost savings.

Summary Figure 2.

Water Bills as a Share of Household Income

(Percentage of U.S. households)



Source: Congressional Budget Office.

Summary Box 2.

Options to Expand Federal Aid for Private Water Systems

Half of all community drinking water systems in the United States are privately owned, as are roughly 20 percent of the wastewater systems that treat household sewage. However, those systems serve only a small share of households: private drinking water systems reach only about 15 percent of households—excluding those using individual wells—and private wastewater systems reach only about 3 percent of sewered households.

Giving private systems access to federal funds on equal footing with public systems may or may not improve cost-effectiveness because of two opposing effects. On the one hand, balanced treatment could result in some cost savings if private ownership can reduce a system's costs in some cases and local decisionmakers can correctly identify those cases. On the other hand, increasing federal aid tends to increase investment costs.

To help equalize federal support, the Congress could modify the Clean Water Act to make private systems eligible for loans from the state revolving funds. On the tax preference side, it could alter policies related to tax-exempt private activity bonds (PABs). Specific options publicized by the Environmental Protection Agency's Environmental Financial Advisory Board include:

- Exempting bonds issued for water systems from the federal limits on the amount of PABs issued in each state;
- Exempting interest earned on those PABs from the individual alternative minimum tax (AMT) and partially exempt it from the corporate AMT;
- Increasing opportunities for PAB issuers to benefit from arbitrage profits—those earned by investing PAB proceeds at a rate above the bond's own yield —by allowing issuers a full two years to spend their bond proceeds; and
- Allowing one-time refinancing of PABs up to 90 days before redemption of the original debt.[1]

One argument for providing private water systems with equal access to federal aid is that it would treat customers of private and public systems equally. Conversely, one argument against equal access is that it would give private water systems unique advantages relative to other types of privately owned firms. Under current law, privately managed enterprises such as airports and solid-waste facilities can be exempt from the PAB limits, but only if they are publicly owned.

1. Environmental Protection Agency, Environmental Financial Advisory Board, *Incentives for Environmental Investment: Changing Behavior and Building Capital* (August 1991).

However, other types of federal support for water services (such as the current spending programs and tax preferences that help fund investment) distort prices and thus undermine incentives for cost-effective actions by water systems and ratepayers. Eliminating those distortions could lower total national costs: for example, system managers might reduce investment costs by undertaking more preventive maintenance and improving the design of their pipe networks, and households might cut water use by fixing leaks and watering lawns less often.

The clearest argument for current policies to subsidize investment in water infrastructure is to shift the costs of water services from ratepayers served by high-cost systems (such as those in small and rural communities) to those served by low-cost systems, or from low-income to high-income households. (Most federal support goes to publicly owned systems, but some goes to privately owned ones; *see Summary Box 2* for options to expand aid to private systems.)

In evaluating the case for subsidizing water services, it is important to recognize that the level and form of the subsidies influence not only the distributional effects but also the extent to which support undermines incentives for cost-effective actions. To preserve those incentives for both water systems and users, the Congress could pursue policies that redistribute income rather than those that distort the price of water.

Implications of Federal Support for Infrastructure Investment

Federal support for water systems can have unintended consequences. For example, an analysis of the federal wastewater construction grants program under the Clean Water Act concluded that it reduced other contributions to capital spending. Thus, total investment in water infrastructure increased only 33 cents for each dollar of federal support; the other 67 cents effectively reduced state and local taxes or was spent on other uses.[9]

Federal support for investment projects also undermines the cost-effective provision of water services by distorting the price signals that systems face and thus affecting managers' choices in many areas, such as preventive maintenance, construction methods, treatment technology, pipe materials, and excess capacity. The resulting losses can be significant, particularly if the subsidies are large. For example, a statistical analysis done for a 1985 CBO study of the wastewater construction grants program estimated that setting the federal cost share at 75 percent initially rather than 55 percent (the reduced level that went into effect that year) raised plant construction costs about 40 percent, on average.[10]

9. James Jondrow and Robert A. Levy, "The Displacement of Local Spending for Pollution Control by Federal Construction Grants," *American Economic Review*, vol. 74, no. 2 (May 1984), pp. 174-178. The displacement of state and local spending per dollar of federal funds might have been less had the federal share been smaller than 75 percent, its statutory level during the period the authors studied.

10. Congressional Budget Office, *Efficient Investments in Wastewater Treatment Plants* (June 1985).

One way to reduce the distorting effects of federal subsidies might be to target increased aid to fewer systems—those judged most deserving, whether because of high costs associated with declining customer bases, federal regulations, or simply high levels of anticipated investment (or investment and O&M spending) in general. However, defining the target group in a way that does not reward systems for poor management and past underinvestment might be difficult. Targeting could even undermine cost-effective practices if it encouraged system managers to let infrastructure deteriorate in hopes of qualifying for aid in the future.

A variety of spending mechanisms—grants, loan subsidies, and credit assistance—are available to deliver and annually readjust a desired level and pattern of aid for water systems, but the design of such programs would influence total costs. For example, federal support such as partial grants, partial loans, or credit assistance would leave investment projects relying on private funds as well, and thus could help keep costs down by subjecting water systems to more market discipline from lenders and ratepayers. Another approach to help system and state authorities make cost-effective choices would be to allow them more flexibility in using the SRFs. That strategy might include eliminating floors and ceilings on funding for eligible activities in the drinking water program, easing restrictions on transferring federal money between drinking water and wastewater revolving funds, and broadening the funds' range of uses to address issues such as nonpoint source pollution.

The federal government can also use tax preferences to aid water systems, but doing so limits its discretion in delivering certain levels and patterns of aid. Public water systems and the interest paid on municipal bonds issued on their behalf are already generally exempt from federal taxes. Options for enhancing the tax preferences include increasing the span of time during which issuers may keep arbitrage profits (earned by investing the proceeds from a bond at a rate above the bond's own yield) and eliminating the partial taxation of interest earned on municipal bonds held by corporations that pay the alternative minimum tax. Such enhancements would aid medium-sized and large water systems; small systems that did not have independent access to the municipal bond market could benefit indirectly, through cheaper or more plentiful SRF loans. The greater year-to-year stability of tax preferences (compared to spending programs with annual appropriations) would make planning easier for system managers, but enhancing the preferences for water systems and not for other issuers of municipal bonds would make the tax code more complex.

Implications of Direct Federal Support for Ratepayers

An alternative to subsidizing investment in water systems would be to assist low-income households facing high water bills. The federal government does not currently provide such assistance, but it aids low-income households through more general transfer programs and tax provisions; it also subsidizes bills for some other utilities.

Compared with support for investment by water systems, support for ratepayers could address concerns about the impact of water bills on household budgets more precisely and with less loss of efficiency. Unlike investment subsidies, support for ratepayers would not distort the choices confronting system managers; nor would it reduce the water prices faced by households not receiving the direct subsidies.

CHAPTER

1

Drinking Water and Wastewater Infrastructure

Drinking water and wastewater services in the United States are very decentralized; there is a strong history of local control, and the large majority of funding for water services comes from local ratepayers and taxpayers. But over the past three decades, the federal government has taken the lead in regulating such systems and has provided some funding for investment in water infrastructure. Concern over rising needs for such investment has led to calls for increased federal funding and for systematic reforms to encourage cost-effectiveness in the provision of water services.

An Overview of U.S. Water Systems

Most U.S. residents are served by drinking water and wastewater systems that are eligible for federal support through state revolving funds (SRFs). In 1999, roughly 54,000 publicly or privately owned community drinking water systems (defined as those with at least 15 service connections used by year-round residents or otherwise serving at least 25 year-round residents) provided drinking water to some 250 million people.[1] As of 1996, 16,000 publicly owned treatment works collected and processed the wastewater from about 190 million people.

Though the details vary, water systems generally provide the same basic functions: drinking water systems take in, treat (in most cases), monitor, and distribute water to bouseholds and other customers, while wastewatet systems collect, treat, and typically discharge water after use. Roughly one-third of the households served by community water systems use groundwater, which in some cases does not require treatment. Otherwise, drinking water undergoes one or more of the following processes: flocculation and sedimentation (to coagulate small particles into larger groups and have them settle out of the water stream), filtration (to remove additional particles), ion exchange (to treat hard water and remove a variety of inorganic contaminants), and disinfection by chlorine or ozone (to kill microbes). Ultimately, the water is distributed through a network of pipes; the necessary pressure is supplied by gravity, when the water has been pumped up into a storage tower, or by direct pumping, when the water is from a ground-level storage facility (*see Figure 1-1*).

Publicly owned treatment works collect wastewater through a network of sewers, then process it using various physical, biological, and chemical treatments. So-called "primary treatment" uses screens, settling tanks, and other physical methods to remove sand, grit, and larger solids; it can remove up to 50 percent of the suspended solids and biochemical oxygen demand (a measure of organic matter, defined by the amount of oxygen that bacteria would consume in decomposing it). In 1972, the Clean Water Act required publicly owned treatment works to adopt "secondary treatment" (which stimulates the growth of bacteria to consume the wasre materials prior to discharge) in order to reduce the levels of key pollutants by 85 percent (*see Figure 1-2*). In some cases, various types of "advanced treatment" may be required to, for example, reduce the unconventional pollutants like nitrogen and phosphorus (which can promote excessive growth of algae) in order to meet quality goals set for specific bodies of water.

1. "Noncommunity" systems that are not-for-profit, such as those of schools and hospitals, are also eligible for assistance from the revolving funds.

Figure 1-1.

A Drinking Water Plant

Source: Adapted by permission. Copyright American Water Works Association.

Figure 1-2.

A Wastewater Treatment Plant

Source: Congressional Budget Office based on Water Environment Federation, *Clean Water for Today: What Is Wastewater Treatment?* (Alexandria, Va.: WEF, November 1999).

Assisted by federal funding provided since 1972, public wastewater systems have nearly reached the goal of universal secondary treatment: as of 1996, only 176 of the 14,000 public treatment facilities that discharged effluent streams were not meeting the requirement—and some of those were exempt from it because they discharged to sufficiently deep ocean waters or to other facilities that in turn provided secondary treatment. As a result, although the amount of biochemical oxygen demand arriving at treatment facilities rose by more than 25 percent between 1972 and 1996 (which was consistent with population and economic growth), the amount discharged fell about 40 percent.

Most water systems are small. For example, 58 percent of community drinking water systems serve 500 people or fewer, and 85 percent reach no more than 3,300 people (*see Figure 1-3*). Many small wastewater facilities (such as household septic units) are privately owned and thus excluded from statistics on publicly owned treatment works. Even so, 81 percent of the public facilities in operation in 1996 handled no more than 1 million gallons per day (MGD), enough to serve roughly 8,000 people, and 41 percent processed no more than 0.1 MGD (*see Figure 1-4*).[2]

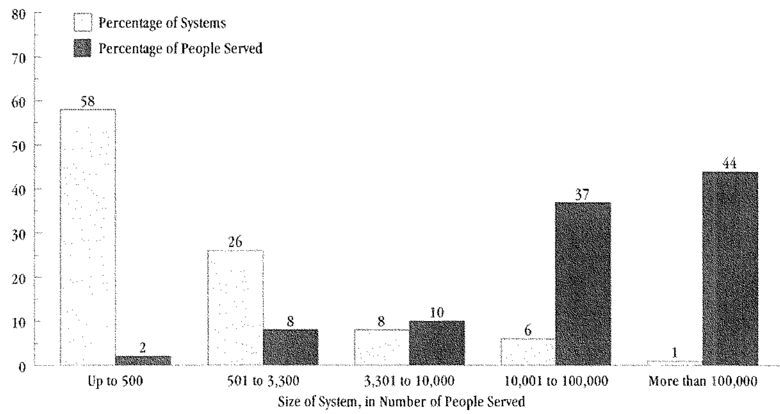
Though outnumbered by the small systems, the relative handful of large systems serve the great majority of people. Just 7 percent of community drinking water systems serve more than 10,000 people each, but they supply 81 percent of those served by such systems; indeed, "very large" sys-

2. The data in million gallons per day are from Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997), p. C-4. The conversion from MGD to persons assumes 125 gallons per person-day, the low end of a range provided in a personal communication from John Flowers of EPA.

Figure 1-3.

Community Water Systems and Population Served by Size of System, 2001

(Percentage)



Source: Environmental Protection Agency, "Factoids: Drinking Water and Ground Water Statistics for 2001" (January 2002).

Note: The total number of water systems is 53,783. The total number of people served is 264,145,129.

tems, defined by the Environmental Protection Agency (EPA) as ones with more than 100,000 customers, represent 1 percent of systems but 44 percent of all people served. Similarly, the largest 3 percent of wastewater plants handled 68 percent of the total flow processed by all such plants nationwide.

For both drinking water and wastewater, systems owned by the public sector—by local governments or special local or regional government authorities—serve the large majority of households. Although community drinking water systems owned by the private sector account for over half of all such systems, they serve only about 15 percent of households; private wastewater systems that treat household sewage account for roughly 20 percent of the total, but serve few households—perhaps 3 percent.[3] In a hybrid arrangement, a small but growing number of publicly owned systems have contracted with private firms to operate and maintain them.

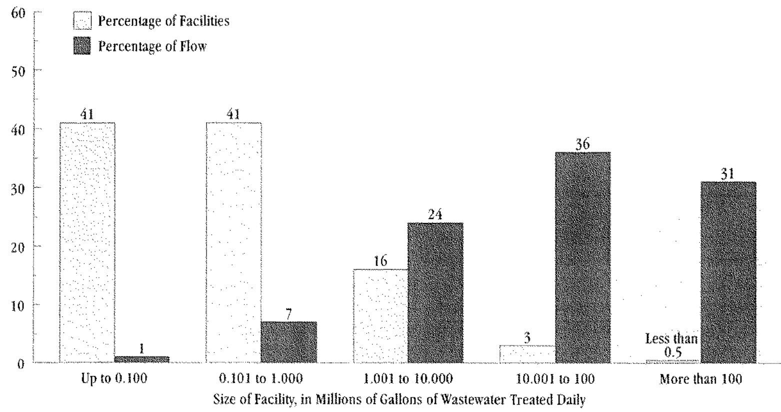
The U.S. pattern of decentralized, local control of water systems is also common abroad, but an increasing number of industrialized countries have moved to consolidate operations or ownership, and some are emphasizing the role of the private sector. In Great Britain, for example, just 10 regional private companies provide almost all wastewater services and most of the drinking water in England and Wales, and fewer than 20 smaller companies

3. EPA's data show that roughly 4,200 private facilities have permits to discharge treated household sewage (by comparison, there are about 16,000 publicly owned treatment works). Private wastewater systems are not eligible for assistance from SRFs (unlike their drinking water counterparts), so they are not included in some of EPA's data-collection efforts, such as the *Clean Water Needs Survey*. Consequently, precise data on the percentage of the population that they serve are not readily available; the estimate of 3 percent reflects common thinking in the industry.

Figure 1-4.

Wastewater Treatment Facilities and Population Served by Size of Facility, 1996

(Percentage)



Source: Congressional Budget Office based on Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997).

Note: The total number of facilities is 15,986; the total daily flow is 32,175 million gallons per day. Totals exclude 38 facilities for which data were unavailable.

supply most of the remaining drinking water[4]; three public authorities provide the water and sewer services in Scotland.[5] Australia, Canada, and Ireland also have regional systems that provide both drinking water and wastewater services.[6] France has 15,500 municipally owned water systems, but most of those systems contract out their operations to one of a handful of private companies.[7]

The costs of providing water services can vary widely, depending on the size of the system, the proximity and quality of the local water sources, and other factors. Treatment costs in particular are subject to economies of scale. For example, EPA's data on the costs of monitoring and treatment to comply with the Safe Drinking Water Act standards in force as of September 1994 suggest that the average cost per household was on the order of $4 per year in systems serving more than 500,000 people, but

4. Organization for Economic Cooperation and Development, Environment Directorate, Working Party on Economic and Environmental Policy Integration, *Industrial Water Pricing in OECD Countries*, ENV/EPOC/GEEI(98)10/FINAL (Paris: OECD, 1999), pp. 9, 192, 197.

5. Web site of the North of Scotland Water Authority, www.noswa.co.uk.

6. Organization for Economic Cooperation and Development, *Industrial Water Pricing*, pp. 9 and 27.

7. Organization for Economic Cooperation and Development, *Industrial Water Pricing*, p. 91; and Liana Moraru-de Loe, "Privatizing Water Supply and Sewage Treatment Services in Ontario," *Water News*, vol. 16, no. 1 (March 1997), available at www.cwra.org/news/arts/privatisation.html.

$300 per year for systems serving no more than 100 people.[8]

The large majority of funding for water services comes from local sources, as can be seen in the detailed data reported by the Association of Metropolitan Sewetage Agencies in its *AMSA Financial Survey, 1999.* Of the revenues reported by 112 medium-sized and large wastewater systems, 55 percent came from user charges or hookup fees, 15 percent from reserves and interesr, 15 percent from bond proceeds, 4 percent from property taxes, 3 percent from SRF loans, 2 percent from federal and state grants, and the remainder from various smaller categories.[9] Excluding reserves, interest, and bond and loan proceeds, all of which derive or must be repaid from other sources, the local funding provided by user charges, hookup fees, and property taxes made up 88 percent of the "underlying" revenues, while federal and state grants contributed just 3 percent.[10] However, federal aid plays a larger role in the financing of small and rural systems not included in the AMSA survey, as discussed below.

The AMSA's data do not categorize user charges by type of customer, but EPA has some information on that subject for dtinking water systems. Results from the agency's 1995 *Community Water System Survey* indicate that residential customers accounred for three times the sales volume of commercial and industrial customers—55 percent versus 18 percent. Another 4 percent of sales were to wholesale customers (who in turn sold to final users), and 23 percent were described as "other," including sales to governmental and agricultural customers and sales by systems that did not disaggregate by customer type.[11]

8. New calculation based on data in Congressional Budget Office, *The Safe Drinking Water Act: A Case Study of an Unfunded Federal Mandate* (September 1995), pp. 16-17.

9. Association of Metropolitan Sewerage Agencies, *The AMSA Financial Survey, 1999* (Washington, D.C.: AMSA), p. 36.

10. Those percentages do not account for the federal and state contributions through subsidized interest rates on SRF loans.

11. Environmental Protection Agency, Office of Water, *Community Water System Survey, Volume I*, EPA 815-R-97-001a (January 1997), pp. 13-14.

The Federal Role

Except as a builder of dams and other major public works used to supply water, the federal government played a relatively minor role in funding or regulating local water systems before 1972.[12] The Public Health Service had published drinking water standards as early as 1914 and updated them in 1925, 1946, and 1962, but those standards were federally enforced only for the water supplies of interstate carriers. Matching grants for 30 percent to 50 percent of the cost of constructing wastewater treatment facilities became available in 1956, but initially the amount of funding was small and there were no federal requiremenrs for such facilities.

With the passage of the Federal Water Pollution Conrrol Act Amendments of 1972, later designated the Clean Water Act, the Congress adopted the goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters, thereby ensuring that they would be fishable and swimmable. Toward that goal, the legislation established a requirement that municipal wastewater discharged to surface waters be given secondary treatment, increased the federal matching share to 75 percent for constructing publicly owned treatment works, and greatly expanded the amount of the available funding. Consequently, federal outlays for wastewater rreatment grants rose tenfold in real (inflation-adjusted) terms during the 1970s, reaching a high of $9.1 billion (in 2001 dollars) in 1980.[13]

The expansion of aid was seen as a temporary infusion of capital to allow publicly owned wastewater systems to construct secondary treatment facilities—and, indeed, funding has declined sharply since its real peak in 1980. In 1981, amendments to the Clean Water Act cut the authorization for wastewater grants in half and reduced the federal matching share to 55 percenr for facilities huilt after 1984. Then in 1987, legislation was enacted to phase out the construction grant program by 1991 and replace

12. Issues involving federal water projects and the adequacy of water supplies are outside the scope of this study. But see Congressional Budget Office, *Water Use Conflicts in the West: Implications of Reforming the Bureau of Reclamation's Water Supply Policies* (August 1997).

13. Congressional Budget Office, *Trends in Public Infrastructure Spending*, CBO Paper (May 1999), pp. 102-104.

it with a period of grants to capitalize state revolving funds, with the states matching 20 percent of each federal dollar. The SRFs provide several types of financial support —including loans at or below market interest rates, purchase of existing local debt obligations (bonds), and guarantees for new debt —but they do not make grants. The 1987 law envisioned that loan repayments would allow the SRFs to operate without ongoing federal support and authorized contributions only through 1994; however, the Congress has continued to appropriate funds each year since then, including $1.35 billion for 2002.[14] In nominal dollars, appropriations from 1973 through 2002 have totaled $73 billion.

The federal government's primary involvement with drinking water began with the Safe Drinking Water Act in 1974. Among the factors leading to its passage were concerns that the Public Health Service's drinking water standards were based on inadequate and obsolete data, that state and local officials were not adequately monitoring water systems, and that pollutants found in drinking water were carcinogenic. EPA issued few standards for drinking water contaminants in the law's first decade, and the Congress amended it in 1986 to require the agency to develop standards for 83 specified contaminants and for 25 others every three years. As amended, the law called for the standards, deemed "maximum contaminant levels," to be set as close as feasible to levels at which no adverse health effects were known or anticipated—taking cost into consideration in defining feasibility. EPA considers a standard feasible if the cost of meeting it is "reasonable" for large water systems.[15]

Neither the original Safe Drinking Water Act nor the 1986 amendments authorized federal funding, but as the number of standards and the costs of meeting them grew, so did support for providing drinking water systems with financial assistance. Thus, a key provision of the law's 1996 amendments created a program of drinking water SRFs modeled after the existing wastewater program and authorized $9.6 billion through fiscal year 2003 in capitalization grants, again requiring a 20 percent state match. (Appropriations through fiscal year 2002 for the drinking water funds have totaled $5.3 billion.) Other major provisions revoked the requirement that EPA regulate an additional 25 contaminants every three years, authorized the agency to adopt less stringent contaminant standards if necessary to keep costs from exceeding benefits, and required it to identify "variance technologies" that could be approved for use by small systems judged unable to afford to comply with the relevant standards. The amendments also called on states to establish programs to certify and develop the technical, financial, and managerial capacity of drinking water systems to comply with all federal requirements.

Federal spending programs outside of EPA also provide financial support for investments in water infrastructure. The Rural Utilities Service of the Department of Agriculture provides a mix of loans and grants for water and waste disposal projects in communities with fewer than 10,000 people; the program received $647 million in 2002. Drinking water and wastewater projects may also receive funding through the Public Works and Development Facilities Program (administered by the Economic Development Administration in the Commerce Department) or the Community Development Block Grants program (administered by the Department of Housing and Urban Development) if they meet the relevant criteria: the former program focuses on job creation and the latter on community development that benefits low- and moderate-income people. Still other programs focus on assistance to specific groups or locations, such as Indian tribes, native Alaskan villages, Appalachia, and unincorporated *colonias* on the U.S.-Mexico border.

The federal government also supports water infrastructure indirectly, through tax preferences. Because the interest paid on state and local bonds is generally excludable from taxable income, municipalities and other public water authorities can issue bonds at lower rates than they would otherwise have to pay. Also, bonds issued for privately owned drinking water and wastewater systems are considered "qualified private activity bonds" eligible for tax-exempt status; however, the federal government limits the

14. In addition, for 2002 the Congress earmarked $344 million in grants for wastewater and drinking water projects.

15. See, for example, Environmental Protection Agency, "National Primary Drinking Water Regulations: Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, Final Rule," *Federal Register*, vol. 66, no. 14 (January 22, 2001), p. 6981.

volume of tax-exempt private bonds that each state can issue annually. Issues of municipal and tax-exempt private bonds for municipal utilities—primarily drinking water and wastewater systems but also some solid and hazardous waste facilities—totaled $14.0 billion in 2000 and $29.3 billion in 2001.[16] The Joint Committee on Taxation estimates that the exemption will save bondholders $0.6 billion in fiscal year 2002.[17]

The Need for Increased Investment

Dramatic incidents in recent years have called attention to the importance of water infrastructure. In 1993, contamination of the Milwaukee water supply by cryptosporidium caused 400,000 cases of gastrointestinal illness and an estimated 50 to 100 deaths. That same year, two people in Atlanta were killed by falling into a sinkhole created by the collapse of a storm sewer. Baltimore had two sinkholes of 30 feet or more in 1997, and a Manhattan sinkhole caused millions of dollars in damage in 1998.

Less catastrophic failures demonstrate the widespread nature of the problems. According to EPA's data, 880 publicly owned treatment works receive flows from "combined sewer systems" which commingle stormwater with household and industrial wastewater and frequently overload during heavy rain or snowmelt. EPA estimates that such overflows discharge 1.2 trillion gallons of stormwater and untreated sewage every year. Even "sanitary" systems with separate sewers for wastewater can overflow or leak because of pipe blockages, pump failures, inadequate maintenance, or excessive demands. According to a draft EPA report, overflows from sanitary sewers alone result in a million illnesses each year.[18] Moreover, according to industry experts, many urban and rural drinking water systems lose 20 percent or more of the water they produce through leaks in their pipe networks.[19]

In part, those problems result from the aging of the nation's water infrastructure, particularly its pipes. Though less visible than treatment facilities, pipes actually account for the majority of both drinking water and wastewater systems' assets.[20] According to estimates, drinking water systems have 800,000 miles of pipes, and sewer lines cover more than 500,000 miles.[21] The rule of thumb is that a sewer pipe lasts 50 years (although actual useful lifetimes can be significantly longer, depending on maintenance and local conditions), and a 1998 survey of 42 municipal sewer systems found that existing pipes averaged 33 years old, suggesting that many are, or soon will be, in need of replacement.[22] Similarly, a study by the American Water Works Association that analyzed 20 medium-sized and large drinking water systems concluded that the need to

16. Personal communication from Amy Resnick, editor, *The Bond Buyer*, citing data from Thomson Financial.

17. Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2002-2006*, JCS-1-02 (January 17, 2002), p. 21.

18. Environomics, Inc., and Parsons Engineering Science, Inc., *Economic Analysis of Proposed Regulations Addressing NPDES Permit Requirements for Municipal Sanitary Sewer Collection Systems and Sanitary Sewer Overflows* (draft prepared for the Environmental Protection Agency, March 24, 2000), p. 3-1.

19. Personal communications from John Young, Vice President for Engineering, American Water Works Services Company, and Buzz Teter, Research and Development Specialist, American Leak Detection.

20. For example, a recent study of 20 medium-sized and large drinking water systems found that water mains accounted for more than 60 percent of the current value of the systems' capital stock. American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (May 2001), p. 11, available at www.awwa.org/govtaff/infrastructure.pdf.

21. American Society of Civil Engineers, *Drinking Water*, Issue Brief (no date); Parsons Engineering Science, Inc., Metcalf and Eddy, and Limno-Tech, Inc., *Sanitary Sewer Overflow (SSO) Needs Report* (prepared for the Environmental Protection Agency, Office of Wastewater Management, May 2000), p. 2-2. The estimate for sewer lines is for systems with separate sanitary sewers; given the same assumptions, systems that combine sanitary wastewater and stormwater add roughly 140,000 more miles to the overall total.

22. American Society of Civil Engineers, *Optimization of Collection System Maintenance Frequencies and System Performance* (prepared for the Environmental Protection Agency, November 1998).

replace pipes will rise sharply over the next 30 years as previous generations wear out.[23]

Although treatment plants represent a smaller share of water systems' assets than pipes do, they too are aging. Equipment in many plants built under the Clean Water Act and Safe Drinking Water Act will need to be replaced in the next decade or two. Moreover, many drinking water systems will have to make additional investments in treatment equipment to satisfy forthcoming regulations under the Safe Drinking Water Act.

In short, costs to construct, operate, and maintain the nation's water infrastructure can be expected to rise significantly in the future. Less clear, however, are the amount and timing of the increases. Estimates of future costs and the uncertainties surrounding them are discussed in Chapter 2; sources of funding to pay those costs are considered in Chapter 3.

23. American Water Works Association, *Reinvesting in Drinking Water Infrastructure.*

CHAPTER

2

Estimates of Future Investment Costs and Their Implications

Any estimate of costs for future investment in water systems reflects not only the current state and future depreciation of the existing infrastructure but also the goals—such as the regulatory requirements and the levels of customer satisfaction—that water systems seek to achieve and the efficiency with which they pursue those goals. An underlying assumption, about which there appears to be general consensus, is that customers will continue to expect high-quality service. Less consensus exists, however, regarding the future costs of regulatory requirements and potential efficiency savings.

Given the limitations of the available data, which begin with uncertainties about even the amount and condition of the current infrastructure, in this study the Congressional Budget Office (CBO) does not provide a single point estimate of 20-year investment costs. Instead, it discusses estimates for two scenarios—a low-cost case and a high-cost case—that it believes span the most likely possibilities. CBO derived those estimates by applying specific new assumptions to the same modeling framework that the Water Infrastructure Network (WIN)—a coalition of groups representing water systems, elected officials, engineers, construction companies, and environmentalists —used to develop its own estimates. Like WIN's analysis, CBO's scenarios cover the years 2000 to 2019; data on actual investment in 2000 and 2001 are not yet available.

The two scenarios yield estimates of average annual investment costs ranging from \$11.6 billion to \$20.1 billion for drinking water systems and from \$13.0 billion to \$20.9 billion for wastewater systems.[1] Those estimates measure investment volume in 2001 dollars (as do all other dollar figures in this chapter not identified otherwise) and in terms of costs as financed, taking into account the use of borrowing to spread the investment burden over time. In particular, the estimates reflect the full capital costs of investments made each year on a pay-as-you-go basis and the debt service (principal and interest) paid on prior financed investments. Costs as financed are particularly relevant to policy debates about affordability because they reflect the current burden on water systems. (One could also measure investment volume in terms of economic resource costs; *see Box 2-1.*)

By comparison, spending on investment in states' 1998-1999 fiscal year (calculated using similar assumptions to the ones underlying the projections of future investment) was \$11.8 billion for drinking water and \$9.8 billion for wastewater. Thus, the projected overall shortfall between current spending and future costs is \$3.0 billion per year in the low-cost case (-\$0.2 billion for drinking water and \$3.2 billion for wastewater) and \$19.4 billion in the high-cost case (\$8.3 billion for drinking water and \$11.1 billion for wastewater).

1. The estimates for drinking water and wastewater are not strictly comparable because the methods CBO used to derive them were not identical, as discussed below.

CBO has also analyzed the impact of those projected increases on household hudgets. Assuming for simplicity that both the level of taxpayer-financed support and the distribution of costs between household and other water ratepayers remained constant, CBO estimates thar hy 2019, average bills for drinking water and wastewater services combined would account for 0.6 percent of average household income under the low-cost case and 0.9 percent under the high-cost case, up from 0.5 percent in the late 1990s. Of course, many households would pay

Box 2-1.

Alternative Measures of Investment Spending

This study measures investments in water systems in terms of costs as financed because that measure hest reflects the impact on water rates and hence on the affordability of household water bills. The alternative and more common measure is economic costs—the quantity of real economic resources required by the investments.

In particular, economic costs reflect the capital costs of all investments, whether financed by bonds or loans or paid for from funds on hand; that measure omits interest payments on bonds and loans, which represent mere transfers of funds. Thus, it differs in two ways from the measure describing costs as financed: by excluding interest costs and by focusing on the full capital costs of new financed investments rather than the current principal payments on previous financed investments (*see the table*). Although less relevant than costs as financed for judging the affordability of water services, economic costs are the preferred measure for policy questions that focus on the efficient use of society's resources, such as questions about the costs and benefits of water-quality regulations.

The Water Infrastructure Network's (WIN's) estimates reflect neither economic costs nor costs as financed. For each of the 20 years analyzed, the estimates combine the capital costs for all investments made that year—that is, the economic costs—and the sum (in real dollars) of all future interest costs for the portion of the investments financed hy borrowing. In other words, each year's estimate adds the cost of that year's pay-as-you-go investments and the total debt service (principal plus interest) to be paid in later years for the new financed investments. Thus, whereas costs as financed include the current debt service paid on past investments, WIN's estimates include future debt service on current investments. The impact of that difference is discussed in *Box 2-3* on page 19.

Note that the distinction between the two measures of cost does not apply to spending on operations and maintenance (O&M). Since O&M is paid for from current funds, the real resource costs to the economy are the same as the immediate burden on water systems and their ratepayers.

Costs Included in Measures of Investment Spending

	Costs as Financed	Economic Costs	WIN's Estimates[a]
Capital Costs of Current Pay-As-You-Go Investments	yes	yes	yes
Current Principal for Old Financed Investments	yes	no	no
Total Future Principal for Current Financed Investments	no	yes	yes
Current Interest on Old Financed Investments	yes	no	no
Total Future Interest on Current Financed Investments	no	no	yes

Source: Congressional Budget Office.

a. As published. Elsewhere in this study, CBO has converted WIN's estimates to costs as financed, using detailed results from WIN's analysis to include and exclude component costs, as needed.

less than those averages, and many others would pay more. For example, in CBO's two cases an estimated 10 percent to 20 percent of households would be paying more than 4 percent of their income for water services by 2019, compared with 7 percent doing so in the late 1990s.

CBO's estimates of future investment costs appear to be significantly below those published in the WIN report; however, the two are not directly comparable because WIN's estimates do not reflect costs as financed. When expressed in comparable terms, the estimates from CBO's high-cost case and WIN's analysis are similar. That similarity is not surprising because CBO used WIN's basic modeling approach and, in the high-cost case, similar assumptions. Thus, CBO's high-cost case does not lend independent support for WIN's estimates; rather it suggests that estimates of that magnitude require relatively pessimistic assumptions. Studies that project national investment costs by aggregating data from individual water systems have yielded estimates that are lower than those of CBO's low-cost case.

CBO's estimates do not include the costs of additional investments in infrastructure security prompted by the September 2001 attacks on the World Trade Center and the Pentagon. As this report was written, the drinking water and wastewater industries were in the early stages of assessing their vulnerabilities (*see Box 2-2*). Preliminary indications are that capital costs for security will not add much to the investment costs described here. CBO's estimates also exclude investments in drinking water systems that serve only future growth; such investments are not eligible for funding under the state revolving fund program.

Bottom-Up and Top-Down Estimates of Investment in Water Systems

To interpret CBO's scenarios and estimates, it is useful to understand the basic approaches underlying previous estimates of investment in water systems—particularly those used in WIN's analysis, which CBO adapted. The approaches can be divided into two categories: bottom-up estimates reflect assessments of the needs of individual systems—either all systems nationwide or a sample of systems—whereas top-down estimates are based on analyses of aggregate national data. Top-down studies are simpler and less expensive, but their results are sensitive to a number of assumptions required because of the limitations of the aggregate data—particularly the lack of a national inventory of pipes' age and condition.

Bottom-Up Estimates

EPA's periodic needs surveys provide the most comprehensive bottom-up estimates.[2] The 1999 drinking water survey, published in February 2001, estimates total investment costs from 1999 to 2018 to be $159.5 billion (*see Table 2-1*).[3] The agency's latest available wastewater survey estimates 20-year costs to be $147.0 billion, if $13.2 billion for projects not involving infrastructure per se is excluded.[4] Expressed as average annual costs, those estimates are $8.0 billion for drinking water systems and $7.3 billion for wastewater systems; both estimates reflect capital costs alone, excluding financing.

One key limitation of both surveys, acknowledged in EPA's reports, is that many respondents may have been unable to supply adequate documentation for investments later in the 20-year survey period because they relied on

2. Some of the estimates identified here as "bottom-up" contain minor top-down components and vice versa.

3. Environmental Protection Agency, Office of Water, *Drinking Water Infrastructure Needs Survey: Second Report to Congress*, EPA 816-R-01-004 (February 2001), p. 12. The report expressed the estimate as $150.9 billion in January 1999 dollars. The survey included on-site analyses at 599 small systems (serving up to 3,300 people) randomly selected from the roughly 45,000 such systems and questionnaires mailed to all of the 1,111 systems serving more than 40,000 people and a random sample of 2,556 of the 7,759 systems serving 3,301 to 40,000 people. The return rate on the questionnaires was 96 percent. Ibid., pp. 18-19.

4. The original figures, in January 1996 dollars, were $128.0 billion and $11.5 billion; EPA derived the national totals after reviewing documentation submitted by the states. Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997), pp. 1-2, 20. The excluded categories cover projects addressing nonpoint source pollution involving agriculture and silviculture; urban runoff; and groundwater, estuaries, and wetlands.

Box 2-2.

Security Investments for Water Systems

Although utility, government, and academic experts can identify generally what measures are needed to safeguard water services, a reliable assessment of the total potential costs of addressing those needs is not yet available.

Environmental Protection Agency officials and outside security experts generally view a terrorist attack on physical infrastructure (dams, treatment plants, pipes, and computer systems) as the scenario warranting the most attention. In some cases, successful attacks, such as one that would destroy any of the 93,000 "high hazard" dams, could not only disrupt service but also immediately cause human deaths. Contamination of drinking water at a reservoir or treatment plant is considered relatively unlikely to cause a large-scale health problem because of the volume of contaminants needed and because of the screening involved in treatment.[1] Contamination of the water once it was in the distribution system would be more direct but would affect fewer people.

In the short term, water systems are focusing on securing or eliminating toxic chemical stockpiles at treatment plants; installing basic surveillance and security equipment such as fencing, lighting, motion sensors, closed-circuit television, locks, and alarms; and conducting background checks and security training programs. Also, the water industry's Information Sharing and Analysis Center (ISAC)—a Web-based tool providing threat alerts, a mechanism for systems to report incidents, and training resources—is scheduled to be launched in December 2002. The ISAC will help water systems, law enforcement agencies, and emergency response organizations share information.

For longer-term improvements in security, the nation's water systems are working to finish vulnerability assessments and to adapt their emergency response plans to include terrorist acts. Moreover, research and development is under way to identify ways to combat physical vulnerabilities and contamination (chemical, biological, or radiological) and to identify the interconnections with other critical services such as those of the energy, telecommunications, and transportation sectors and emergency services.

As the vulnerability assessments and research projects are completed, investment needs will become clearer, and perhaps much larger than those identified today. Nonetheless, on the basis of conversations with industry experts, CBO anticipates that those needs will be small compared with the widespread needs to replace and improve the water infrastructure. For example, the American Water Works Association has estimated national costs of $450 million to complete vulnerability assessments for all systems serving more than 3,300 people and $1.6 billion for initial security improvements (access controls such as fences, lighting, cameras, and alarms). Combined, those one-time amounts represent less than 1 percent of CBO's estimates of the 20-year capital costs of investment in drinking water systems.

1. For a contrary view, see www.amsa-cleanwater.org/advocacy/security/articles.cfm, which cites an article from the November 17, 2001, *St. Louis Post Dispatch* quoting two government officials who believe that the potential risk from bacterial contamination is high.

planning documents covering one to 10 years.[5] The report on wastewater also argues that the survey underreports future investments to correct problems with sanitary sewer overflows (SSOs).[6] Indeed, a subsequent top-down report placed the investment costs of controlling SSOs at $92.4 billion, well above the figures found in the

5. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey*, p. 43; and *1996 Clean Water Needs Survey*, p. 7.

6. Environmental Protection Agency, *1996 Clean Water Needs Survey*, p. 7.

Table 2-1.

Summary of Estimates of Investment Costs for Water Systems

(In billions of 2001 dollars)

	Drinking Water		Wastewater		Total	
	As Published	Per Year	As Published	Per Year	As Published	Per Year
Bottom-Up Estimates						
Environmental Protection Agency						
Clean Water Needs Survey	n.a.	n.a.	147.0 over 20 years	7.3	n.a.	n.a.
Drinking Water Infrastructure Needs Survey	159.5 over 20 years	8.0	n.a.	n.a.	n.a.	n.a.
American Water Works Association	255 over 30 years	8.5	n.a.	n.a.	n.a.	n.a.
Top-Down Estimates						
Stratus Consulting (Investments in distribution systems only)	348.3 over 20 years	17.4	n.a.	n.a.	n.a.	n.a.
Water Infrastructure Network						
Capital only	20.9 per year	20.9	19.2 per year	19.2	40.1 per year	40.1
Capital and financing	26.3 per year	26.3	24.2 per year	24.2	50.5 per year	50.5

Source: Congressional Budget Office based on Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997); Environmental Protection Agency, Office of Water, *Drinking Water Infrastructure Needs Survey: Second Report to Congress*, EPA 816-R-01-004 (February 2001); American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Denver, Colo.: AWWA, May 2001); Stratus Consulting, Inc., *Infrastructure Needs for the Public Water Supply Sector* (unpublished report for the American Water Works Association, December 22, 1998); and Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

Note: n.a. = not applicable.

corresponding categories of the survey.[7] Replacing those figures reported in the survey with the top-down estimate raises total costs from $147.0 billion to $198.2 billion.

The perceived shortcomings of EPA's surveys helped spur the American Water Works Association (AWWA) to conduct an in-depth analysis of 20 large and medium-sized drinking water systems. On the basis of the actual age and estimated lifetimes of the pipes, treatment plants, and other assets, the analysis found that the 20 systems would need to spend about $6 billion (in 2000 dollars) above their current levels over the next 30 years.[8] The corresponding annual costs per household ranged from about $18 to $77. On the basis of those 20 systems, the report extrapolated a national total of $255 billion over 30 years, implying an annual average of $8.5 billion (in 2001 dollars)—very similar to the $8.0 billion average reported in EPA's drinking water survey.

Top-Down Estimates

The top-down estimates reviewed for this study are larget than the bottom-up estimates (*see Table 2-1*). The differences could reflect incomplete coverage of costs over the 20-year period and other limitations of the existing bottom-up studies, inaccurate assumprions in the top-down studies, or both.

7. Parsons Engineering Science, Inc., Metcalf and Eddy, and Limno-Tech, Inc., *Sanitary Sewer Overflow (SSO) Needs Report* (prepared for the Environmental Protection Agency, Office of Wastewater Management, May 2000), pp. 1-7, 5-3. As presented in the report, the estimate was $87.3 billion in December 1998 dollars.

8. American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Washington, D.C.: AWWA, May 2001), p. 18.

A top-down study done by Stratus Consulting for the AWWA (not to be confused with the association's recent 20-system study) estimated 20-year costs for investments in drinking water distribution systems to be $348.3 billion, roughly four times the amount reported in EPA's survey.[9] The total from the Stratus study translates to average annual costs of $5.1 billion for large systems and $9.9 billion for medium-sized systems, reflecting point estimates or probability distributions for five factors: the number of systems nationwide (classified by size and region), the miles of pipe per system, the distribution of pipe mileage by size category, the replacement cost of pipes in each size category, and the average annual rate of replacement.[10] Many uncertainties surround those factors. For example, two databases cited in the study yielded estimates of 828 miles and 713 miles of pipe in the average large system.[11] Simply using the lower figure instead of the higher would have reduced estimated investment costs for large systems by 14 percent, or $15 billion over 20 years. And major uncertainty accompanied the assumptions regarding future replacement rates, as discussed in the next section.

WIN's April 2000 report combined data and estimates from existing sources with a new top-down analysis.[12] For drinking water, WIN borrowed estimates related to water distribution from the Stratus study and estimates for all other categories (treatment, storage, water sources, and "other") from EPA's 1995 needs survey for drinking water, the predecessor to the 1999 survey discussed above.

For wastewater, WIN's approach distinguished investments to replace existing infrastructure from all other investments, such as those to build new treatment plants or new structures to contain stormwater runoff. The analysis calculated the cost each year for replacing infrastructure as the product of net capital stock in that year and a fixed depreciation rate.[13] WIN estimated other investment costs on the basis of EPA's needs survey, adjusted using the agency's revised estimate for controlling sanitary sewer overflows. However, because the survey captured some replacement projects also, WIN's analysts subtracted a percentage to avoid double-counting. Again, some key assumptions, such as those about the depreciation rate and the correction factor for double-counting, were accompanied by significant uncertainty.

The WIN report went beyond the studies discussed above by also estimating financing costs and operation and maintenance (O&M) costs. To estimate financing costs, WIN's analysts assumed that water systems would pay for 25 percent of investment costs from internal funds, with the rest financed for 20 years at a real interest rate of 3 percent. They estimated O&M costs by extrapolating a linear trend through data on actual spending: for drinking water, they used 1985-1994 data on O&M spending itself; for wastewater, they used 1972-1996 data on O&M spending per dollar of estimated net capital stock. Both estimates apparently subtract 20 percent for efficiency savings, phased in over 10 years. Those approaches are discussed in more detail in Appendix A.

9. Stratus Consulting, Inc., *Infrastructure Needs for the Public Water Supply Sector* (unpublished report for the American Water Works Association, December 22, 1998). The study estimated costs only for large and medium-sized systems; for small systems, it adopted the estimate from EPA's 1997 needs survey.

10. The report provided 80 percent confidence intervals—that is, the ranges that cover the central 80 percent of the possible outcomes, omitting only the bottom 10 percent and the top 10 percent. For large systems, the 80 percent confidence interval (in 1998 dollars) covered $0.9 billion to $9.7 billion. For medium-sized systems, the distribution was somewhat less diffuse, spanning $5.8 billion to $13.6 billion. Ibid., p. 3-10.

11. Ibid., p. 3-2.

12. Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000), available at www.win-water.org. The following description of WIN's methods comes from an unpublished appendix to the report and from several sets of oral or written statements from Kenneth Rubin, PA Consulting, who served as lead analyst developing the model for WIN.

13. WIN constructed its estimate of the capital stock of wastewater infrastructure that existed in 1999 from a 1990 estimate prepared for the Federal Infrastructure Strategy Program of the Army Corps of Engineers, information on annual investments for 1990 to 1999 obtained or extrapolated from census data, and the assumed depreciation rate. That depreciation refers to the annual reduction in the useful economic life of an asset, not to the related accounting concept of the credit allowed for tax or regulatory purposes.

Table 2-2.

CBO's Estimates of the Likely Range of Average Annual Costs for Water Systems, 2000 to 2019

(In billions of 2001 dollars)

	Drinking Water	Wastewater	Total
Debt Service on Pre-2000 Investments	4.4 to 4.4	4.3 to 4.3	8.7 to 8.7
Capital Costs (Paygo + Financed Principal) on New Investments	5.3 to 12.1	6.5 to 12.9	11.8 to 25.0
Interest on New Financed Investments	1.9 to 3.6	2.3 to 3.7	4.1 to 7.3
Total Investment	11.6 to 20.1	13.0 to 20.9	24.6 to 41.0
Operations and Maintenance	25.7 to 31.8	20.3 to 25.2	46.1 to 57.0

Source: Congressional Budget Office.

Note: Ranges reflect CBO's low-cost and high-cost cases.

CBO's Estimates of Future Costs

CBO's two sets of projections of 20-year costs for water systems differ significantly. Under its low-cost case, the estimate for average annual investment costs for both drinking water and wastewater is $24.6 billion ($11.6 billion for drinking water and $13.0 billion for wastewater —*see Table 2-2*), 40 percent less than its estimate of $41.0 billion under the high-cost case ($20.1 billion for drinking water and $20.9 billion for wastewater). Again, the estimates are measured in terms of costs as financed, reflecting the average annual capital costs for pay-as-you-go (or more briefly, paygo) investments and the debt service (principal and interest) paid on prior financed investments.[14] The divergent estimates reflect nine differences in the assumptions used in the two scenarios and illustrate the uncertainty inherent in top-down analyses of 20-year investment needs.

For operations and maintenance, the range of estimates between the two cases is narrower—the smaller total of $46.1 billion is just 19 percent below the larger figure of $57.0 billion. Those estimates reflect a relatively narrow range of modeling assumptions and may understate the true range of uncertainty.

CBO's estimates of future investment under its high-cost scenario are similar to those from WIN's analysis, when the latter are measured in terms of costs as financed (*see Table 2-3*). (WIN's report does not provide costs-as-financed estimates, but CBO was able to calculate such estimates using more-detailed results provided by WIN's analysts; *see Box 2-3*.) WIN's operations and maintenance estimates are directly comparable to CBO's and fall within the upper half of the range between the two cases.

Note that because of the nature of the underlying data sources, CBO's estimates of future costs, like WIN's, exclude some investments associated with new customers and expansion, at least for drinking water. The estimates for investments in drinking water distribution, which are based on the analysis by Stratus Consulting, cover only the cost of replacing the existing infrastructure and exclude the effects of any increases (or decreases) in capacity. The estimates for other categories of investments in drinking water systems reflect the eligibility criteria used in EPA's needs survey and thus include investments to serve new customers only if those investments are necessary to respond to a public health problem (for example, bringing service to homes served by contaminated wells) or if they represent components of projects triggered by the needs of existing customers (such as increased capacity

14. As Table 2-2 shows, debt service on pre-2000 projects accounts for roughly one-third of total investment costs in the low-cost case and one-fifth in the high-cost case.

Table 2-3.

Comparison of CBO's and WIN's Estimates of Average Annual Costs, 2000 to 2019

(In billions of 2001 dollars)

	Drinking Water	Wastewater	Total
Investment (Costs as financed)			
CBO[a]	11.6 to 20.1	13.0 to 20.9	24.6 to 41.0
WIN (Calculated by CBO)	21.4	18.9	40.3
Operations and Maintenance			
CBO[a]	25.7 to 31.8	20.3 to 25.2	46.1 to 57.0
WIN	29	24	53

Source: Congressional Budget Office based in part on data from the Water Infrastructure Network.

Note: CBO recalculated WIN's estimates for investment to convert them to costs as financed.

a. Ranges reflect CBO's low-cost and high-cost cases.

of a treatment plant due for replacement anyway).[15] Those exclusions tend to bias estimated future costs downward; however, both CBO's and WIN's analyses of the impact of future costs on water systems and ratepayers also neglect related factors that could increase revenues, such as population growth and increased reliance on hookup fees and developers' contributions.

The Low-Cost and High-Cost Scenarios

CBO's goal in assembling the assumptions for each scenario was to choose sets of plausibly (not extremely) low and high values that have a reasonable chance of occurring together. The resulting low and high estimates are thus intended to span most of the distribution of possible outcomes but not its extreme tails.

In total, 11 assumptions distinguish the low-cost and high-cost cases from each other or from WIN's analysis (*see Table 2-4*). The three assumptions most responsible for the difference in estimates of investment costs in CBO's scenarios are those concerning the rate at which drinking water pipes will need to be replaced, the costs associated with addressing combined sewer overflows (CSOs), and the potential savings in investment costs from gains in efficiency. Those assumptions are outlined here; a more comprehensive discussion of all 11 assumptions is available in Appendix A.

Replacement Rate for Drinking Water Pipes. The aging of existing water infrastructure is the single largest factor driving projected increases in investment spending.[16] But how much of the infrastructure will need to be replaced over the next 20 years is a difficult question. Again, for purposes of this analysis, CBO assumes that managers maintain service standards and make efficient choices in trading off investment and maintenance; clearly, one could reduce replacement costs over a span of 20 years by delaying appropriate investments, at the cost of lower standards of service, excessive maintenance expenditures in the meantime, or both.

15. The estimates of investment costs for wastewater systems are probably also incomplete, though in a less systematic way. The estimates of costs for replacement do not directly include the incremental costs of any increases in capacity or capability. In principle, those incremental costs could be reflected in the needs survey data that underpin the estimates of other costs (because wastewater projects to serve new customers are eligible for SRF assistance and are thus covered in the needs survey); as explained, however, it is doubtful that the survey data capture such costs for the full 20-year period.

16. Of course, such investments cannot always be assigned a unique cause. For example, some replacements of deteriorated sewer pipes can be viewed either as triggered by a need to comply with regulations on sewer overflows or as ordinary replacements of depreciated capital stock.

Box 2-3.

The Water Infrastructure Network's Published Estimates of Investment Needs and the "Funding Gap"

The Water Infrastructure Network's (WIN's) published estimates of total investment needs (capital plus financing) do not reflect costs as financed: they include total debt service on new investments from 2000 to 2019, regardless of when those payments occur, rather than the debt service (on both pre-2000 and new investments) actually paid during the period. The difference is important because the investments financed from 1980 to 1999 and still being paid off from 2000 to 2019 are smaller than the investments projected to be financed during the latter period. Therefore, as the table shows, recalculated to express the costs of investment as financed—the true burden facing water systems and ratepayers during the 20-year period—WIN's results drop by 20 percent: from the published annual average of $50.5 billion (in 2001 dollars) for both drinking water and wastewater to $40.3 billion.

Not only do WIN's published estimates not represent costs as financed, they also do not measure the same things covered by the Census Bureau's data on water systems' current spending (discussed below in the text). Thus, subtracting the census data from WIN's estimates, which WIN did to derive what it termed the "funding gap," does not yield an internally consistent estimate of the difference between current spending and future needs. In particular, whereas WIN's projections of needs in any year include all interest paid over time on that year's investments, the census data for a given year include interest payments made in that year on preexisting debt for drinking water systems and exclude interest on debt for wastewater systems. When both future investment needs and current spending are measured in terms of costs as financed, the estimated funding gap that WIN refers to averages $18.6 billion per year for drinking water and wastewater combined.[1]

1. That estimate uses 1999 as the base year for "current" spending, whereas WIN's published estimate used 1996. CBO has not pursued the data far enough to estimate 1996 spending in terms of costs as financed; doing so would require estimating 1996 debt-service payments on investments going back to 1976 (assuming 20-year borrowing). Nonetheless, it is safe to say that the funding gap measured in costs as financed would be similar with 1996 as the base year: costs as financed reflect debt service on many previous years of investment and thus are a kind of moving average that smooths out year-to-year changes in investment volume.

WIN's Estimates, as Published and in Costs as Financed
(In billions of 2001 dollars)

	Drinking Water	Wastewater	Total
WIN's Estimates as Published			
Total investment	26.3	24.2	50.5
Increase above 1996 level	12.2	13.5	25.7
WIN's Estimates in Costs as Financed (Calculated by CBO)			
Total investment	21.4	18.9	40.3
Increase above 1999 level	9.4	9.2	18.6
Memorandum:			
CBO's Range of Estimates			
Total investment	11.6 to 20.1	13.0 to 20.9	24.6 to 41.0
Increase above 1999 level	-0.2 to 8.3	3.2 to 11.1	3.0 to 19.4

Source: Congressional Budget Office based in part on Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

Table 2-4.

Assumptions Used in CBO's and WIN's Analyses

	CBO's Assumptions		
	Low-Cost Case	High-Cost Case	WIN's Assumptions
Capital Factors			
Savings from Increased Efficiency in Investment by Drinking Water and Wastewater Systems (Percent)	15.0	5.0	0
Drinking Water Systems			
Annual percentage of pipes replaced	0.6	1.0	1.0
Average annual cost for regulations not yet proposed (Billions of 2001 dollars)	0	0.53	0
Wastewater Systems			
Annual percentage depreciation	2.7	3.3	3.3
Share of investments in EPA's needs survey for replacing existing capital (Percent)	25.0	15.0	20.5
Average annual cost for abating combined sewer overflows (Billions of 2001 dollars)	2.6	5.4	2.6
Financing Factors			
Real Interest Rate (Percent)	3.0	4.0	3.0
Repayment Period	30 years	25 years	20 years
Pay-As-You-Go Share of Total Investment (Percent)	15.0	30.0	25.0
Average Annual Debt Service on Pre-2000 Investments (Billions of 2001 dollars)	8.7	8.7	9.5
Operations and Maintenance	Linear extrapolation of 1980-1998 trend, less 20 percent efficiency savings phased in from 1995 to 2004	Linear extrapolation of 1980-1998 trend	Drinking water: Linear extrapolation of 1985-1994 trend, apparently less 20 percent efficiency savings phased in from 1997 to 2006 Wastewater: Linear extrapolation of 1972-1996 trend per unit of net capital stock, less 20 percent efficiency savings phased in from 1997 to 2006

Source: Congressional Budget Office based in part on data from the Water Infrastructure Network.

In the case of drinking water pipes, both of CBO's scenarios assume replacement rates drawn from the aforementioned study by Stratus Consulting, whose findings were later incorporated in the WIN coalition's analysis. The Stratus study assumed that 1 percent of pipe mileage is replaced each year on average, and CBO adopted that assumption in its high-cost case.[17] However, that study also presented a plausible alternative approach in which a pipe is replaced when its age reaches its service life, and growth in pipe mileage since 1880 has been proportional to growth in the U.S. population. On the basis of that approach, CBO's low-cost case adopted an average annual replacement rate of 0.6 percent.[18]

Abatement of Combined Sewer Overflows. After the deterioration of existing infrastructure, regulatory requirements are probably the second largest factor driving investments in water systems. Wastewater systems in particular face major investments to reduce the incidence of sewer overflows—from both combined sewers, which commingle stormwater with domestic sewage and industrial wastewater, and separate sanitary sewets.[19] As noted in Chapter 1, combined sewer systems—found in roughly 900 wastewater systems nationwide, about 4 percent of the total—frequently exceed their collection and treatment capacity during periods of heavy rain or snowmelt, discharging the excess flow directly into receiving waters.

The low-cost case assumes that investments to control CSOs will total $51.3 billion nationally, as estimated in EPA's *1996 Clean Water Needs Survey.* That estimate comes from a top-down statistical analysis, supplemented by communities' documentation of specific plans when available. The analysis assumed that communities would need to capture and treat 85 percent of their rain and snowmelt and calculated the cost of constructing basins and disinfection facilities to do so.

For many communities, however, 85 percent will not be enough, given their state's designated uses for water bodies and associated quality standards. Thus, analysts generally regard EPA's estimate of CSO control costs as too low under current standards.[20] For example, the CSO Partnership—a coalition of communities with combined sewer systems and firms expert in designing controls—believes that EPA's estimate is a reasonable one only if states make wide use of their legal option to revise the standards but that meeting current standards could cost on the order of $100 billion.[21] CBO adopted that figure in its high-cost scenario.

17. More precisely, the study assumed a range of annual replacement rates from 0.5 percent to 1.5 percent, averaging 1.0 percent. The study used repeated random sampling from that range and ranges for other uncertain factors to calculate a probability distribution for investment costs. Stratus Consulting, *Infrastructure Needs for the Public Water Supply Sector,* p. 3-9.

18. Under that simple historical approach, annual replacement rates between 2000 and 2019 would average 0.9 percent if pipes last 50 years, just 0.3 percent if they last 75 years (because it assumes that relatively few pipes were laid during the Depression and World War II, when the population grew slowly), and about 0.6 percent if they last 100 years (ibid., p. 3-5). CBO averaged those three rates to obtain the 0.6 percent rate assumed in its low-cost case. Each of the three rates is well below the long-run average set by the inverse of the lifetime (that is, 2.0 percent for 50 years, 1.3 percent for 75 years, and 1.0 percent for 100 years), indicating that pipe networks remain relatively young until after 2019. Thus, the approach does not support the perception of an imminent crisis in drinking water pipes.

19. Although investment costs to address sanitary sewer overflows are also uncertain, CBO's two scenarios both use EPA's estimate of those costs, largely for lack of information to underpin an alternative estimate.

20. In some cases, however, emerging innovative approaches that remove stormwater from the centralized sewer system—such as decentralized wastewater treatment (which emphasizes reusing treated flows where practical) and restorative redevelopment (which reintroduces stormwater to the soil and vegetation)—might result in costs lower than those reflected in EPA's estimates.

21. States are authorized to modify the designated uses of and quality standards for their water bodies if they demonstrate that meeting the old standards is technically infeasible or would have "substantial and widespread economic and social impacts." Examples of changes that could reduce costs for addressing CSOs include allowing a higher number of days that swimming may be suspended because of elevated bacteria levels; allowing less stringent standards in the winter when swimming is less popular; and applying water quality standards at the site of human contact, rather than the site of the discharge from the combined sewer system.

Efficiency Savings. Many water systems are realizing significant savings in operational and capital costs per unit of service by focusing on such things as demand management, labor productivity, system consolidation, asset management, and innovative construction contracting (*see Appendix B*).[22] However, the amount that systems will save from efficiency gains over the next 20 years—or could save, if given the right incentives—is uncertain.

CBO's low-cost and high-cost cases assume that efficiency savings reduce future investment by 15 percent and 5 percent, respectively. Those assumptions reflect several types of indirect or anecdotal evidence—data on potential and observed savings in O&M costs, estimates of investment savings from studies of water systems abroad, and individual case studies of domestic systems—and are within the range cited by some industry experts.[23]

Evidence that water systems are already reaping savings in O&M costs and could continue to do so comes from comparing a consulting firm's assessments of 97 medium-sized and large water utilities conducted through 1997 with 136 later assessments. In the initial group, potential savings in operational costs through the use of six types of best practices averaged 25 percent; for the later group, the distance from the efficiencies of best practices had narrowed, averaging only 18 percent.[24] Similarly, a 1996 report from the Association of Metropolitan Sewerage Agencies said that it is "not unusual" for systems that undertake efficiency initiatives to reap savings of 20 percent to 25 percent in operational costs.[25]

Fewer data are available on the potential impact of efficiency savings on investment costs. Some of the best evidence comes from overseas. One study of urban water systems in New South Wales, Australia, estimated potential investment savings of 12 percent to 14 percent within five years; also, executives from two Australian systems report anecdotally that they have already realized savings of 30 percent.[26] In the United Kingdom, the latest rates from the government regulator of water companies assume capital savings averaging 13 percent over five years, on top of savings already achieved in the past decade.[27] Here in the United States, two well-documented examples of innovative contracts giving a single firm the responsibility to design, build, and operate a treatment plant have yielded estimated savings of about 20 percent and 40 percent, the latter including discounted O&M costs (*see Appendix B*).

Comparing CBO's Estimates with Those of Others

One measure of the importance of the above assumptions is the impact each one would have had on the estimate of investment costs for drinking water and wastewater

22. For examples of the methods systems are using to identify potential savings, see Terry L. Atherton, "Success Through Mock Competition," and Mark Premo, "Rebuilding a Utility with Employee Involvement and Peer Input," both in Association of Metropolitan Water Agencies, *Making Waves: Competitiveness Strategies for Public Water Utilities*, vol. 1 (Washington, D.C.: AMWA, undated).

23. For example, one expert has testified to the Congress that "The cost profiles of the water and wastewater industries suggest the potential for cost reductions in the range of five percent or more in *each* of the following areas: efficiency practices (planning, management, and operations), integrated resource management (supply side and demand side), technological innovation (capital and operating), and industry restructuring (consolidation, privatization, and market-based approaches)" (emphasis in original). Supplemental answers from Dr. Janice A. Beecher, Beecher Policy Research, Inc., in Senate Committee on Environment and Public Works, Subcommittee on Fisheries, Wildlife, and Water, *Water and Wastewater Infrastructure Needs*, Committee Print 107-316 (March 27, 2001), p. 95. Of course, some of those categories would apply more to operational costs than to capital costs.

24. Personal communication with Alan Manning, EMA Associates.

25. Association of Metropolitan Sewerage Agencies, in collaboration with Apogee Research, Inc., *Evaluating Privatization: An AMSA Checklist* (Washington, D.C.: AMSA, 1996), p. 11.

26. Halcrow Management Sciences Limited, *New South Wales Water Agencies' Review: Summary* (December 1999), p. 53, available from the Independent Pricing and Regulatory Tribunal at www.ipart.nsw.gov.au under "What's New–Updates," January 28, 2000; and personal communication with Claude Piccinin, Deputy Executive Director, Water Services Association of Australia, July 26, 2001.

27. Office of Water Services, *Final Determinations: Future Water and Sewerage Charges 2000-05* (undated), p. 98, available at www.ofwat.gov.uk/final_determinations.htm.

systems if it had been used individually in WIN's analysis. For example, if that analysis had used 0.6 percent instead of 1.0 percent for the average annual rate of replacement for drinking water pipes, as in CBO's low-cost case, WIN's estimate in costs as financed would have been reduced by $5.4 billion per year (*see Table 2-5*). Thus, that factor alone accounts for more than one-third of the total difference between the estimates from WIN's analysis and CBO's low-cost case. Conversely, the higher costs for abating combined sewer overflows assumed in CBO's high-cost case would have raised WIN's estimate of average annual costs by $2.2 billion. CBO's assumptions about efficiency would also have had significant impacts: the assumed savings of 5 percent to 15 percent would have reduced estimated annual costs by $1.5 billion to $4.6 billion.

Despite some different assumptions, CBO's estimate from its high-cost case is very close to WIN's because savings from a longer borrowing term, on old debt service, and from efficiency are almost entirely offset by larger costs to address combined sewer overflows, to fund to in-

Table 2-5.

Contributions of Individual Assumptions to Differences Between CBO's and WIN's Estimates

(In billions of 2001 dollars per year)

	Low-Cost Case	High-Cost Case
WIN's Estimate (one case)	40.3	40.3
CBO's Estimate	24.6	41.0
Difference to Be Explained (WIN minus CBO)	15.7	-0.7
Capital Factors		
Savings from Increased Efficiency by Drinking Water and Wastewater Systems	4.6	1.5
Drinking Water Systems		
Annual percentage of pipes replaced	5.4	n.a.
Average annual cost for regulations not yet proposed	n.a.	-0.4
Wastewater Systems		
Depreciation rate	0.8	n.a.
Share of investments in EPA's needs survey for replacing existing capital	0.5	-0.6
Average annual cost to control combined sewer overflows	n.a.	-2.2
Total Savings from Capital Factors	11.4	-1.7
Total Capital Savings, Including Interactions	10.4	-1.7
Financing Factors		
Real Interest Rate	n.a.	-2.0
Repayment Period	5.0	3.0
Pay-As-You-Go Share of Total Investment	1.2	-0.6
Average Annual Debt Service on Pre-2000 Investments	0.8	0.8
Total Savings from Financing Factors	7.1	1.3
Total Financing Savings, Including Interactions	7.8	1.1

Source: Congressional Budget Office.

Notes: n.a. = not applicable (when assumptions do not differ from WIN's).

Because of interaction effects, the sum of the dollar impacts from each assumption individually—or from all capital factors and all financing factors—does not equal the overall difference between CBO's and WIN's estimates. For example, the impact of investment efficiencies is smaller when the rate of investment is reduced by lower rates of depreciation and replacement.

Table 2-6.

Estimates of Average Annual Capital Costs for Investment in Water Systems, 2000 to 2019

(In billions of 2001 dollars)

	Drinking Water	Wastewater
CBO[a]	12.0 to 20.5	14.9 to 22.3
Water Infrastructure Network	20.9	19.2
Environmental Protection Agency		
Clean Water Needs Survey[b]		
As published	n.a.	7.3
Adjusted for more recent estimate of costs to control sanitary sewer overflows	n.a.	11.4
Drinking Water Infrastructure Needs Survey[c]		
As published	8.0	n.a.
Adjusted for estimated underreporting	11.1	n.a.
American Water Works Association[d]	8.5	n.a.

Sources: Congressional Budget Office; Environmental Protection Agency, Office of Water, *1996 Clean Water Needs Survey: Report to Congress*, EPA 832-R-97-003 (September 1997); Environmental Protection Agency, Office of Water, *Drinking Water Infrastructure Needs Survey: Second Report to Congress*, EPA 816-R-97-003 (February 2001); American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Denver, Colo.: AWWA, May 2001); Water Infrastructure Network, *Clean and Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure* (Washington, D.C.: WIN, April 2000).

Note: n.a. = not applicable.

a. Ranges reflect CBO's low-cost and high-cost cases.
b. Estimate for 1996 through 2015.
c. Estimate for 1999 through 2018.
d. Estimate for 2000 through 2029.

vestments in wastewater systems for purposes other than replacing existing infrastructure, and to meet drinking water standards, along with a higher interest rate and larger paygo share. In contrast, CBO's low-cost case differs sharply from WIN's largely because of the replacement rate assumed for drinking water pipes, the assumed savings from efficiency, and the longer borrowing term; other assumprions, such as a smaller paygo share and lower estimate of old debt service, have smaller but still significant effects.

Evidence from the available bottom-up studies—EPA's needs surveys and the American Water Works Association's study of 20 systems—does not support estimates of the magnitude produced by CBO's high-cost case and WIN's analysis. Indeed, estimates from the bottom-up studies are well below those from CBO's low-cost case (when expressed in comparable terms). Specifically, EPA's survey estimated average annual capital (that is, real resource) costs of $8.0 billion for drinking water, and AWWA's study put that figure at $8.5 billion. For wastewater, EPA's figure was $7.3 billion. By comparison, CBO's estimates of real resource costs in the low-cost case are $12.0 billion for drinking water and $14.9 billion for wastewater (*see Table 2-6*). The estimates based on EPA's surveys remain somewhat lower even after (perhaps incomplete) adjustments to better capture investmenr needs over the full 20-year horizon, which raise the figure for drinking water to $11.1 billion and the figure for wastewater to $11.4 billion.[28]

28. The adjustment for drinking water systems applies the percentage amount of underreporting that EPA found in follow-up visits to 200 medium-sized and large systems after the 1995 needs survey. The adjustment for wastewater systems substitutes EPA's later model-based estimate of costs to address SSOs for the estimates from the survey—specifically, those for projects to prevent inflows and infiltration and to replace or rehabilitate sewers.

For O&M costs, the differences between CBO's and WIN's estimates involve fewer factors. The approach that CBO used in its low-cost case to estimate O&M costs for drinking water systems is essentially the same as WIN's, differing only in extrapolating from 19 years of data instead of 10 and phasing in the assumed 20 percent efficiency savings two years sooner. Those factors account for a minor part of the difference in the two estimates; most appears to reflect differences in data sources.[29] For wastewater systems, one additional difference between CBO's low-cost case and WIN's analysis is that the latter extrapolates the trend in the ratio of O&M to capital stock, not in O&M itself (see the discussion in Appendix A). For both drinking water and wastewater, CBO's high-cost case estimates exceed WIN's because they assume no efficiency savings (beyond those already reflected in the 1980-1999 trend).

Comparing Current Spending and Future Costs

Large future investment costs are relevant to policymakers primarily because of the prospect that they will require large increases above current investment levels and hence large increases in the rates charged to households and other water users. WIN's report, EPA officials, and water industry representatives have referred to the difference between current (or recent) spending and future costs as a "funding gap." But the difference does not reflect the ability of local water systems to generate additional resources on their own to pay for increased future investment, so it does not reflect a gap that can only be filled by federal funds.

CBO estimates that investment spending in 1999 was $11.8 billion for drinking water and $9.8 billion for wastewater (in 2001 dollars). Those figures are estimates because the available data do not measure spending in terms of costs as financed. The most comprehensive data, from the Census Bureau's annual surveys of state and local government finances, show total capital outlays (whether financed through borrowing or paid from funds on hand) for both drinking water and wastewater systems and interest payments for drinking water systems. Thus, the census data do not capture costs as financed because they lack information on interest payments for wastewater systems (which the survey classifies as municipal departments, not utilities) and because they include the capital costs for new financed investments rather than the current principal payments made on past investments.

CBO's estimates of 1999 baseline spending for drinking water and wastewater combined include estimates of spending on new paygo investments and on debt service for earlier investments financed through borrowing. CBO calculated the former as an assumed share of all investments made in 1999; the latter reflects assumptions regarding interest rates and paygo shares from 1979 through 1998.[30] (CBO used the same approach to estimate the future costs of debt service on pre-2000 investments; *see Appendix A* for details.) The resulting estimates are necessarily somewhat uncertain, given the large number of assumptions involved.

Those estimates of 1999 spending imply that future investment costs represent an annual average increase for drinking water and wastewater systems combined of $3.0 billion under the low-cost case and $19.4 billion under the high-cost case (*see Table 2-7*). The former figure represents just 14 percent of the current financial burden of water investments. That result is contrary to the conventional wisdom that the nation's water systems will soon be straining to fund a large increase in investment, but CBO considers it reasonable, given the uncertainty about how soon existing infrastructure will need replace-

29. For example, whereas CBO took the data it used to convert nominal O&M spending to 2001 dollars from the GDP price deflator, WIN appears to have used the *Engineering News-Record's* Construction Cost Index, which both WIN and CBO used for capital spending.

30. CBO's analysis also involved scaling up the census data on investments in drinking water systems by 15 percent to capture spending on privately owned systems. For lack of information, however, CBO did not adjust the data downward to omit investments to serve future growth. As noted above, growth-related investments are excluded from EPA's needs survey and thus from CBO's estimates of future investment costs; consequently, their inclusion in the census data lends a downward bias to CBO's projections of the difference between current spending and future costs. WIN's analysis of baseline spending made those same choices.

Table 2-7.

Estimates of the Difference Between 1999 Spending and Future Costs for Investments in Water Systems

(In billions of 2001 dollars per year)

	Drinking Water	Wastewater	Total
CBO[a]			
Future costs	11.6 to 20.1	13.0 to 20.9	24.6 to 41.0
1999 spending	11.8	9.8	21.6
Difference	- 0.2 to 8.3	3.2 to 11.1	3.0 to 19.4
WIN (Costs as financed)			
Future costs	21.4	18.9	40.3
1999 spending (Approximate)	12.0	9.7	21.7
Difference	9.4	9.2	18.6

Source: Congressional Budget Office.

Note: The figures for 1999 spending are estimates, reflecting assumptions about debt service payments on investments from earlier years. For the purpose of comparison, CBO recalculated WIN's results in terms of costs as financed and approximated WIN's estimate of 1999 spending.

a. Ranges reflect CBO's low-cost and high-cost cases.

ment, the prospects for increased efficiency, and the potential for water systems to fund more of their investment through borrowing and to borrow for longer terms. In contrast, the $19.4 billion difference estimated under the high-cost case, which CBO considers equally possible, nearly matches the current financial burden of investments in water systems.

Expressed in costs as financed, WIN's results show a difference between 1999 spending and average future costs of $9.4 billion for drinking water and $9.2 billion for wastewater (*see Table 2-7*).[31] Again, the implied estimates from WIN's analysis are close to those from the high-cost case and much larger than those from the low-cost case (while significantly below WIN's published figures, shown in *Box 2-3* on page 19). The main novelty here is that subtracting baseline spending makes the differences between WIN's estimates and CBO's larger in relative terms.

The Impact of Projected Water Costs on Households' Budgets

Ultimately, individuals bear the costs of investments in water systems and expenditures for O&M—directly through households' drinking water and wastewater bills and indirectly through the prices they face for goods and services produced using water and through local, state, and federal taxes supporting water systems. The distribution of costs among individuals depends on their water use, their system's characteristics (including rate structures and external funding), their consumption of water-intensive goods and services, and their tax bills.

Given the availability of data on households' water bills, but not on indirect expenditures on water through taxes and consumption of other goods and services, CBO has analyzed the impact that projected levels of investment and O&M spending would have on households' budgets in the absence of increased support from taxpayers. For simplicity, the analysis assumed that all residential, com-

31. CBO did not obtain enough information to directly calculate WIN's estimate of 1999 debt service, a key component of baseline spending in terms of costs as financed. Instead, CBO approximated WIN's estimate by using a proxy model based on WIN's methods and assumptions. To improve the approximation, CBO adjusted the proxy model's estimate of 1999 debt service in proportion to the difference between WIN's known estimate of average annual debt service from 2000 to 2019 and the corresponding estimate from the proxy model.

Box 2-4.

CBO's Analysis of Household Water Bills

CBO's data come from the quarterly responses of approximately 2,800 households participating in the national Consumer Expenditure Interview Survey, carried out by the Bureau of the Census under contract with the Bureau of Labor Statistics. Households in CBO's sample began their yearlong participation in the survey no earlier than the third quarter of 1997 and no later than the second quarter of 1998. To obtain national-level results, CBO weighted the data to adjust for the fact that not all surveyed households participated for the full course of a year.

Participants report "cash" income from all sources, including food stamps. To guard against an overly conservative estimate of the proportion of household income spent on water bills, CBO incorporated all incomes as reported to the Consumer Expenditure Survey even though 3 percent of households in the sample have an annual income of less than $5,000 and a small fraction have large negative incomes. Some analysts question the reliability of such reported incomes because expenditures by those households often exceed their pretax income.[1]

Participants also report water expenditures on the basis of bills received exclusively for drinking water and sewer services. For the 39 percent of respondents not reporting their own water bills, CBO imputed their expenditures by using the average values of water bills from reporting households in comparable income classes. Those income classes covered $10,000 segments up to $100,000; the last income class consisted of households earning at least $100,000. Again, that imputation errs on the side of overstating the share of household income spent on water since most nonreporting households are probably apartment dwellers who do not receive separate water bills. Water use per capita is generally lower in multifamily units, which, compared with single-family homes, tend to have fewer water-using appliances and to share landscaping and swimming pools.[2]

1. Geoffrey D. Paulin and David L. Ferraro, "Imputing Incomes in the Consumer Expenditure Survey," *Monthly Labor Review*, vol. 117, no. 12 (December 1994), pp. 23-31.

2. Duane D. Baumann, John J. Boland, and W. Michael Haneman, *Urban Water Demand Management and Planning* (New York: McGraw-Hill, Inc., 1998).

mercial, and industrial water customers would face the same percentage increase in their bills, notwithstanding the fact that investment and O&M requirements vary among systems.

CBO's Estimates

CBO estimates that total household water bills represented 0.5 percent of total household income in the late 1990s, when customers paid about $58 billion directly to water systems (*see Box 2-4*). To pay for future infrastructure expenditures and O&M costs without increased support from taxpayers, direct funding from customers in 2019 would have to reach $84.7 billion in the low-cost case and $121.9 billion in the high-cost case, implying average annual rates of increase between 1999 and 2019 of 1.62 percent and 3.48 percent, respectively. Taking into account projected growth in income over that time, water bills in 2019 would equal 0.6 percent of national household income in the low-cost case and 0.9 percent in the high-cost case.[32] The best available data suggest that such shares would not be high compared with those in many other industrialized countries (*see Box 2-5*).

32. The percentages reflect a projected 19.2 percent increase in real household income between the late 1990s and 2019 on the basis of CBO's July 2001 forecast through 2011 for taxable personal income for earners age 20 and over (with married couples counting as one earner) and the Social Security trustees' midrange assumptions for population growth. The simple analysis leaves out several factors, including potential changes in the spread of the income distribution or in the allocation of water costs between household and other users.

Box 2-5.

Water Bills in Various Industrialized Countries

Compared with households in other countries, U.S. households typically enjoy relatively low-cost water bills. Without information on household costs associated with tax-financed subsidies for water systems, international comparisons of drinking water and wastewater costs at the household level are limited to examining bills that users pay for typical quantities of water services. By that measure, U.S. households' water bills as a share of personal financial resources, on average, currently rank third-lowest among those of 16 industrialized countries of the Organization for Economic Cooperation and Development (*see the table*).

By 2019, under the Congressional Budget Office's high-cost case, U.S. households' average cosrs (as a percentage of per capita gross domestic product) would nearly double if the increases in investment and O&M expenditures were passed along entirely to customers in their water bills. If households' water bills in other countries rose no faster than per capita GDP, the United States' ranking would fall from third- to tenth-lowest. Even with those assumptions, direct billing for water services relative to personal financial resources would still be lower in the United States, on average, than in France or England.

Households' Average Bills for Typical Levels of Water Consumption in OECD Countries in the Late 1990s (Percentage of per capita GDP)

Korea	0.64
Italy	0.72
United States	1.00
Japan	1.04
Turkey	1.32
Belgium	1.44
Sweden	1.48
Spain	1.52
Denmark	1.60
Australia	1.72
Finland	2.16
France	2.20
England and Wales	2.28
Netherlands	2.52
Czech Republic	3.84
Hungary	6.20

Source: Congressional Budget Office based on Organization for Economic Cooperation and Development, Environment Directorate, Environment Policy Committee, *Household Water Pricing in OECD Countries*, ENV/EPOC/GEEI(98)12/FINAL (Paris: OECD, May 1999).

Note: The table reflects the best indicator of households' water bills that CBO can construct, given limitations on international data. It draws on two data sources that incorporate information from different years. The first reports 1996 data on average drinking water charges for a household using 200 cubic meters of water per year relative to per capita GDP; the second reports average drinking water and sewer charges per cubic meter for a year between 1994 and 1999, depending on the most recent data available for each country.

However, shares of income nationwide can obscure important differences among households and thus shed only limited light on the argument, made by advocates of increased federal aid for investment in water systems, that rising costs will make hills unaffordable for some households.[33] Certainly, households at different income levels

33. Other summary measures of water costs consider the share of income spent by individual households. For example, the median share of income spent on water services in the late 1990s was 0.98 percent, meaning that half of all households spent less than that amount and the other half spent more. Another summary measure—the average of the individual household shares—cannot be calculated in a nonarbitrary way because of the very small, zero, and negative incomes reported by some surveyed households (*see Box 2-4*). One arbitrary approach is to cap all shares at some maximum level; with a cap of 10.1 percent, the average household share becomes 1.6 percent. Another way is to ignore the data from all households reporting zero or negative income; under that approach, which accepts all small but positive incomes as accurate, the average share is 4.8 percent.

Table 2-8.

Percentage Shares of Households' Average Expenditures in the Late 1990s, by Category

	Annual Household Expenditures (Thousands of dollars)					
	Under 10	10 to 20	20 to 30	30 to 40	40 to 90	Over 90
Water and Sewer	2.49	1.67	1.27	1.09	0.80	0.56
Other Utilities	10.75	8.62	7.39	6.70	5.24	3.74
Shelter, Household Operations, and Supplies	34.86	35.05	30.63	28.75	26.48	26.68
Food	20.97	17.31	15.50	14.59	12.35	10.13
Health Care	6.70	7.43	5.76	5.52	4.21	3.16
Other Identified Expenditures[a]	24.41	29.33	35.65	37.24	41.68	40.41
Taxes (Nonproperty)	-0.19	0.60	3.80	6.11	9.25	15.33
Total for Identified Expenditures	100	100	100	100	100	100

Source: Congressional Budget Office based on data from Bureau of the Census, Consumer Expenditure Interview Survey, third quarter 1997 through first quarter 1999.

a. Apparel and personal care, transportation, personal insurance and pensions, recreation, entertainment, alcohol, smoking, education and reading, and cash contributions.

devote different proportions of their total spending to water services—as they do to other utilities, food, medical care, and housing. For example, households with total expenditures under $10,000 devoted an average of 2.5 percent to water bills in the late 1990s and thus would generally have to adjust more to accommodate rate increases than would households with expenditures of, say, over $90,000, which devoted an average of just 0.56 percent to water bills (*see Table 2-8*).[34] For comparison, the share of total spending going to everything other than food, housing, medical care, utilities, and taxes averages 22 percent for the former group and 40 percent for the latter.

Of course, the share of a household's income spent on water bills also depends on its water use and local rates. Sorting individual households specifically by the share of income going to water bills, CBO found that in the late 1990s, half of all households spent 1 percent of income or less for water services, while others spent significantly more (*see Figure 2-1*).[35]

Distributions such as those CBO found can be characterized in many ways, emphasizing different features. One measure that has received significant attention is the fraction of households billed more than 4 percent of income for their water services—but that is simply one of many potential summary measures. Four percent has no particular economic significance as the point at which households' water bills become "unaffordable." (For the origin of the 4 percent measure, *see Appendix C*.)

34. To avoid the problems associated with the very low and negative income reported by some households in the survey, *Table 2-8* compares spending in each category not to income but to total spending. For households that are net savers, water bills represent a larger share of spending than of income; for households that are net borrowers, the opposite is true.

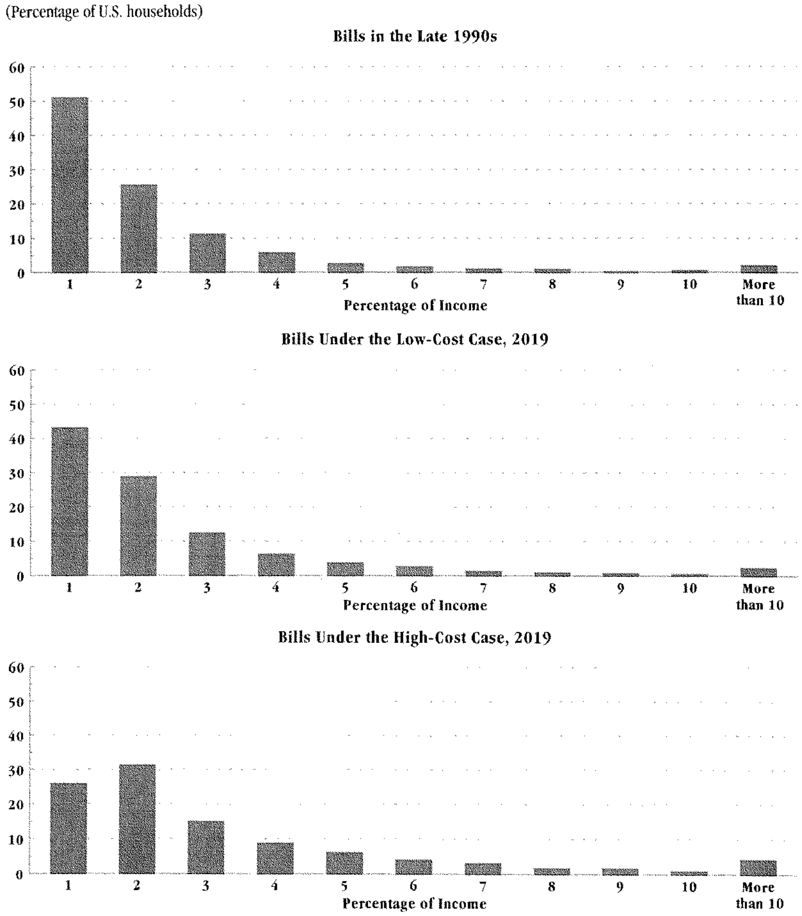
Households' adjustments to higher rates would reflect not only their income and expenditures but also their potential for reducing water use. A 1984 assessment of 50 peer-reviewed studies concluded that a 10 percent increase in price, with everything else unchanged, would prompt a 2 percent to 4 percent decline in residential water demand. John J. Boland, Benedykt Dziegielewski, Duane D. Baumann, and Eva M. Opitz, *Influence of Price and Rate Structures on Municipal and Industrial Water Use*, Institute for Water Resources Report 84-C-2 (Fort Belvoir, Va.: U.S. Army Corps of Engineers, 1984).

35. The figure treats households that reported zero or negative income as spending more than 10 percent of their income for water.

Figure 2-1.

Water Bills as a Share of Household Income

(Percentage of U.S. households)



Source: Congressional Budget Office.

However, using that particular measure, CBO estimates that in the late 1990s, 7 percent of U.S. households spent more than 4 percent of their income on water; an additional 16 percent spent more than 2 percent. Twenty-five percent spent less than 2 percent but more than 1 percent, and 51 percent spent no more than 1 percent.[36] The distribution in the late 1990s represents a modest shift from the late 1980s, when only 4.7 percent of U.S. households were spending over 4 percent of their income on water bills. In 2019, given uniform increases in charges associated with CBO's low-cost and high-cost estimates, 10 percent to 20 percent of U.S. households might be spending more than 4 percent of their income on bills for the services they now use; an additional 19 percent to 23 percent might be spending more than 2 percent.

Comparing CBO's and WIN's Estimates

Compared with CBO, WIN found water bills accounting for a much larger share of household budgets, both now and in the future. The coalition's estimate that 18 percent of U.S. households spent more than 4 percent of their income on water bills in 1997 is more than twice as high as CBO's estimate of 7 percent. WIN projected that 22 percent of households would spend over 4 percent of their income on water bills by 2009 (halfway through the 2000 to 2019 study period) and stated that a third or more of the population would have bills reaching that level as costs continued to rise.[37]

The discrepancy between CBO's estimate for the late 1990s and WIN's for 1997 apparently exists because WIN did not analyze actual bills based on water use by individual households as CBO did. Instead, WIN calculated households' water bills using data on Ohio systems' 1997 charges for the equivalent of 250 gallons per day.[38] (The other possibility would be that WIN's estimates of household income were lower than CBO's, but comparing average income by percentile across WIN's and CBO's data sources suggests that household income was higher in WIN's analysis.) The accuracy of WIN's results rests on the extent to which households' water bills nationally can be characterized using only data on charges for consumption of 250 gallons per day in Ohio. If, for example, low-income households tend to use less water than that, then, other things being equal, WIN's estimates overstate the number of households with water bills claiming more than 4 percent of their income.[39]

36. The distribution appears to be similar for urban and rural areas. For example, CBO estimates that 7 percent of urban households and 8 percent of rural households were paying more than 4 percent of their income for water bills. However, the urban-rural comparison is hampered by the large share (47 percent) of rural households that did not report water bills. Since CBO imputed spending for nonreporters using average bills of all rural and urban households with similar income, estimated bills for rural households may be too low if actual bills for rural nonreporters exceeded the imputed averages. Alternatively, estimated bills for rural households may be too high if the imputed costs exceeded the actual costs—if, for example, many of the rural nonreporters used private wells and septic tanks.

37. Water Infrastructure Network, *Clean and Safe Water for the 21st Century*, pp. 3-4 and 3-5.

38. Although WIN's *Clean and Safe Water for the 21st Century* report states that its analysis is based on "individual fees (not average)," it is actually based on the 1997 rates that Ohio households would have faced if they used the equivalent of 250 gallons per day, according to Ken Rubin of PA Consulting.

39. WIN considered Ohio households' expenditures for drinking water and wastewater services (relative to income) as representative of such expenses nationwide because in the 1990 census such data on spending for drinking water in that state matched well with the information for the United States as a whole. (The 1990 census data do not include wastewater expenditures.)

CHAPTER

3

Options for Federal Policy

Federal intervention in drinking water and wastewater markets may be designed to serve various purposes, such as protecting the environment or ensuring that drinking water meets certain standards everywhere in the country. All such policy objectives can be viewed as efforts to increase the cost-effectiveness of providing and using water or to achieve a certain distribution of the benefits and costs.

Economic principles suggest that federal action may be able to increase cost-effectiveness when other entities do not have adequate incentives to account for the extrajurisdictional, or "spillover," effects that their decisions have on third parties. For example, standards for wastewater treatment may improve cost-effectiveness by reducing costs to downstream users by more than the costs of treatment. However, whether current standards established under the Clean Water and Safe Drinking Water Acts are consistent with the economically efficient use of society's resources is an important question that is outside the scope of this study.

A main opportunity for federal involvement that may improve cost-effectiveness is sponsoring research and development (R&D). Private firms and state governments that may fund R&D for water systems have little incentive to consider the spillover benefits that would accrue to other parties and thus are likely to forgo some research opportunities that would be worthwhile from the national perspective.[1]

Federal intervention in water markets can also be intended to serve distributional purposes—to shift costs from people who have low income, use a lot of water, or are served by high-cost systems to people who have high income, use relatively little water, or are served by low-cost systems. The drawback of such interventions through federal funding and tax preferences, however, is that they generally distort prices and thereby undermine incentives for cost-effective actions by producers and consumers of water services. Eliminating the distortions could lower total national costs: without federal support, the prospect of rising costs and accountability to ratepayers would give managers of water systems strong incentives to look for ways to control costs in both their operational and investment choices. Similarly, the increased rates themselves, better reflecting the true costs of water services, would tend to encourage water users to adjust their behavior—for example, to use less water or to pretreat industrial wastewater—in order to cut costs.

Both the distributional effects of subsidies for water services and the extent of their adverse impact on incentives for cost-effective actions depend on the subsidies' level and form. To preserve incentives for cost-effective actions by water systems and users, the Congress could pursue policies that redistribute income—such as aid to water systems based on a predetermined formula not tied to current investments or direct subsidies to needy households for a basic level of water use—rather than policies that distort the price of water, such as the present subsidies for investment in infrastructure.

1. See Congressional Budget Office, "Investing in Physical Capital and Information," in *Budget Options* (February 2001). Even broad-based coalitions may not be able to support the appropriate level of research through coordinated voluntary contributions.

Federal Support for Research and Development and Its Implications

Technical R&D into new pipe materials, construction and maintenance methods, and treatment technologies can lead to significant savings. One of the many successful innovations that could be cited here is pipe bursting, a method for replacing pipes that does not require trenches to be cut along the entire length of the replacement. Instead, using a single access point, the construction crew sends equipment into a section of pipe to burst it from within and feeds a flexible new pipe in to take its place. By using pipe bursting, the drinking water system in Columbus, Georgia, reduced its costs for replacing water mains by an estimated 25 percent.[2] A less tested but promising technology for wastewater treatment, supercritical water oxidation, could achieve superior environmental results and reduce operating cosrs by one-third, according to one study. Capital costs could be somewhat higher than those for existing technologies but might fall as the method is further developed or used at larger scales.[3]

Despite the potential for technological progress to provide cost savings, the level of R&D spending on drinking water and wastewater currently seems low compared with that for electrical power according to the limired data available. The combined budgets of the American Water Works Association Research Foundation (AWWARF) and the Water Environment Research Foundation (WERF), the main research organizations for the drinking water and wastewarer industries, are on the order of $25 million per year. That amount represents roughly 0.05 percent of current spending for investment in water systems and their operations and mainrenance. In contrast, spending in 2000 by the Electric Power Research Institute was 0.14 percent of total electricity sales (which roughly corresponds to spending on investment and O&M). The Environmental Protection Agency funded an additional $7 million of R&D in 2002, excluding grants to AWWARF and WERF.[4]

To try to speed the development and adoption of less costly materials and methods, the federal government could increase its financial support of technical R&D. The increase could take the form of additional research projects managed by EPA, larger federal grants to private organizations such as AWWARF and WERF, or both. One specific proposal, advanced by the Water Infrastructure Network coalition, calls for federal funding of $250 million per year for a new Institute of Technology and Management Excellence.[5] As the name suggests, that institute would support not only technical R&D but also the dissemination of good management practices.

While additional federal funding for R&D may have the potential to lower total national costs for water services, in practice it may be difficult to determine an appropriate increase, since the line between a useful response to a market failure and a wasteful subsidy is not always clear. Federal funding may be subject to various influences nor related to the cost-effective provision of water services and may allow others to reduce their own research funding. Thus, a compelling case for increased appropriations for water research cannot rest at the theoretical level but must include the details of the proposed uses of the additional funds and the capabilities of other funders.

In many cases, the key to improving the cosr-effectiveness of a particular drinking water or wastewater system may lie not in developing new technologies but in improving the way system managers deploy exisring and emerging technologies. Notwithstanding important differences in local conditions that ate beyond managerial control, it is clear that some systems operate less efficiently than others, whether because of ignorance, system-level problems (such

2. Steve Allbee, Environmental Protection Agency, "The Infrastructure Investment Gap Facing Drinking Water and Wastewater Systems" (speech to the Association of Metropolitan Water Agencies, St. Pete Beach, Fla., October 24, 2000).

3. "New Wastewater Treatment Good for the Environment," *WaterTechOnline*, October 9, 2001, available at www.watertechonline.com/news.asp?mode=4&N_ID=26205.

4. Personal communication with Terry Grindstaff, EPA, September 27, 2002. The figure includes $6.2 million for research on drinking water treatment and $0.7 million on wastewater treatment.

5. Water Infrastructure Network, *Water Infrastructure Now: Recommendations for Clean and Safe Water in the 21st Century* (undated), available at www.win-water.org, p. 12.

as poor leadership, featherbedding, or operation on a small scale), or simply a lack of concern over current water costs. As noted in Chapter 2, according to recent assessments of 136 systems, the industry is becoming more efficient but still could reduce operating costs by an average of 18 percent through more widespread use of "best practices."[6]

Of course, rising costs for investment and O&M can be expected to motivate system managers to acquire knowledge and overcome local constraints in order to reduce the pressure for higher rates. So whether federal support for the dissemination of information on best practices could further improve systems' efficiency is unclear.

Federal Support for Infrastructure Investment and Its Implications

Through different spending programs, including the state revolving funds, federal funds paid for about 11 percent of the nationwide investment in water infrastructure in 1999, and federal tax preferences provided a subsidy equivalent to perhaps 3 percent more. Again, Congressional action to increase such support would affect both the national costs for water services and the distribution of those costs, but the specific effects would depend on choices about the amount of the increase, the degree of targeting to particular categories of water systems, and the mechanisms used to provide the support. Similarly, the effects of cutting back federal assistance would depend on the details of the cuts.

Current Federal Support for Water Systems

As noted in Chapter 1, the federal government supports investment in water infrastructure through a variety of spending programs and, to a lesser extent, through tax preferences. Small and disadvantaged communities benefit disproportionately from the spending, through either explicit targeting at the federal level or states' allocations of loans from the revolving funds. In contrast, larger communities (which can access the municipal bond market more easily) are the primary beneficiaries of the tax preferences. Privately owned water systems have less access to federal support than their publicly owned counterparts do (*see Box 3-1*).

Federal tax law aids investment in water systems primarily through the general exemption of interest on municipal bonds, which makes the bonds more attractive to buyers and thus reduces the interest rates that water systems must offer. The exemption applies to personal and corporate income taxes but not to the alternative minimum tax (AMT) for corporations; firms that pay the AMT must include interest on the bonds in calculating their "adjusted current earnings," which effectively makes 75 percent of the interest subject to that tax. Two other provisions of the federal tax code related to municipal bonds also help water systems: bond issuers can keep some arbitrage profits (made by reinvesting bond proceeds at a higher interest rate) and can refinance the bonds up to 90 days before redeeming the original debt.[7] The Joint Committee on Taxation estimated that the interest exemption and related provisions saved bondholders $0.6 billion in 1999 on bonds issued for both municipal and privately owned water systems and hazardous waste facilities.[8] That figure, including the unknown but relatively small share associated with hazardous waste facilities, corresponds to roughly 3 percent of the investment in water systems in 1999, the latest year for which data are available.

Federal spending programs support water infrastructure in several ways, including direct grants for investment projects, capitalization grants to the SRFs, and credit subsidies in the form of loans and loan guarantees. On the

6. Personal communication with Alan Manning, EMA Associates.

7. To keep any arbitrage profits, systems must spend the bond proceeds within four phased deadlines over two years. Also, they can use the "advance refunding" option only once for each original bond issue.

8. Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 1999-2003*, staff report JCS-7-98 (December 14, 1998), p. 16. This figure covers bonds backed by water systems' revenues but not municipal "general obligation" bonds. Note that the committee's estimate of the "expenditure" associated with a tax preference is somewhat larger than the corresponding estimate of the increased federal revenue associated with eliminating it: the former takes the existing level of the taxed activity as given and thus does not reflect behavioral adjustments that taxpayers would make if the preference was changed.

Box 3-1.

Federal Support of Privately Owned Water Systems

The large majority of households are served by publicly owned, or municipal, drinking water and wastewater systems. Although nearly half of all community drinking water systems are privately owned, they reach only about 15 percent of the households served. Roughly 20 percent of wastewater systems that treat household sewage are privately owned, but they serve only about 3 percent of households.[1] Various federal and state restrictions limit private systems' access to federal aid provided through the state revolving fund (SRF) programs and to federal tax preferences.

Private wastewater systems are not eligible for loans from SRFs, and although private drinking water systems are eligible under federal law, they may be blocked by provisions in some states' constitutions. In other states, private systems' access to SRF loans can be inhibited simply because the states leverage their SRF money. If enough of the proceeds from bonds issued to leverage SRF money are used to make loans to private systems, the bonds are considered private activity bonds (PABs), which are subject to several restrictions.[2]

The most important of those restrictions is the cap on each state's annual volume of tax-exempt PABs. Federal tax law sets the limits at the greater of $75 per resident of the state or $225 million in calendar year 2002, after which those figures will be indexed for inflation. To date, the limits have restrained the issuance of PABs in most states.[3] And within those limits, water systems' needs compete for allocations against many other purposes, such as housing, industrial development, student loans, mass commuting facilities, and local electricity and gas facilities. Indeed, all "exempt facilities"—the subset of eligible facilities or purposes that includes water infrastructure—accounted for less than 10 percent of PABs in 1999.

Even when private water systems are allocated a share of a state's PABs, three other provisions of federal tax law raise their financing costs relative to those of municipal systems. First, interest on PABs remains subject to the alternative minimum tax (AMT) for both corporations and individuals, which reduces the demand for such bonds by potential investors who pay the AMT and thus raises the interest rate that issuers must offer.[4] (As discussed in the body of this report, interest on municipal bonds can be partially taxed under the corporate AMT.) Second, privately owned systems must spend bond proceeds within six months, whereas public systems have four phased deadlines that allow spending to occur over two years. The shorter spendout period reduces the time during which private systems can earn "arbitrage profits" by investing bond proceeds at rates above the bond's own yield and may also force them to incur higher transaction costs for a phased series of smaller bond issues. Third, private systems have somewhat less flexibility in refinancing bonds to take advantage of favorable interest rates: PABs cannot be refinanced with new tax-exempt bonds unless the proceeds are used immediately to retire the original debt,

1. The estimate of 3 percent is commonly cited within the industry, but precise data on the households served by private wastewater systems are not readily available.

2. See Environmental Protection Agency, Environmental Financial Advisory Board, *Funding Privately Owned Water Providers Through the Safe Drinking Water Act State Revolving Fund* (July 1998). Private activity bonds are those for which 10 percent or more of the proceeds are used directly or indirectly by a nongovernmental entity and 10 percent or more are secured directly or indirectly by property used in a trade or business. Formally, the definition applies to both taxable and tax-exempt bonds; typically, however, the term "private activity bond" is used to refer to the latter.

3. States may carry forward allowances under the cap for designated projects for three years. Frequently, a state that appears to have not issued PABs up to its limit in a given year will actually be using that option to save allowances for a large project or to wait for more favorable market conditions.

4. The impact on PAB rates is estimated to be 15 to 25 basis points (that is, 0.15 to 0.25 percentage points). See Environmental Protection Agency, Environmental Financial Advisory Board, *Funding Privately Owned Water Providers.*

Box 3-1.

Continued

whereas governmental bonds can be "advance refunded" once, up to 90 days before redemption of the original debt.

The Congress could eliminate most of those provisions that place privately owned systems at a disadvantage relative to municipal systems—the exception being obstacles in states' constitutions that disallow aid from SRFs.[5] For example, it could amend the Clean Water Act to allow SRF loans to private wastewater systems. It could also reclassify bonds for projects that served public needs for water services as governmental bonds rather than PABs (thus sidestepping all of the differences in tax treatment), or it could partially or fully exempt bonds for water systems from the annual caps on PABs. There is no precedent for such tax treatment of privately owned utilities, however. PABs for airports, docks, wharves, solid-waste facilities, and environmental enhancements of hydroelectric generating facilities are exempt from the volume caps, as is 75 percent of the value of PABs for high-speed intercity rail facilities, but only if the facilities are publicly owned, with private parties restricted to serving as operators or lessees.[6]

A commonly heard argument for equalizing both the access to funding and the tax treatment of private and municipal water systems is that water users should not be denied the benefits of federal aid simply because their service comes from a privately owned system. Opponents of aid to private systems sometimes argue that the government should not support private profits; however, state regulation of rates charged by private utility monopolies such as water systems constrains profits and can ensure that most of the gains from federal aid flow to customers.[7]

The overall cost impact of treating publicly and privately owned systems equally is not clear. On the one hand, equal treatment could be beneficial to the extent that private ownership reduces investment or operating costs in at least some cases and that local decisionmakers can generally identify the efficient arrangements. On the other hand, equalizing the treatment would in all likelihood mean increasing federal aid to private systems rather than reducing aid to public systems; thus, as with the options to increase aid to water systems in general, it could contribute to higher total national costs by distorting water companies' own choices—such as choices between equity and bond financing and between investment and maintenance.

One final argument sometimes made for equalizing treatment—or more broadly, for encouraging or reducing barriers to direct private investment in water systems—is that the private sector can tap large additional sources of funding for infrastructure needs. That argument is flawed, however, since the funds for both publicly and privately owned systems ultimately come from the ratepayers (and perhaps taxpayers). A more compelling version of the argument is that private owners may have access to cheaper financing in some cases.

5. Of course, the Congress could give states incentives to amend their constitutions. One proposal for doing so calls for modifying the calculation of each state's share of the annual federal appropriations for drinking water SRFs, which reflect the findings of the Environmental Protection Agency's needs survey, to exclude the needs for privately owned systems in states that do not make loans to such systems.

6. Moreover, the contract or lease for such a facility is subject to several restrictions: it must not allow the private operator to claim depreciation or investment tax credits, extend beyond 80 percent of the useful life of the assets financed by the bonds, or allow assets to be sold to the operator for less than fair market value; and compensation to the operator must be primarily in the form of a fixed periodic payment. Also excluded from the volume cap on PABs are bonds for veterans' mortgages and for certain nonprofit organizations. Bonds for public educational facilities have their own cap, equal to the greater of $10 per person or $5 million.

7. Small water systems, such as those owned by small housing developments, homeowners' associations, resorts, summer camps, and trailer parks, are not always subject to rate regulation. Even when not regulated, however, many such systems are likely to pass the benefits of federal support on to water users, whether because of their ownership structure (in the case of homeowners' associations) or because of market competition on overall rates (in cases such as camps and trailer parks).

basis of a mix of data on appropriations, obligations, and outlays, the General Accounting Office reported that federal support in 2000 included $1.5 billion in project grants, nearly $2.2 billion in SRF grants, and $780 million in the face value of loans and loan guarantees from the Department of Agriculture (USDA).[9] Of course, SRF grants do not flow directly to water systems but rather to state pools from which loans are made, and only a small portion of the face value of loans and loan guarantees represents a subsidy to the recipient water systems. Taking into account the actual volume of SRF loans, the average interest rates charged in the SRF program and USDA's program, and the market-based rates that borrowers would otherwise have to pay, the Congressional Budget Office estimates that federal and federally supported spending provided a subsidy equivalent to 10.8 percent of the total investment in drinking water and wastewater systems in 1999.[10]

Some federal spending on water infrastructure is targeted to particular categories of systems. The drinking water SRF program allows states to use up to 30 percent of their capitalization grants to subsidize the loans to systems serving disadvantaged communities, as defined by state affordability criteria, and requires states to give at least 15 percent of the loan dollars to systems serving no more than 10,000 people, if enough eligible projects are available. Through 2000, systems of that size had received 39 percent of the loan funds (and 74 percent of the loans).[11] USDA's program exclusively aids communities of no more than 10,000 people. Under that program, communities with a lower median household income receive loans carrying lower interest rates; eligibility for grant assistance is restricted to projects that would otherwise exceed an affordability guideline.[12] Various smaller federal programs target aid on the basis of location (as with grants from the Appalachian Regional Commission), local economic distress (for example, the Public Works Program of the Commerce Department), or other factors.

In contrast, neither the clean water SRF program nor the federal tax preferences draw formal distinctions between small and large water systems. Nonetheless, a November 2000 report noted that states had given wastewater systems serving up to 10,000 people 23 percent of the money loaned under the SRF program (and 58 percent of the loans) since 1990, whereas systems of that size accounted for 11 percent of the 20-year needs documented in EPA's 1996 survey.[13] Conversely, because many small communities have no credit rating and cannot issue their own bonds, drinking water and wastewater systems owned by such communities cannot directly take advantage of the tax preferences; instead, they benefit indirectly to the extent that they receive assistance from a state revolving fund or other pooling mechanism that taps the bond market.

General Implications of Federal Investment Support for Water Systems

Federal investment support for water systems can have unintended consequences, such as a reduction in comparable spending by state or local governments. Evidence from

9. General Accounting Office, *Water Infrastructure: Information on Federal and State Financial Assistance*, GAO-02-134 (November 2001). The figures are in 2000 dollars.

10. This calculation of the value of the subsidy received by water systems is partly analogous to the calculation of the subsidy value under the Federal Credit Reform Act of 1990 for the purpose of determining the impact on the federal budget. The latter would use the federal government's borrowing rate (instead of the market rate) and make allowances for default risk. (Neither calculation reflects any illiquidity or undiversifiability associated with the debt.)

11. Mary Tiemann, *Safe Drinking Water Act: State Revolving Fund Program*, CRS Short Report for Congress 97-677 (Congressional Research Service, updated January 10, 2002).

12. Subject to additional eligibility requirements, projects may receive grant funding if the ratio of the median household income (MHI) in the service area to the statewide median for nonmetropolitan areas is no greater than 80 percent and the project's debt service per household would exceed 0.5 percent of the local MHI or if the ratio is between 80 percent and 100 percent and the debt service would exceed 1.0 percent of the local MHI. Because that guideline focuses on the debt service associated with an individual project rather than local costs in total—and on MHI rather than individual household income—it sheds little light on the question, discussed in *Appendix C*, of the fraction of income above which water bills might be considered unaffordable.

13. Claudia Copeland, *Rural Water Supply and Sewer Systems: Background Information*, CRS Report for Congress 98-64 ENR (Congressional Research Service, November 30, 2000).

the federal wastewater construction grants program under the Clean Water Act suggests that large increases in federal aid can lead to significant displacement. Between 1970 and 1980, federal support for wastewater plants rose by $8.2 billion, but state and local funding fell by $1.9 billion, effectively negating about one-quarter of the federal increase. A more detailed analysis, taking into account factors that might otherwise have led to increased state and local investment, concluded that federal construction grants reduced other capital spending by 67 cents on the dollar.[14] The exact relationship between federal funding and displacement of spending by state and local governments is not known; for instance, displacement per dollar could be smaller at lower levels of federal involvement. But to the extent that state and local governments cut their funding for water systems, federal support intended for water infrastructure benefits state and local taxpayers instead through increased spending on other services or through lower nonfederal taxes.

A second unintended consequence of federal aid for investment projects is that it distorts price signals for system managers—and thus affects their decisions about such things as preventive maintenance, construction methods, treatment technology, pipe materials, and excess capacity —and for ratepayers, affecting their decisions about usage. The overall effect is to undermine the cost-effective provision and use of water services. Evidence from a 1985 CBO study of wastewater treatment plants indicates that the effects can be significant, at least at high levels of subsidization. Case studies of four plants, financed with various levels of governmental assistance, showed that higher subsidies led to the selection of more costly treatment technologies, the construction of significant reserve capacity, and longer construction periods.[15]

14. James Jondrow and Robert A. Levy, "The Displacement of Local Spending for Pollution Control by Federal Construction Grants," *American Economic Review*, vol. 74, no. 2 (May 1984), pp. 174-178.

15. Congressional Budget Office, *Efficient Investments in Wastewater Treatment Plants* (June 1985), pp. xi-xii. According to some analysts, another factor responsible for raising costs in the construction grant program was the industry's inability to design and build treatment plants rapidly enough to accommodate the sudden, large infusion of additional federal dollars.

In that same study, a statistical analysis of cost data on 68 plants indicated that reducing the nonlocal share of investment funding from 75 percent to 55 percent, as occurred in 1985 under the construction grant program, would reduce capital costs by an average of roughly 30 percent. That estimate implies that the federal burden for the same number of projects would be almost twice as high at 75 percent support as at 55 percent, with more than four-fifths of the difference going to cover higher costs and less than one-fifth going to reduce the burden on local systems.[16] Thus, at least for wastewater treatment plants, high levels of subsidization appear to be a very inefficient way to reduce local investment costs.

The study was less able to quantify the effects that lower subsidy levels would have on cost-effectiveness. It is plausible that the impact of an additional dollar of federal aid depends on the base level of subsidy—for example, that raising the subsidy from 5 percent to 10 percent, with recipient systems still bearing 90 percent of capital costs, would lead to a smaller increase in costs than raising it from 50 percent to 55 percent would. But efforts to map the relationship between external support and project costs in more detail were inconclusive, in part because of the small data set.

One way to reduce the distortions associated with federal aid to water systems, of course, would be to reduce the aid itself. Doing so would encourage system managers to find greater efficiencies in their investment and operations and prompt ratepayers to reduce low-priority uses. Consequently, total nationwide costs for water services would be lower than they would if federal support remained steady or increased. But despite the savings, total costs would probably still rise, given the projected increases in replacement and new investment—and a larger share of those total costs would be paid more visibly through water bills, rather than taxes. Opponents of cutting federal aid for water infrastructure also argue that national funding

16. For example, a treatment plant that cost $10 million to build with a 75 percent federal subsidy would have a federal share of $7.5 million and a local share of $2.5 million, while a plant that cost 30 percent less and had a 55 percent subsidy would entail federal costs of $3.85 million and local costs of $3.15 million. So the higher subsidy rate raises federal spending by $3.65 million but reduces local spending by only $0.65 million.

should continue to help local systems pay for the costs of meeting water quality standards set or directed by the federal government.

Another way to reduce the distortions would be to deliver the aid to water systems differently—according to some formula that does not involve systems' current investments or activities and thus does not distort the marginal costs seen by system managers. Such a formula could include factors related to systems' size (such as miles of pipes and investment spending over some fixed historical period), investment needs (for example, average age of pipes and treatment plants), and local financial capacity (such as the population and average income of the service area). By leaving marginal costs largely untouched, formula-based aid reflecting such independent factors would redistribute revenue to water services without undermining managers' incentives for cost-effective choices, at least in the short run.[17] However, it would not address the issue of federal support displacing funding from state and local governments.

Targeting Investment Aid for Water Systems

Still another way to limit the negative incentives of increased federal support for water systems is to target the aid. All things being equal, the fewer systems eligible for aid, the smaller the undesired consequences. Aid could be given to systems facing high costs (relative to the population served or relative to the aggregate income of the population served) for investment (or investment and O&M) in general or for narrower categories of costs, such as those to comply with federal regulations or to maintain or replace investments "stranded" by shifts in population. But defining the target group in a way that does not reward systems for poor management and low spending in the past, and does not encourage such laxness in systems hoping to qualify for aid in the future, could be difficult.

17. Some factors included in an aid formula could be influenced by the choices of system managers over a longer period of time. For example, the level of investment activity in a system would affect the average age of its infrastructure. Even in that case, however, the incentives to invest would be only modestly distorted if the formula reflected not the current average age of infrastructure but, say, the average age five years earlier.

Implementation would be another challenge. One of the two main choices would be to establish a formula to determine the amount of aid to be given to a system with certain characteristics; the other would be to specify general criteria and then have systems submit funding applications that would be judged against the criteria, allowing a system to present whatever information supports its case. On the one hand, case-by-case review avoids the use of rough proxies and arbitrary thresholds and could allow for aid to systems with ongoing weaknesses to be tied to specific requirements for improvement. On the other hand, the administrative costs of preparing and evaluating the applications would be higher, and the lower predictability would give more systems reason to defer investing on their own in hopes of gaining outside funding.

Advocates of maintaining or increasing the current targeting of small systems in any expansion of federal aid point to a backlog of requests for USDA's assistance and high projected per capita investment costs, at least for drinking water systems.[18] Some opponents argue that the states' emphasis on small systems in allocating SRF money makes additional federal targeting unnecessary. Moreover, it could be ineffective: increasing the statutory targeting within the SRF programs would merely codify what many states are already doing, and providing increased support through other programs (such as USDA's program) might lead states to readjust their SRF portfolios to maintain the current distribution of aid between small and large systems. Some opponents also question whether current programs do enough to ensure that small systems do not remain dependent on external funding indefinitely.

Grants, Credit Subsidies, and Tax Preferences

As noted earlier, subsidies to investments in water systems may be delivered through spending on grants or credit

18. In January 2000, USDA reported a backlog of $3.3 billion in requests for water loans and grants. EPA's latest survey of drinking water needs reported that 20-year needs per household averaged $3,000 in systems serving up to 3,300 people, nearly four times the $790 average for large systems (those serving more than 50,000 people). Similarly, for wastewater, EPA has stated that the smallest systems lack economies of scale and are likely to face the largest percentage increases in user charges and fees; however, results from the 1996 *Clean Water Needs Survey* found that small systems accounted for 11 percent of both needs and population, implying equal costs per capita.

subsidies (such as loans with subsidized interest rates, loan guarantees, and bond insurance) and through tax preferences. Despite the seeming diversity, each of those approaches serves to reduce investment costs to the water system, and for a given reduction in the cost of a particular project, each is likely to have the same impact on the recipient. For example, a 10 percent reduction in the local cost of a $12 million treatment plant that would otherwise be financed by 30-year bonds paying 5 percent interest could be accomplished by providing a grant of $1.2 million, a loan for the full cost of the project at 4.1 percent interest, or bond insurance or tax preferences that reduced the bond interest rate to that same 4.1 percent.

But some levels and patterns of federal subsidy may not be easily attained through all of the mechanisms. For example, providing large increases in aid to publicly owned water systems through tax policy alone would be difficult, given that such systems and the interest paid on municipal bonds are generally exempt from federal taxes already. (Significantly increasing the tax preferences available to privately owned systems would be easier; *see Box 3-1.*) Where tax preferences and spending programs are viable alternatives to achieve the desired level and pattern of support to water systems, the two can be contrasted in several ways. One argument in favor of tax preferences is that they provide more year-to-year stability, which can facilitate planning by system managers. However, spending programs are more readily reviewed and adjusted by the Congress. And changing the tax rules to benefit water systems alone could raise questions about the treatment of other users of municipal bonds while adding complexity to the tax code and increasing administrative costs.

Federal spending programs also differ from tax preferences in that they make it easier for the Congress to specify detailed conditions under which the aid is to occur. Such conditions can have both positive and negative effects on cost-effectiveness. In some cases, incentives or requirements associated with federal funds—"carrots and sticks" —may prompt recipients to take cost-effective actions that they would not otherwise. But conditions on spending that are truly beneficial may be rare: broad, general provisions may have little impact, and specific, detailed conditions may be cost-effective for some systems but not for others. Currently, one prominent stick is the requirement that drinking water systems receiving SRF assistance demonstrate the technical, managerial, and financial capacity to comply with the Safe Drinking Water Act over the long term. In keeping with that requirement, some states give priority to SRF loans that address capacity problems by consolidating two or more systems.[19] Various additional carrots and sticks have been proposed, such as giving priority to systems that adhere to certain best practices or to states that have or adopt laws allowing water treatment plants to be designed and built using integrated contracts (discussed earlier in *Box 2-3* on page 19).

More generally, however, restrictions on the use of federal dollars can reduce cost-effectiveness by limiting the recipients' flexibility in addressing their goals for water services. To increase such flexibility, the Congress could reduce the amount of money earmarked for special-purpose projects and provide those funds to the SRFs instead. Also, the SRFs themselves could be made more flexible by eliminating floors and ceilings on funding for eligible activities in the drinking water program, allowing states to transfer more of their grant money between the drinking water and the wastewater SRFs, and broadening the range of uses—as in a proposal from EPA's Environmental Financial Advisory Board to combine the existing SRFs into environmental state revolving funds (ESRFs).[20] Designed to address a broad set of issues affecting water quality, the ESRFs could fund a wider range of projects to control nonpoint source pollution (particularly projects on private property) and contamination problems associated with landfills, "brownfields," and air pollution.[21]

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19. Environmental Protection Agency, Office of Water, *The Drinking Water State Revolving Fund: Financing America's Drinking Water,* EPA-816-R-00-023 (November 2000), p. 7.

20. Under current law, states may shift up to one-third of each year's drinking water SRF grant to the clean water program or an equal amount in the other direction. For the proposal to create ESRFs, see Environmental Protection Agency, Environmental Financial Advisory Board, *Environmental State Revolving Funds: Developing a Model to Expand the Scope of the SRF* (June 2001).

21. Of course, allowing greater flexibility in the use of SRF money might be said to dilute the original Congressional intent to support infrastructure, and some of the gains expected from broadening the SRF programs may not materialize if the state agencies administering the funds lack the technical expertise to accurately evaluate new kinds of proposals.

Within the set of spending options, the distinctions among grants and credit subsidies arguably have less policy significance. Grants are sometimes said to be more appealing because they are simpler to explain to local ratepayers. Conversely, it is sometimes argued that in comparison to grants, credit subsidies have a lower federal cost per dollar of support seen by the recipient—that argument, however, holds only under the assumption that the government's cost should not be measured using a discount rate reflecting the same risk premiums that private lenders require.[22] Finally, investment projects that rely at least in part on private funding can help keep costs down by subjecting systems to more market discipline; that argues against traditional loans covering 100 percent of capital costs and in favor of grants or partial loans or loan guarantees.

In terms of tax preferences, one approach that could benefit both municipally owned systems and private systems would be to relax the restrictions on arbitrage profits—the gains state and local governments make from the difference between the tax-free rate of interest that they pay bondholders and the higher rates they can earn on taxable bonds and other assets. To avoid encouraging state and local governments to issue bonds simply to take advantage of the spread in interest rates, the federal government restricts such arbitrage profits. In particular, current rules require that systems rebate to the government arbitrage profits on bond proceeds not spent on schedule within a two-year deadline (or for private systems, a six-month deadline). Extending the deadline or otherwise increasing the arbitrage earnings that water systems could keep would reduce their net cost of borrowing.[23] Another option would be to eliminate the partial taxation of interest on municipal bonds held by corporations that pay the alternative minimum tax.

Direct Federal Support for Ratepayers and Its Implications

The federal government supports low-income households in various ways, notably through income-based welfare programs and the earned income tax credit, but does not currently provide direct funding to assist households with their water bills. Existing payment assistance programs for water services are organized locally—some by individual utilities, others by local authorities using tax revenues for support or by community organizations using donated funds—and are much less common than those for home energy and telecommunications services.[24] The federal government does provide some assistance for other utility bills. In particular, the Low-Income Home Energy Assistance Program (LIHEAP), established in 1981, provides states with over $1 billion in block grants each year to subsidize low-income households' heating and cooling costs. Also, the Low Income Program of the telecommunications Universal Service Fund, authorized in its current form in 1996, has used approximately $600 million per year (from fees charged to firms that provide interstate telecommunications services) to provide eligible households with discounts on telephone services.

Federal aid to households could address distributional objectives with more precision and less loss of efficiency than can be achieved from aid for investment in water systems. A program that aided households directly could be more cost-effective in achieving a given distributional objective because fewer households would face reduced water prices and water system managers would not face distorted choices.[25] A program designed to defray the

22. The argument is that the federal government has a lower discount rate (based on its lower borrowing cost), which gives the same loan repayment stream a higher present value for the Treasury than for the local system—and thus that the net federal cost of making the loan is smaller than the net support it provides. Paul K. Marchetti, *The Programmatic and Financial Integration of Grants and Loans Within the State Revolving Funds,* Council of Infrastructure Financing Authorities Monograph no. 11 (September 2001), pp. 11-13.

23. A variant option would be to maintain the current time limits during which proceeds on tax-exempt bonds may earn arbitrage profits but extend the period during which the proceeds must be spent. That alone could lower investment costs by reducing the number of cases in which systems would have to use a phased series of smaller bond issues.

24. For a comprehensive discussion of payment assistance programs for water services, see American Water Works Association Research Foundation, *Water Affordability Programs* (Washington, D.C.: AWWARF, 1998).

25. H.R. 3930 and S. 1961 in the 107th Congress would allow states to use a certain portion of federal SRF grants to buy down the interest rate or otherwise increase the subsidy on SRF loans to local water systems, if the systems in turn directed the bene-

expense of basic water use—one that provided a dollar amount determined by the number of members in the household instead of paying benefits as a proportion of water bills, for example—would not affect households' marginal costs of water consumption, thus preserving incentives for consumers to avoid overusing water services.[26] A consumption subsidy could also be designed to support conservation measures—for example, by subsidizing repairs to fix leaky plumbing. However, beneficiaries (and others allocating funds on their behalf) are likely to prefer direct assistance over conservation measures with even moderately long payback periods.[27]

Delegating most implementation responsibilities to subfederal entities and providing the consumption subsidy to service providers on behalf of households could minimize the federal government's administrative costs and allow more people to be served for a given amount of funding. For example, delegating to the states would allow for cost-effective variations, taking advantage of existing state institutions and programs, in the methods used to identify, notify, and deliver benefits to eligible households. But some of the federal costs "saved" would be merely shifted to nonfederal parties, such as service providers.

State governments shoulder most of the responsibility for administering LIHEAP, and most states exercise their authorization to make consolidated payments on behalf of households to utility companies and fuel dealers.[28] In the Low Income Program for telecommunications, all payments from the fund go to companies on behalf of the households receiving the subsidized services. Administrative costs for the program are about $1.7 million annually, less than one-half percent of the program's fiscal year 2000 outlays of $553 million (in current dollars). The costs incurred by service providers to identify eligible households and apply the appropriate benefits are unknown.

Concluding Note

Water pipes and treatment plants last for decades. Consequently, today's infrastructure represents a cumulation of investment choices and maintenance practices over many years past, and today's investments will affect operating costs and service quality for many years into the future. The magnitude and especially the timing of future investments are uncertain, as discussed in Chapter 2, but barring major breakthroughs in technology, investment costs will certainly rise for decades to come as more and more of the existing infrastructure wears out. Although this report has focused on the costs of water services through 2019, if the drinking water and wastewater industries continue to fall short of self-sufficiency, the consequences for the federal budget may last not two decades, but five or 10.

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fits of the additional subsidy to needy households through adjustments in user charges. The increases in the subsidy component of SRF loans should not significantly increase the distorting effects of federal support for investment itself. From the point of view of water systems receiving the loans, the savings in repayment costs would be offset by reduced revenues from beneficiary households.

26. The Universal Service Fund's Low Income Program illustrates that approach: each of its three types of benefits is capped at a level essentially unrelated to the volume of service used by a particular household. The "Link-Up" benefit subsidizes half of the customary connection fee, up to a maximum of $30. "Lifeline" reduces monthly service bills by $5.25 to $7.85, depending on a number of factors, including whether the state has a matching program. "Toll Limitation Service" covers the cost to providers of allowing consumers to block or set a predetermined limit on long-distance (toll) calls. In the case of LIHEAP, under which states have significant discretion in determining household benefits, questions about inefficient consumption have arisen: the Securing America's Future Energy Act of 2001, passed by the House, calls for the General Accounting Office to determine the extent to which those benefits encourage or discourage energy conservation and investments in energy efficiency. It also requests that that agency examine the extent to which the goals of conservation and assistance to low-income households could be achieved through cash income supplements that do not specifically target energy.

27. Federal rules for LIHEAP allow states to use 15 percent of their grants for low-cost residential weatherization or other energy-related home repairs. Each year, states may also apply for permission to raise that share to as much as 25 percent; however, on average, only five states have done so in recent years.

28. From 1995 through 1999, aggregate state administrative costs averaged close to 9 percent of total spending under LIHEAP.

APPENDIX

A

Assumptions the Congressional Budget Office Used In Its Low-Cost and High-Cost Cases

As with all modeling exercises, the Congressional Budget Office's (CBO's) analysis of future costs for investment in water infrastructure rests on the quality of the data used as inputs and the validity of the many assumptions used in converting the data into estimates. The most readily apparent assumptions are the 11 specific numerical values that differ between CBO's low-cost and high-cost cases and between those cases and the analysis done by the Water Infrastructure Network (WIN). Those assumptions include a factor describing savings from improved efficiency in investment by both wastewater and drinking water systems; three factors pertaining to capital costs for wastewater systems alone; two specific to capital costs for drinking water systems; four involving financing costs; and one pertaining to operations and maintenance (O&M). The goal in selecting the assumptions was not to determine the lowest and highest possible values of each one, but to identify reasonably low and high values that might realistically occur together in the scenarios.

Aside from the 11 distinguishing assumptions (*see Table 2* on page 20), CBO's scenarios and WIN's analysis have much in common, including primary data sources and "structural" assumptions about which factors influence other factors. The effects of those common elements is unknown. For example, CBO cannot quantify the extent to which differences in the available data and modeling approaches used to analyze investments for drinking water and wastewater affected the estimated costs.

Savings from Increased Efficiency in Investment

Although quantifying the potential impact of improved management and better technology on future investment is difficult, CBO considers it likely that U.S. systems could achieve savings of 10 percent or more, given incentives to do so. Evidence for that assumption comes from Australia and the United Kingdom, where water systems have been pressed to become more efficient. Accordingly, CBO reduced estimated costs for capital investment in both drinking water and wastewater systems by 15 percent in the low-cost case and by 5 percent in the high-cost case.[1]

Capital Costs for Wastewater Systems

In light of the limited data available and the resulting uncertainty, the two scenarios differ in the depreciation rates for wastewater infrastructure, the shares of investment for replacing infrastructure that CBO assumed were

1. Both scenarios implicitly assume that the data collected in the Environmental Protection Agency's needs surveys do not already reflect future efficiency savings. The other sources of estimated capital costs—the Water Infrastructure Network's analysis of investment in wastewater systems for replacing infrastructure and Stratus Consulting's report on investment in drinking water distribution—are explicitly based on current prices and valuations and thus do not reflect potential efficiency gains.

included among the needs estimated in the Environmental Protection Agency's (EPA's) survey, and the costs for dealing with combined sewer overflows (CSOs). The costs to address sanitary sewer overflows (SSOs) are also uncertain, but CBO used the same estimate of those costs for both scenarios, largely for lack of information on which to base contrasting estimates.

WIN's rule-of-thumb assumptions about the lifetimes for sewer pipes, treatment plants, and vehicles—50 years, 20 years, and 5 years—seem reasonably conservative (in other words, short). Reflecting those assumptions and the relative importance of the three types of capital stock, CBO adopted a weighted (economic) depreciation rate of 3.3 percent for its high-cost case. Those rules of thumb could in principle underestimate replacement costs if wastewater systems have built up an investment backlog; presumably, however, most overdue investments would be affecting service quality and thus would probably be included in EPA's needs survey and reflected in WIN's estimate of costs for investments besides those for replacing infrastructure.

Conversely, some experts have suggested to CBO that reasonably optimistic lifetimes for pipes and treatment plants would be 75 years and 30 years, respectively. Moreover, replacement rates over a period of 20 years could fall below the average level implied by those lifetimes, depending on the age of the existing stock. In the absence of better data on actual lifetimes and current ages, however, the low-cost case assumes lifetimes of only 60 years for pipes, 25 years for treatment plants, and 7 years for vehicles, and uses the corresponding weighted overall depreciation rate of 2.7 percent.[2]

The low-cost and high-cost scenarios assume, respectively, that 25 percent and 15 percent of the investments in the relevant categories of EPA's needs survey—secondary and advanced treatment, new collector and interceptor sewers, combined sewer overflows, and stormwater management—represent replacement of existing infrastructure. Since such investments are captured in the analysis by applying the depreciation rate to the total capital stock, that 15 percent to 25 percent overlap must be subtracted from the total in the needs survey to avoid double-counting. CBO chose those percentages to illustrate the uncertainty surrounding WIN's estimate of 20.5 percent—which was derived by assuming that investments to replace existing infrastructure represented 50 percent of the investments cited in EPA's survey for addressing SSOs and zero percent of the investments in other survey categories.

CBO's low-cost case takes its estimate of the costs for addressing CSOs from EPA's needs survey. WIN's analysis uses the same figure, but WIN argues that EPA's estimate is too low and is a significant source of downward bias in its analysis. The CSO Partnership believes that EPA's estimate is a reasonable one if states exercise the maximum flexibility in reviewing and revising their water quality standards, but costs could reach $100 billion if states maintain the current standards. Consequently, CBO's high-cost case incorporates that latter figure.[3]

Capital Costs for Drinking Water Systems

The main factor responsible for the difference between the two scenarios' estimates of investment costs for drinking water is the assumed rate of pipe replacement. The Stratus Consulting report that underlies WIN's analysis

2. Because the modeling framework that WIN developed derives its estimate of the value of the existing stock of wastewater infrastructure by cumulating past investments and subtracting depreciation, the lower the rate of depreciation in the past, the larger the current capital stock. For consistency, therefore, CBO calculated an alternative estimate of the 1999 capital stock for the low-cost case, using the lower depreciation rate assumed in that scenario. The alternative estimate is 12.3 percent larger, which partly offsets the impact of the lower depreciation rate on estimated future investment.

Also, CBO's analysis, like WIN's, calculated each year's investment for replacing infrastructure by applying the depreciation rate to the current net stock of capital, not the gross stock. That approach is clearly not a literal description of replacement at the level of individual investments: a pipe or treatment plant does not cost less to replace simply because it is older and thus has depreciated more. Rather, it should be viewed as a way of approximating the total amount of replacement needed for a large capital stock containing assets of various ages.

3. The assumptions in both scenarios are "gross" costs—that is, the costs before subtracting anything for overlap with investments to replace infrastructure or efficiency savings.

focused on an average rate of 1.0 percent per year (averaging over rates randomly selected from a uniform probability distribution from 0.5 percent to 1.5 percent), but it also presented an alternative analysis that related historical investment in pipes to population growth. CBO's high-cost case, like WIN's analysis, adopts Stratus's assumption of 1.0 percent as a plausible though marked increase above recent rates. The low-cost case focuses on the alternative "demographic" analysis and assumes a replacement rate of 0.6 percent—the average of the six rates calculated for the 2000-2010 and 2010-2020 decades using 50-, 75-, and 100-year pipe lifetimes.[4] Here, as elsewhere in its analysis, CBO assumes for simplicity that the relevant replacement rate (1.0 percent or 0.6 percent) holds steady throughout the 2000-2019 period. In reality, replacement is likely to accelerate as existing pipes age, so the rates are best viewed as averages over the period.

The other assumption pertaining to investment for drinking water concerns the costs associated with future federal regulations. EPA's estimates of compliance costs for drinking water regulations are frequently controversial, with water systems claiming that they are grossly understated. Often, assumptions about compliance methods are at the heart of the controversy. For example, a study issued by the American Water Works Association Research Foundation estimated that national annualized costs to comply with an arsenic standard of 10 micrograms per liter could be as low as $230 million, close to EPA's estimate of $180 million to $206 million, if each system affected by the standard was able to achieve compliance by using the least costly technology.[5] However, using professional judgments about the likely performance of various technologies under different conditions, the study's "best estimate" of compliance costs was much higher—$585 million. Conversely, an EPA contractor's report looking retrospectively at compliance with regulations for nitrate and atrazine found that many systems used cheaper compliance methods than EPA had assumed in its regulatory impact analyses.[6] That finding suggests that the agency's estimates may overstate costs rather than understate them, at least in some cases.

Even if the estimates in EPA's impact analyses were known to be perfectly accurate, uncertainty would still remain about the costs of regulations not yet promulgated or proposed, for which no such analyses exist. Agency sources do not currently anticipate proposing high-cost rules beyond those already part of the regulatory agenda, but some new development in the next five to 10 years could lead to regulations that would have significant cost impacts by 2019. In the low-cost case, CBO assumes incremental costs of zero for future regulations (as does WIN's analysis), on the grounds that those already proposed or promulgated could reflect most of the compliance costs that systems will incur through 2019, with efficiency savings on those "known" regulations roughly balancing any costs during the period for subsequent requirements. In the high-cost case, CBO adds $10 billion (in January 1999) dollars over the 20-year period —the equivalent of $0.53 billion per year in 2001 dollars—on the assumption that the estimate of compliance costs for known regulations expressed in EPA's needs survey ($9.3 billion in January 1999 dollars) covers roughly half of total costs through 2019 for both known and future regulations. That assumption takes into account the possibility that costs for the known regulations will exceed EPA's estimate as well as the possibility of spending on later requirements. Somewhat higher figures could also be justified as plausible but would not have a major additional impact on total estimated costs.

Financing

In consultation with a half-dozen experts from the water and municipal bond industries, CBO derived pairs of

4. One factor that could keep pipe replacement rates low is the use of new techniques to identify pipes that are redundant and can be abandoned, given existing or potential alternative routes in the pipe network.

5. Michelle M. Frey and others, "Cost Implications of a Lower Arsenic MCL," AWWA Research Foundation Project #2635 (October 2000), p. ES-20, available at www.awwarf.com/exsums/2635.htm. The study does not specify the type (nominal or inflation-adjusted) or year of the dollars used in the estimates.

6. Abt Associates, Inc., *Predicting Community Water System Compliance Choices: Lessons from the Past* (submitted to the Environmental Protection Agency, Office of Policy, Economics, and Innovation, September 2000).

assumptions about future interest rates, borrowing terms, and the use of debt financing versus pay-as-you-go (or paygo) for capital investment. CBO used related assumptions to estimate the average annual spending to service debt on "old" (that is, pre-2000) investments in drinking water and wastewater systems; the resulting estimates are common to both of CBO's scenarios but somewhat lower than those used in WIN's analysis.

The low-cost case uses a real interest rate of 3 percent (as does WIN's analysis), and the high-cost case uses 4 percent. CBO chose those assumptions on the basis of an estimated 3.2 percent weighted average covering market-rate bonds and subsidized rates on state revolving fund (SRF) loans. The estimate took into account CBO's long-run projections for inflation and the nominal interest rate on 30-year Treasury bonds, traditional spreads between Treasuries and municipal bonds, projections of potential assistance from SRFs, and current interest rates on SRF loans. That range from 3 percent to 4 percent may understate the true uncertainty about average interest rates over the 2000-2019 period; however, once those figures are combined with the many other pairs of low-cost and high-cost assumptions, CBO believes that they yield suitably low and high estimates of investment spending.

CBO assumes the average repayment period on borrowed funds to be 30 years in the low-cost case and 25 years in the high-cost case; WIN's analysis assumes a shorter period of 20 years. Although some (mostly smaller) municipalities continue to borrow at terms as short as 10 years and loans from state revolving funds must still be amortized over no more than 20 years, industry experts told CBO that water bond maturities have lengthened overall and that 30 years is now the standard term. Even within the wastewater SRF program, EPA now interprets its regulations to allow SRFs themselves to borrow 30-year money and use it to buy local systems' debt. As investment programs increase, stretching out debt service will be increasingly important as a way to contain rate increases; indeed, the Boston-area Massachusetts Water Resources Authority is now borrowing 40-year money. Accordingly, CBO considers 30 years a cautiously optimistic assumption for the average dollar borrowed over the 2000-2019 period and 25 years an adequately pessimistic alternative.

Similarly, keeping rates low in the face of rising investments will also mean reducing the use of paygo financing in favor of borrowed funds. In two small 1999 surveys of drinking water and wastewater systems, indirect data appear to suggest average paygo shares of roughly 40 percent and 50 percent.[7] Nonetheless, according to industry experts, systems undertaking large amounts of investment generally use paygo financing very little (often a share of just a few percent), suggesting that the national average paygo share will fall as capital spending rises. Reflecting the uncertainty about how quickly and how far the average will fall through 2019, the high-cost and low-cost cases use paygo rates of 30 percent and 15 percent, respectively. WIN's analysis assumes a paygo share of 25 percent.

Assumptions about borrowing terms, paygo shares, and interest rates are also relevant in estimating the costs of "old" debt service—that is, the financing costs associated with previous investments still being paid off during the 2000-2019 period. For simplicity, CBO uses the same assumptions about those costs in both scenarios.[8] In

7. In the one survey, 76 privately owned drinking water systems (many belonging to the same parent companies) reported total construction expenditures of $846 million and total gross cash flow from financing activities (before subtracting debt repayment and dividends) of $526 million. Presumably, paygo accounted for the remaining $320 million, or 38 percent, of construction spending. See National Association of Water Companies, *1999 Financial and Operating Data for Investor-Owned Water Utilities* (Washington, D.C.: NAWC, 2000).

   In the survey of wastewater systems, bond proceeds and SRF loans accounted for 46 percent of capital spending; interest earned and other revenue sources provided another 7 percent. Depending on the classification of those latter two sources, the residual paygo share lay between 47 percent and 54 percent. Only 40 to 69 systems provided responses other than zero to the survey's questions about capital spending, however, so the sample may not have been representative of all medium-sized and large wastewater systems. See Association of Metropolitan Sewerage Agencies, *The AMSA Financial Survey, 1999: A National Survey of Municipal Wastewater Management Financing and Trends* (Washington, D.C.: AMSA, 1999).

8. Using two sets of assumptions would have complicated the problem of matching assumptions about paygo shares with each of CBO's scenarios. Lower paygo shares on new investments imply lower up-front costs; conversely, if paygo shares also vary

particular, CBO assumes that the repayment period on funds borrowed before 2000 is 20 years (shorter than the 25-year and 30-year periods used going forward) and that the assumed paygo shares decline by 1 percent each year, from 50 percent in 1980 to 31 percent in 1999. The latter assumption is broadly consistent with the theory that paygo shares decrease as investment programs increase; a higher trajectory of paygo rates could have been justified by the available (limited) survey data, but would have implied larger discontinuities between 1999 and 2000. Finally, rather than assume a fixed real interest rate, CBO's analysis used each year's average nominal rate for 10-year Treasuries, reduced by spreads ranging from 5 percent to 15 percent between municipal and Treasury bonds. CBO then converted total annual payments for debt service to constant dollars using the gross domestic product (GDP) deflator. For federal loans through EPA's state revolving funds and the U.S. Department of Agriculture's (USDA's) rural utilities program, the analysis used those same interest rates less 2 percent.[9]

The estimates of average annual costs for "old" debt service resulting from those assumptions are somewhat lower than WIN's: $4.4 billion instead of $5.1 billion for drinking water and $4.3 billion instead of $4.4 billion for wastewater.[10] The differences are primarily attributable to CBO's higher paygo shares and differences in data sources; the use of variable interest rates and the different method of converting to real dollars did not have much impact.

Operations and Maintenance

Although the focus of this study is on investment costs, spending for operations and maintenance is relevant in that it contributes to the total financial burden facing water systems and their ratepayers. CBO used comparatively simple approaches to model future O&M costs. Under the high-cost case, both drinking water and wastewater systems' O&M are modeled by extrapolating a linear trend through estimated spending (in constant dollars) from 1980 through 1998.[11] The approach used in the low-cost case starts from the same trend lines but assumes that increased efficiency yields savings of 20 percent, phased in 2 percent each year from 1995 to 2004.

The rationales for those scenarios are straightforward. The trend lines for both drinking water and wastewater systems' O&M fit the 1980-1998 data extremely well (explaining 99 percent of the variation from the means) and thus appear to be reasonable bases for extrapolating future spending. At the same time, cost savings of 20 percent seem well in line with the experience of systems that

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on previous investments, then lower shares imply higher costs for old debt service. Thus, whether lower assumptions about past and future paygo shares should be assigned to the low-cost or the high-cost case would have been an empirical question, subject to changes in those shares or in other, interacting assumptions.

9. Data for the analysis came from several sources, including Congressional Budget Office, *Trends in Public Infrastructure Spending* (May 1999), which in turn drew on the Census Bureau's annual surveys of *State and Local Government Finances*; General Accounting Office, *Water Infrastructure: Information on Federal and State Financial Assistance* GAO-02-134 (November 2001); and data from EPA on loan volumes and federal outlays for the state revolving funds. Data on drinking water systems derived from the census survey, which covers only publicly owned systems, are scaled up by 15 percent to account for spending by privately owned systems. That adjustment roughly reflects the population served by privately owned systems; WIN, too, makes that adjustment in its analysis.

For lack of information, however, CBO did not scale the census data down by a percentage reflecting investments in drinking water infrastructure to serve growth, which are not covered in the estimates of future costs. That factor is one of two that tends to overstate relevant investment spending in 1999 and future debt service on pre-2000 investments. The other is the neglect of any refinancing that systems did as interest rates fell in the 1990s. Two other limitations of the data act in the opposite direction: they do not distinguish USDA loans from local systems' spending of their own funds before 1991, and they understate local spending starting in 1992 by an amount equal to the federal budget cost (that is, the subsidy value) of those loans.

10. WIN's analysis used the same assumptions for pre-2000 investments as for new investments: a 20-year borrowing term, 25 percent paygo share, and 3 percent real interest rate.

11. The estimates were derived from data in the Census Bureau's surveys of government finances. CBO averaged data from successive surveys to convert from state fiscal years (typically July 1 to June 30) to calendar years and used the GDP price index to convert from nominal dollars to constant 2001 dollars. Again, CBO increased the estimates for drinking water systems by 15 percent to account for privately owned systems not covered by the surveys.

have begun to emphasize efficiency and competitiveness and also broadly consistent with significant decreases in the average annual growth in O&M spending seen in the last four years of available data (1995 through 1998).

The approach CBO took in its low-cost case echoes that used in WIN's analysis, which also appears to modify linear extrapolations by phasing in 20 percent efficiency savings over 10 years.[12] For drinking water systems' O&M, the low-cost case differs from its WIN counterpart only in the data sources: WIN's analysis based its extrapolation on data from 1985 to 1994, and, to convert from nominal to 1997 dollars, appears to have used the *Engineering News-Record's* Construction Cost Index (which focuses on only the prices of labor, structural steel shapes, cement, and lumber) rather than the more general GDP price index. For wastewater systems' O&M, an additional factor distinguishes the two approaches: WIN's linear extrapolation (using 1972-1996 data) was not on O&M spending itself but on spending per dollar of net capital stock.

Although the size of the capital stock is plausibly related to the amount of O&M, CBO did not see a compelling case for WIN's more complicated approach. It is not obvious that each additional dollar of capital stock should be associated with an ever-increasing (rather than a steady) amount of additional O&M spending. Specific factors that contributed to steady increases in wastewater systems' O&M spending (in comparison to capital stock) between 1972 and 1996, such as a major increase in the use of secondary treatment methods and increased requirements for handling biosolid residues, may have largely played themselves out by now. And the linear trend line through the data on spending per dollar of net capital stock, while a very good fit, was no better than the trend line through the data on O&M spending itself.

Of course, the simple approaches CBO used could understate the uncertainty surrounding O&M costs by failing to capture some ways in which the future could differ from the past. For example, tighter effluent standards or additional drinking water regulations might raise O&M costs faster than projected in the high-cost case, while more aggressive efficiency campaigns or faster technological progress might yield savings larger than projected in the low-cost scenario.

12. The documentation available to CBO did not show that efficiency savings were applied to the trend for drinking water systems' O&M; however, by experimenting with the data that WIN used, CBO found that including such savings and phasing them in over the same 1997-2006 period specified for the savings by wastewater systems roughly reproduced WIN's published estimate of average annual costs over the 2000-2019 period. Although WIN's report said that its model assumed 25 percent savings, the consultant who led the analysis has confirmed that the correct figure is 20 percent.

APPENDIX

B

Major Sources of Efficiency Savings

Faced with increased pressure from ratepayers and local government officials to control costs, drinking water and wastewater systems around the country are looking for ways to improve the efficiency of their investment, operations, and maintenance activities. Their efforts have identified many sources of efficiency savings, most of which are captured under one or more of the categories discussed below.

Demand Management

Efforts to influence the demand for water services may take a variety of forms, including increases in prices to better reflect the full costs of water services, rebates for purchases of equipment that uses less water, and campaigns to promote voluntary reductions in water use.

One important application of demand management is to reduce peak usage and thereby postpone expensive increases in capacity. For example, after determining that higher demand for water in the summer, driven primarily by residential landscape watering, cost four times as much to satisfy as average annual demand ($0.97 versus $0.22 per hundred cubic feet, in unspecified dollars), Seattle Public Utilities implemented several methods—including a media campaign, appearances by speakers, demonstration gardens, bill inserts, zoning codes, and seasonal rate increases ranging from 50 percent to 160 percent—to reduce summer watering. According to the utility, the measures have cut the maximum amount demanded on any one day of the year by almost one-third despite an increase of 20 percent in the population served. The measures yielded savings of millions of dollars from postponed expansions in distribution and supply facilities and additional savings in energy and labor costs and increased flexibility in routing water through the distribution system.[1]

On the wastewater side, pricing based on marginal-cost principles to reduce cross-subsidies between different classes of users can improve efficiency not only by alleviating pressure for investments in overall capacity but also by reducing costs associated with treating particular types of wastes—as these examples show: fats, oils, and greases (as from restaurants and auto shops) can raise a wastewater system's costs for keeping its sewers unclogged; and metal contaminants can raise the costs of disposing of treated biosolids by making them unfit for application on nearby agricultural land.[2] By analyzing the cost impacts of such wastes and charging accordingly, system managers can give users incentives to "pretreat" them on-site or avoid creating them whenever the cost of doing so is lower than the cost of treating them in the wastewater system.

Labor Productivity

Labor costs are a major focus of efforts to improve efficiency because they represent the largest single compo-

1. Allan Dietenmann, "A Peek at the Peak: Reducing Seattle's Peak Water Demand" (Seattle Public Utilities, Resource Conservation Section, Feburary 9, 1998).

2. For examples and discussion, see Industrial Economics, Inc., *Cost Accounting and Budgeting for Improved Wastewater Treatment* (prepared for the Environmental Protection Agency, Office of Policy, Planning and Evaluation and Office of Water, February 1998).

nent of water systems' operational costs. For example, according to a 1999 survey of medium-sized and large wastewater systems by the Association of Metropolitan Sewerage Agencies (AMSA), "in-house" wages and benefits accounted for 48 percent of operational costs, on average. In comparison, services that the wastewater systems purchased from other municipal departments or private contractors accounted for another 28 percent, and electricity and other utilities, chemicals, parts, and supplies, the remaining 24 percent.[3]

But the AMSA survey also shows evidence of the progress wastewater systems are making in increasing labor productivity. Responding systems had an average of 4.7 full-time-equivalent (FTE) workers per 10,000 people served, down from 5.6 FTEs in the 1996 survey and 6.8 FTEs in the 1990 survey. Because the set of responding systems changes with each survey, however, those figures may obscure the actual change over time. A smaller comparison, focusing on the 45 systems that answered both the 1996 and 1999 surveys, shows FTEs per 10,000 people served falling from 5.0 to 4.7 over those three years, a reduction of 6 percent.[4]

One method that systems are using to improve productivity is cross-training to increase the flexibility of their workforce—for example, by reducing or eliminating the distinction between "operators" and "maintenance staff." Another is reducing staffing, particularly for off-peak shifts, through more use of automation and communication technologies to allow equipment to operate unattended under normal circumstances.[5]

3. Association of Metropolitan Sewerage Agencies, *The AMSA Financial Survey, 1999: A National Survey of Municipal Wastewater Management Financing and Trends* (Washington, D.C.: AMSA, 1999).

4. Ibid., pp. 12, 67. An alternative measure of staffing—FTEs per million gallons of water treated per day—also fell by roughly 6 percent, from 3.5 to 3.3, for 41 systems responding in both 1996 and 1999.

5. Apogee Research/Hagler Bailly, Inc., and EMA Services, Inc., "Thinking, Getting, & Staying Competitive: A Public Sector Handbook" (prepared for the Association of Metropolitan Sewerage Agencies and the Association of Metropolitan Water Agencies, Washington, D.C., undated), pp. 35-36. Many water systems are finding ways to economize on other operational costs, notably those for electricity and chemicals. Some of those savings are found through asset management—in particular, through the use of life-cycle costing to identify efficient investments in improved technology.

Consolidation of Systems

As discussed in Chapter 1, the large majority of drinking water and wastewater systems are small. All things being equal, small systems incur much higher unit costs for treatment and other functions. For example, the Environmental Protection Agency's data on the costs of monitoring and treatment to comply with the Safe Drinking Water Act's standards in force as of September 1994 suggest that the average cost per household was about $4 per year in systems serving more than 500,000 people but about $300 per year for systems serving no more than 100 people.[6] Among the difficulties small systems face are a shortage of staff and financial resources to stay current with the latest technologies and management practices and the small scale of their purchases of chemical supplies and other materials.

Many small water systems, including roughly half of all small drinking water systems, lie within one of the nation's roughly 275 metropolitan areas (defined using census data), and a subset of those may be good candidates for physical consolidation or merger.[7] Some states have used SRF assistance as leverage to induce small systems to consolidate and to help larger regional systems absorb smaller neighbors.[8] Alternatively, where the distances make physical connections impractical and thereby preclude savings from centralized treatment, some efficiencies may still be obtained through consolidating

6. Estimates are in 1992 dollars, based on data in Congressional Budget Office, *The Safe Drinking Water Act: A Case Study of an Unfunded Federal Mandate* (September 1995), pp. 16-17.

7. American Water Works Association, *Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era* (Washington, D.C.: AWWA, May 2001), p. 15.

8. The drinking water SRF program prohibits assistance to any system that cannot demonstrate "the technical, financial, and managerial capacity to ensure compliance with the [Safe Drinking Water Act] over the long-term." Environmental Protection Agency, Office of Water, *The Drinking Water State Revolving Fund: Financing America's Drinking Water*, EPA-816-R-00-023 (November 2000), p. 7.

management, staff, and administrative functions. Even systems that continue to operate independently may be able to cooperate in, for example, biring a "circuit rider" to provide technical expertise on a shared basis.

Asset Management

As the words suggest, "asset management" refers to efforts to get the maximum benefit from an organization's assets, usually its fixed physical assets. For existing assets, the key to maximizing the benefits is making efficient choices about maintenance and replacement. For new assets, the key is to evaluate total life-cycle costs—not only initial capital costs but also subsequent operational, mainre-nance, and disposal costs—to ensure that the investment is optimally cost-effective.

Active asset management in a large water system is challenging; it requires paying attention to the condition of equipment and the performance of the system and analyzing the discounted costs of different invesrment and maintenance strategies. But the potential for managing assets efficiently has increased with the advenr of sophisticated analytical tools that help optimize the design of pipe networks (in some cases, identifying links that can be abandoned rather than replaced) and evaluate the ttade-offs involved in maintaining equipmenr versus replacing it. The payoffs of such effort can be significant, by extending the life of equipment, eliminating redundant equipment, reducing O&M costs by as much as 40 percent, and improving the reliability of the system by roughly 70 percenr.[9]

Innovative Construction Contracting

Some water systems have found that when the time comes to construcr a new treatment plant (or significantly expand or update an old one), they are able to reduce costs significantly rhrough the use of "design/build" or "design/build/operare" (DB or DBO) contracting. Whereas traditional practice involves using one firm (often selected without competition) to do the engineering design and then competitively awarding the actual construction to the lowest bidder, hoth DB and DBO procurements bundle the design and construction phases into a single contract, awarded on the basis of competitive bids that are judged on cost and quality together. Done properly, the approach may save time, increase accountability, and reduce costs (in part by allowing design firms to incorporate more proprietary or specialized methods and technologies and by reducing the need to "overdesign" to avoid later errors in construction or operarion). According to EPA's Environmental Financial Advisory Board, some DBO contracts have yielded savings of 35 percent to 40 percent of project costs.[10] Savings claims for DB contracts are commonly around 10 percent or 15 percent.

Two examples of DBO projects that provide clear evidence of cost savings are a 120-million-gallon-per-day (MGD) filtration plant for drinking water for Seattle, Washington, and a 1.2 MGD wastewater treatment plant for Washington Borough, New Jersey. In the Seattle case, a conventional design was substantially complete by the rime Seattle Public Utilities decided to switch to the DBO approach, and so more information than usual is available abour the costs of the forgone alternative. On the basis of engineering estimares in rhe conventional design, Seattle Public Utilities has calculated that that approach would have cost $171 million (in discounted present value, using 1998 dollars) for construction and 25 years of operations, compared with $101 million under the DBO contract.[11] The savings of 41 percent may be somewhat overstated, however, because engineering estimates of construction costs do not necessarily reflect the lowest qualified bid that will subsequently be received.[12]

9. Apogee Research/Hagler Bailly and EMA Services, "Thinking, Getting, & Staying Competitive," p. 12.

10. Environmental Protection Agency, Environmental Financial Advisory Board, "Private Sector Initiatives to Improve Efficiency in Providing Public-Purpose Environmental Services" (July 2001).

11. See "The Solicitation Process" on Seattle's "Project Summary" Web page for the Tolt Treatment Facilities, at www.cityof seattle.net/util/DW/TOLT/summary.htm.

12. David Higgens and Frank Mangravite, "Comparison of Design-Build-Operate and Conventional Procurements on Washington Borough, N.J., Wastewater Treatment Plant," *International Supplement to RCC's Public Works Financing* (July-August 1999), p. 1.

In the Washington Borough case, the conventional approach was taken one step further, and actual construction bids were received. Using alternative assumptions for such things as the costs of construction change orders under the forgone approach, the borough and its advisers estimate that the DBO contract reduced design and construction costs by between 17 percent and 25 percent and lowered annual operating costs by 4.2 percent.[13]

13. Ibid., p. 6.

APPENDIX

C

The 4 Percent Benchmark for Affordability

The Environmental Protection Agency has never adopted a measure to indicate how much an individual household can pay for water services before they become unaffordable. Yet participants in the current debate use (and attribute to EPA) the assumption that any household with water bills in excess of 4 percent of its income is experiencing a hardship. In adopting that notion, they mistakenly apply to individual households "affordability criteria" that the agency developed for whole water systems.

The distinction is important because EPA's criteria compare the revenues collected by a water system to the median household income (MHI) in a service area, not to individual household income. Certainly, average household costs that correspond to 4 percent of a community's MHI represent an even higher percentage of the income of an individual household earning less than the median. Thus, EPA's (subjective) judgment that 4 percent of MHI is a reasonable ceiling on a water system's yield does not translate into a judgment that each individual household served by that system should pay no more than 4 percent of its income for water services.

The 4 percent benchmark reflects EPA's separate figures of 2 percent each for wastewater and drinking water. The origins of those individual figures highlight the subjectivity inherent in setting affordability criteria.

EPA's Affordability Criterion for Wastewater Systems

EPA's guidance on the affordability of investment in wastewater systems uses an average household rate of 2 percent of MHI as one assessment factor in conjunction with measures of the system's debt, socioeconomic conditions of the area, and financial management conditions.[1] The focus on affordability at the system level is also reflected in the guidance's reference to a 1988 study examining municipal governments' ability to issue revenue bonds to finance environmental compliance. EPA assumed that lending insritutions would initially be reluctant to accept ratios of user fees to income that were much above those already in existence in most communities, but the agency was clearly not concerned about whether individual households could afford higher rates —it asserted that as new environmental regulations gained wider acceptance, lenders would not be put off by higher ratios.[2]

1. See Environmental Protection Agency, Office of Water, Office of Wastewater Management, "Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development," EPA 832-B-97-004 (February 1997).

2. Financial markets do not use a household-level affordability criterion in determining a system's overall financial condition and credit capacity. But they do consider whether rates that are comparatively low for a region may constrain asset maintenance and whether rates that are too high may limit expansion of the industrial customer base. Rate assessments allow for timely capital improvement plans and rates that reflect the full cost of service. In addition to rates, financial analysts examine the diversity and breadth of a system's customer base, the strength of the local economy, the system's governance and organizational structure, the quality of its management and strategic focus, and its liquidity. See Mary Francoeur, Chee Mee Hu, and Thomas Paolicelli, *Rating Methodology: Analytical Framework for Water and Sewer System Ratings* (Moody's Investor Service, Municipal Credit Research, August 1999). Conversation with Chee Mee Hu, December 17, 2001.

EPA's Affordability Criterion for Drinking Water Systems

EPA was led to establish an affordability criterion for drinking water systems by the 1996 Amendments to the Safe Drinking Water Act. The amendments specified that small public drinking water systems would be allowed to use less effective pollutant control technologies when designated technologies capable of achieving a maximum contaminant level for a pollutant or satisfying a treatment technique requirement were not "affordable." EPA judged that a technology was not affordable for a small system if the associated average expense per household served exceeded 2 percent of the service area's MHI.

EPA settled on 2 percent after seeking a value that would be "closer to the cost of other utilities, and not significantly less than the cost of specific discretionary items."[3] Consumer expenditures on alcohol and tobacco represented 1.5 percent of 1995 pretax MHI, and expenditures on energy and fuels accounted for 3.3 percent.[4] From that range, the agency selected 2 percent, in part because it was roughly consistent with the premium that some households were choosing to pay when installing a drinking water treatment device or purchasing bottled water.[5]

EPA recently decided to raise the value to 2.5 percent of MHI, which highlights the subjective underpinnings of the agency's affordability criterion. The change allows EPA to designate point-of-use treatment devices as "compliance technologies" because it ensures that average household charges by small systems installing such devices would remain below the affordability criterion. In effect, the change limits the recourse of small drinking water systems to less effective pollutant control technologies.

3. See International Consultants and others, "National Level Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act (Final Draft Report)," USEPA Contract 68-C6-0039 (August 1998), pp. 6-2, 4-6; and Environmental Protection Agency, Office of Water, "Variance Technology Findings for Contaminants Regulated Before 1996," EPA 815-R-98-003 (September 1998), p. 19.

4. Environmental Protection Agency, Office of Water, "Variance Technology Findings," p. 45.

5. International Consultants, "National Level Affordability Criteria," p. 4-3.

APPENDIX

D Acknowledgments

Many people assisted the authors of this study, by typing drafts, reviewing drafts, providing helpful information, editing and proofreading the study, and preparing the final version for printing and for posting on the Congressional Budget Office's Web site (www.cbo.gov). Taking responsibility for any remaining errors, the authors want to express their appreciation to the people listed below for their contributions.

Congressional Budget Office
Christine Bogusz
Tracy Foertsch
Ed Harris
Annette Kalicki
Angela Z. McCollough
Susanne Mehlman
John Peterson
John Skeen
Eric Warasta
David Weiner
Kathryn Winstead
Rae Wiseman
Dennis Zimmerman

Environmental Protection Agency
Steve Allbee
George Ames
Veronica Blette
Alvin Edwards
Kit Farber
John Flowers
Terry Grindstaff
Sandra Perrin
David Travers
Kevin Weiss

Other

Janice Beecher, Beecher Policy Research
Mel Blackwell, Universal Service Administrative Company
Larry Bowman, U.S. Department of Agriculture
Caroline Carbaugh, U.S. Census Bureau
Peter Cook, National Association of Water Companies
Claudia Copeland, Congressional Research Service
John Cromwell, PA Consulting
Michael Deane, United Water
Andreas Deppe, formerly of Hagler Bailly Services
Rick Farrell, Council of Infrastructure Financing Authorities
Lee Garrigan, Association of Metropolitan Sewerage Agencies
Jim Gebhardt, New York Environmental Facilities Corporation
Barbara Gottschalk, formerly of the Massachusetts Water Resources Authority
Jon Harcum, Tetra Tech, Inc.
Thomas Holtmann, Joint Committee on Taxation
Eric Keil, Bureau of Labor Statistics
Ken Kirk, Association of Metropolitan Sewerage Agencies
Jim Land, Federal Communications Commission
Amy Laskey, Fitch Ratings
Robert Lenna, Maine Municipal Bond Bank
Randall Lutter, American Enterprise Institute
Steven Maguire, Congressional Research Service
Alan Manning, EMA, Inc.
Guy Nagahama, First Albany
Charles Noss, Water Environment Research Foundation
Tom Paolicelli, New York City Municipal Water Finance Authority
Mark Poland, CSO Partnership
Kirby Posey, U.S. Census Bureau
George Raftelis, Raftelis Consulting
Bill Reinhardt, Public Works Finance
Glenn Reinhardt, Water Environment Research Foundation
Haydn Reynolds, Haydn Reynolds and Associates
Kenneth Rubin, PA Consulting
Margot Saunders, National Consumer Law Center
Jon Schellpfeffer, Madison Metropolitan Sewerage District
Nick St. Angelo, Department of Health and Human Services
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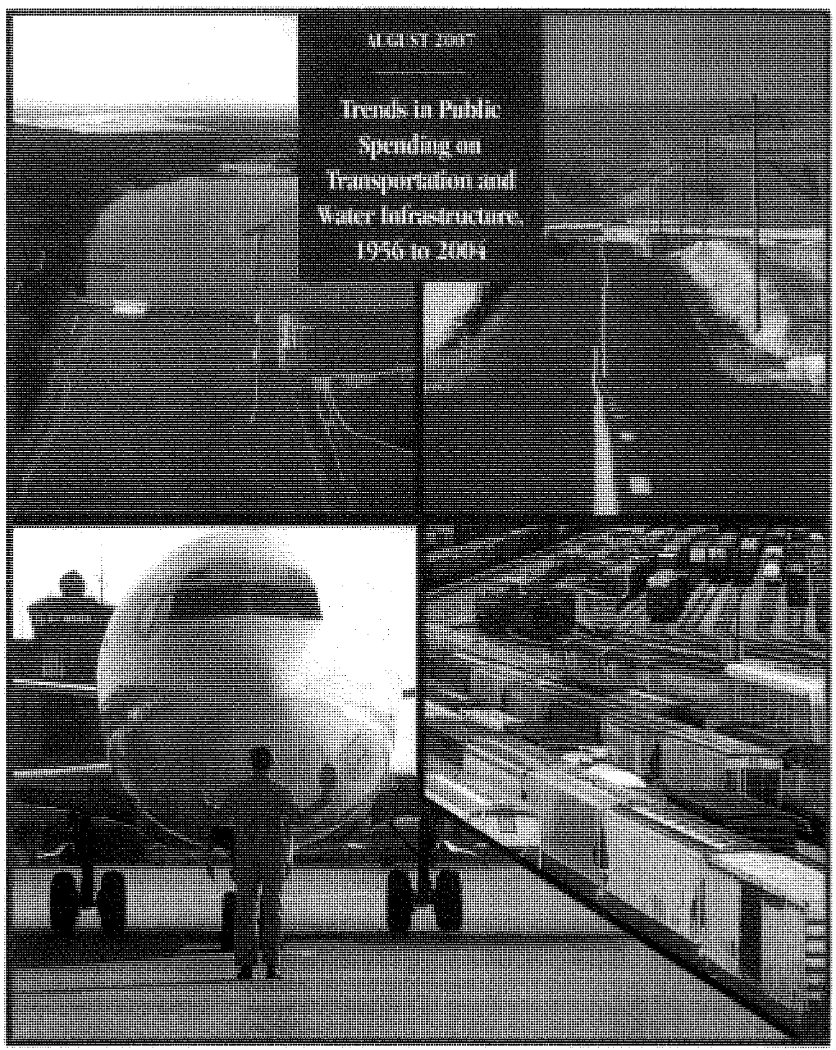


Pub. No. 2880

A CBO PAPER

Trends in Public Spending on Transportation and Water Infrastructure, 1956 to 2004

August 2007

The Congress of the United States ■ Congressional Budget Office

Notes

Unless stated otherwise, spending by state and local governments is net of federal grants and loan subsidies.

All years cited in the paper refer to fiscal years.

Numbers in the text and tables may not add up to totals because of rounding.

Dollar values that have been adjusted for inflation are expressed in 2006 dollars.

Among the photographs on the cover, the top left-hand one shows Webbers Falls Lock and Dam, located near Webbers Falls, Oklahoma, on the Arkansas River; it is used courtesy of the Department of Energy. Clockwise from that, the photographs are © S. Alden/Photolink/Photodisc/Getty Images; TR002563/Photodisc/Getty Images; and JupiterImages.

Preface

The nation's infrastructure plays a vital role in its economy. Vigorous commerce and the daily activities of the nation require reliable means of transporting merchandise from producers to consumers and of conveying passengers to their destinations. Fundamental to economic activity as well is sound stewardship of the nation's resources, including ensuring an adequate supply of fresh water and of wastewater treatment services.

In response to a June 2007 request from the Chairman and Ranking Member of the Senate Finance Committee, this paper by the Congressional Budget Office (CBO) analyzes spending on infrastructure by the federal government and state and local governments. It updates and expands upon the agency's May 1999 *Trends in Public Infrastructure Spending*. In accordance with CBO's mandate to provide objective and impartial analysis, the paper contains no recommendations.

Nathan Musick of CBO's Microeconomic Studies Division wrote the paper under the supervision of Joseph Kile and David Moore. Elizabeth Robinson and Lawrence Hush of the Office of Management and Budget and Henry Wulf and Stephen Owens of the Bureau of the Census provided the primary data on infrastructure spending and supplied helpful answers to questions about them. Carma Ray Hogue of the Bureau of the Census, Nicole Carter and Robert Kirk of the Congressional Research Service, Paul Aussendorf of the Government Accountability Office, Thomas Holtmann of the Joint Committee on Taxation, and David Joulfaian and Thornton Matheson of the Department of Treasury provided additional insights into the data on infrastructure spending and tax expenditures. Within CBO, Robert Dennis, Scott Dennis, Ann Futrell, Mark Hadley, Arlene Holen, Jeff Holland, Daniel Hoople, Majorie Miller, Donald Marron, Sarah Puro, Bob Sunshine, Tom Woodward, and Dennis Zimmerman provided useful comments. Bill Reinhardt of *Public Works Financing* reviewed the draft. (The assistance of an external reviewer implies no responsibility for the final product, which rests solely with CBO.)

John Skeen edited the manuscript, and Kate Kelly proofread it. Maureen Costantino designed the cover and prepared the paper for publication. Lenny Skutnik produced the printed copies, and Linda Schimmel handled the distribution. Simone Thomas prepared the electronic version for CBO's Web site (www.cbo.gov).

Peter R. Orszag
Director

August 2007

Contents

Tables

Figures

Boxes

Trends in Public Spending on Transportation and Water Infrastructure, 1956 to 2004

Introduction and Summary

The nation's infrastructure plays a vital role in its economy and in the daily lives of its citizens. Since the mid-1950s, expenditures for transportation and water infrastructure by the federal government and state and local governments have annually accounted for over 2 percent of the nation's gross domestic product (GDP). In 2004, such spending for infrastructure was more than $312 billion (measured in 2006 dollars).

This Congressional Budget Office (CBO) paper describes the trends in public spending for transportation and water infrastructure since 1956.[1] CBO focuses on spending for highways and roads, mass transit, rail, aviation, water transportation, water resources such as the construction and maintenance of dams and levees, and water supply and wastewater treatment. Those types of infrastructure, which draw heavily on federal resources, share the economic characteristics of being relatively capital intensive and producing services under public management that facilitate private economic activity. They are typically the types examined by studies that attempt to calculate the payoff, in terms of benefits to the economy, from government funding of infrastructure.[2]

Broader definitions of infrastructure might include such things as energy generation and distribution facilities and telecommunications networks—or schools and research labs. Those types of infrastructure, however, are often primarily provided by either state and local governments or the private sector, and they are not included in this paper.

The paper reports public spending both for capital and for operation and maintenance. Capital spending is for the purchase, construction, rehabilitation, and improvement of physical infrastructure. Spending for operation and maintenance is composed of expenditures that are generally required to provide the services needed for infrastructure to function and that are often necessary for the repair and safe operation of existing infrastructure. (In some cases—as with air traffic control services, for instance—the costs can be sizable.)[3]

CBO's tally of public spending on infrastructure provides a budgetary perspective on such spending. As such, this paper reports gross governmental spending on infrastructure capital and related operation and maintenance. The budgetary perspective stands in contrast to an alternative economic perspective that would, in particular, focus on measuring the value of the stock of

1. This paper is the fifth in a series of reports by CBO on the topic since 1992. The last paper was Congressional Budget Office, *Trends in Public Infrastructure Spending* (May 1999).

2. See, for example, Edward M. Gramlich, "Infrastructure Investment: A Review Essay," *Journal of Economic Literature*, vol. 32, no. 3 (September 1994), pp. 1176–1196.

3. For accessibility, CBO has adopted the phrase operation and maintenance. Most of the expenditures for those purposes are classified by the Office of Management and Budget as being for "noninvestment activities"; the corresponding classification by the Bureau of the Census is "current operations." In addition to operation and maintenance per se, the category includes expenditures for related purposes—for instance, to cover administrative and other expenses of government infrastructure programs and to conduct public safety and educational programs and research and development related to infrastructure. A methodological appendix to this paper, which has been published as a Web supplement (available at www.cbo.gov), provides a comprehensive discussion of data sources and definitions.

Box 1.

Different Measures of Public Infrastructure

Public infrastructure is one type of capital that contributes to the U.S. economy's output and performance. The budgetary focus of this report is different from the perspective that would be necessary to measure the contribution of public spending on infrastructure to economic performance. Such an alternative perspective would differ by recognizing depreciation of the capital stock when reporting public spending for both infrastructure capital as well as for operation and maintenance.

For example, the annual spending on infrastructure capital that the Congressional Budget Office (CBO) reports can also be considered gross investment, because it includes spending both to replace depreciated capital (which results from wear and tear as infrastructure is used) and to add to the capital stock. By contrast, net investment in infrastructure—which reflects changes to the stock of capital available to supply infrastructure services—would be expressed net of depreciation. Even though there are many challenges in measuring stocks of publicly owned infrastructure and other capital, the Department of Commerce's Bureau of Economic Analysis does so for different levels of government in the national income and product accounts. Additionally, although CBO reports spending on operation and maintenance to provide infrastructure services, that figure does not include expenses incurred through the depreciation of the infrastructure that is part of the cost of providing those services.

infrastructure and changes in that value as investments are made and physical assets depreciate (see Box 1).

The data that CBO uses for its analysis of public spending on transportation and water infrastructure, which come from the Office of Management and Budget (OMB) and the Bureau of the Census, cover federal spending from 1956 to 2006 and state and local government spending from 1956 to 2004. The data on federal spending also incorporate CBO's estimate of spending for 2007 and its baseline projecrions through 2009 (the period through which expenditures on highways and roads and mass transit, which account for over one-half of federal spending on infrastructure, have been authorized by the Congress).[4] CBO reports total federal spending on infrastructure as well as its two components: (1) grants and loan subsidies to states and localities, which constitute almost two-thirds of the total, and (2) all other federal spending on infrastructure. CBO reports state and local spending net of the federal grants and loan subsidies.

4. The baseline projections for programs governed by annual appropriations assume that the appropriated amounts increase each year at the rate of inflation. The numbers in this paper reflect CBO's baseline projections that were issued in March 2007.

From 1956 to 2004, annual public spending on infrastructure, adjusted for inflation, rose steadily—growing an average of 2.3 percent per year. During the first several decades of the span, that growth was mostly attributable to increases in federal expenditures, particularly, rising capital spending on highways and roads, water supply and wastewater treatment facilities, and rail.

From 1987 onward, infrastructure spending by the federal government and by states and localities has grown in real terms by 1.7 percent and 2.1 percent, respectively. Additionally, several other key features of public infrastructure spending have been quite stable over roughly the past two decades:

- Infrastructure spending by states and localities has accounted for around three-fourths of total spending;
- Capital expenditures have been slightly less (about 45 percent) than expenditures for operation and maintenance (55 percent);
- As a share of GDP, infrastructure spending has fluctuated between 2.3 percent and 2.6 percent; and
- Federal spending on infrastructure has hovered around 3 percent of total expenditures in the federal budget.

In 2006, the federal government spent $76.3 billion on infrastructure. Grants and loan subsidies totaled $50.6 billion, and all other federal spending on infrastructure totaled $25.7 billion. Over and above those amounts (and the other federal spending on infrastructure reported throughout this paper) are revenues forgone through the tax preferences that the federal government offers on municipal bonds issued by states and localities to finance their infrastructure spending. In 2006, those forgone revenues amounted to an estimated $7.9 billion, or about 16 percent of the value of grants and loan subsidies provided by the federal government in that year.

Several recent developments have influenced the amount of federal resources allocated to infrastructure and related activities. First, the hurricanes of 2005 prompted increased federal spending both to repair damage to highways and roads and to respond to and recover from future hurricanes, flooding, and other natural disasters. Those expenditures totaled $3.3 billion in 2006.

Second, as a result of the heightened terrorist threat after September 11, 2001, federal spending to make public infrastructure more secure—especially the facilities and services for air travel—has been sizable. Because such expenditures are essentially for national defense and law enforcement, they are not included in the totals reported here. However, from 2002 to 2006, spending on airline and airport security by the Transportation Security Administration of the Department of Homeland Security amounted to $28.8 billion (financed in part by $8.7 billion in revenues from security and cargo fees). Those expenditures have paid for a variety of security measures, including hiring additional federal air marshals and conducting more-rigorous screening of passengers, baggage, and other cargo. From 2003 to 2006, the Department of Homeland Security also provided $1.4 billion in grants to states.

Third, another relatively new development is the growth in the private sector's interest in participating in infrastructure projects. According to the available data, such private activity has most likely accounted for only a very small share of spending on public infrastructure in the United States, but private funding and participation may increase in the future as the growing resources of pension funds that seek stable long-term investments are tapped by governments at various levels for upgrades to and expansion of infrastructure.

As part of its analysis of public spending on infrastructure, CBO has also reviewed the current literature on the resulting economic returns. Such spending provides benefits to the economy by reducing the cost of private business transactions or yielding other social benefits. During the past 20 years, economists have attempted to measure the purely economic benefits from public expenditures on infrastructure and have obtained a wide range of estimates. The literature supports two conclusions: first, that public spending on infrastructure often has positive economic returns and, second, that both the average return and the range of returns among projects vary significantly and depend upon a number of factors. For example, research suggests that the returns to early public investments, such as expanding the interstate highway system, can be large but that the economic payoff from such spending declines as those types of systems grow.

Basic Features of Public Spending on Infrastructure

Real (inflation-adjusted) public spending on infrastructure totaled just over $312 billion in 2004. Of that, the federal government spent $73.5 billion, about 24 percent of the total, on projects that it funded directly and on grants and loan subsidies to state and local governments. States and localities spent $238.7 billion, or 76 percent of the total. The spending shares of the federal government and states and localities have been quite stable over roughly the past two decades (see Table A-1 in the appendix).[5]

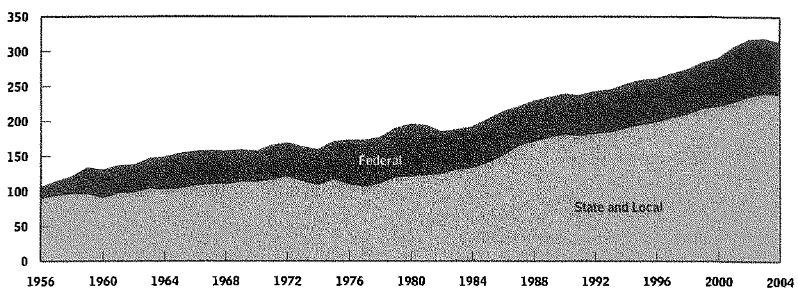
Between 1956 and 2004, annual spending on infrastructure rose steadily, growing an average of 2.3 percent each year (after an adjustment for inflation) (see Figure 1). At times, that overall growth masks highly divergent trends in spending at the federal and the state and local levels. From 1956 through the mid-1970s, real federal spending on infrastructure grew much more rapidly than did state and local spending; on average, federal spending grew at an annual rate of 7 percent, versus about 1 percent for state and local spending. In 1977, federal spending reached its peak share of 38 percent of total spending. From the late 1970s through the mid-1980s, real state and local spending grew at a faster

5. In addition to the tables in the appendix, the Web supplement to this paper provides greater detail on spending.

Figure 1.

Public Spending on Infrastructure, 1956 to 2004

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: Data on state and local spending do not include expenditures on freight rail or, after 1990, water resources.

annual rate than did federal spending, which, on average, declined slightly. Between 1987 and 2004, spending by the federal government rose 1.7 percent annually, while yearly spending by state and local governments grew by 2.1 percent.[6]

Infrastructure Spending and the Federal Budget

Since the late 1980s, federal spending on infrastructure typically has constituted around 3 percent of all federal spending. As a share of nondefense spending, which is another useful basis of comparison because this paper primarily includes expenditures on civilian infrastructure, federal spending on infrastructure during that period has ranged between roughly 3.5 percent and 4 percent (see Table A-2).

Before the late 1980s, infrastructure spending as a share of nondefense federal expenditures was considerably greater than it is today, regularly accounting for about 10 percent or more from 1959 through 1966, which was part of a period of exceptionally rapid growth in federal spending on infrastructure. The subsequent decline of that share occurred in part because of a rise in spending on domestic programs unrelated to infrastructure—for example, health care and income support programs generally and Medicare and Social Security in particular.

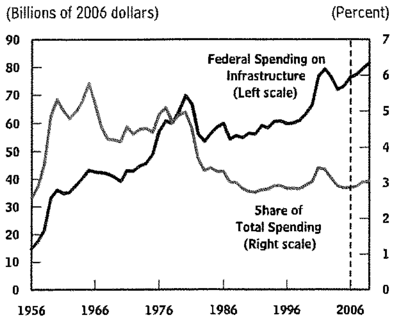
After adjusting for inflation, CBO estimates that federal spending on infrastructure will rise from $76.3 billion in 2006 to $77.3 billion in 2007; under CBO's assumptions for its baseline, outlays would rise further—to $79.4 billion in 2008 and $81.5 billion in 2009. Spending on infrastructure would account for roughly 3 percent of total federal spending during that period (see Figure 2).

6. The recent figures for state and local governments do not include spending on water resources, because specific data have been unavailable since 1991. The Bureau of the Census's most relevant category (Other Natural Resources—Function Code 59) includes spending on both water resource infrastructure and other activities, such as environmental projects (for example, soil conservation, reclamation, and erosion-control measures), regulation of mineral and energy resources, and geological surveying and mapping. Annual expenditures in that category are approximately $12 billion.

Figures on state and local governments' spending on freight rail are also not included here, because the Bureau of the Census does not collect data on it (the agency puts expenditures for passenger rail in the mass transit category). However, recent data on states' spending on both freight and passenger rail together can be found in Virginia Department of Rail and Public Transportation, *State Rail Agencies Throughout the U.S.—Structure, Governance, Funding* (October 2005), available at http://freight.transportation.org/doc/rail/DRPT_railreport.pdf.

Figure 2.

Federal Spending on Infrastructure in Dollars and as a Share of Total Federal Spending, 1956 to 2009



Source: Congressional Budget Office.

Note: The dashed vertical line separates actual from projected spending. The 2007 amount is the Congressional Budget Office's estimate of outlays in that year. The 2008 and 2009 amounts are the agency's baseline projections of outlays in those years.

Public Spending on Infrastructure as a Share of Gross Domestic Product

As a share of GDP, public spending on infrastructure has ranged from 2.3 percent to 2.5 percent since the mid-1980s. Before then, it had trended downward, from a peak of 3 percent in the late 1950s and early 1960s. Spending shares for capital and for operation and maintenance have similarly been fairly stable over the past two decades (see Table A-3).

Although infrastructure spending as a share of GDP serves as a measure of the importance of public infrastructure in the economy, for several reasons it does not necessarily indicate whether the appropriate level of investment in infrastructure is taking place. First, although infrastructure spending facilitates the growth of the economy and improvement in the quality of life, determining the level of infrastructure spending that is appropriate for those purposes is difficult. Similarly, determining the level of spending necessary for the efficient and safe operation of existing infrastructure is difficult at the aggregate level, because individual infrastructure projects have varying needs depending upon their age, type of construction, intensity of use, and other factors.

Second, economic growth and the additional demands it may place on infrastructure need not always give rise to proportionate increases in infrastructure spending. The average cost of providing some services, for example, highway or rail transportation, could decline as use increased. That outcome is likely whenever high fixed costs (that is, costs that do not vary regardless of the number of users) are incurred when the infrastructure is first put in place and additional users can be accommodated with little or no additional cost. Conversely, because infrastructure facilities usually are subject to wear over time, simply reporting annual investment does not provide insight into whether the spending is sufficient to remedy deterioration and accommodate potential new demands from economic growth.[7]

Finally, public spending on infrastructure as a share of GDP may not maintain a predictable relationship to economic activity because such spending may be intended to achieve policy goals apart from facilitating commerce, such as providing widespread access to basic services. For example, federal expenditures for water supply and wastewater treatment are often made to support such infrastructure in disadvantaged communities.[8]

Infrastructure Spending for Capital and for Operation and Maintenance

In 2004, public spending on infrastructure for capital projects totaled $143.6 billion, and spending for opera-

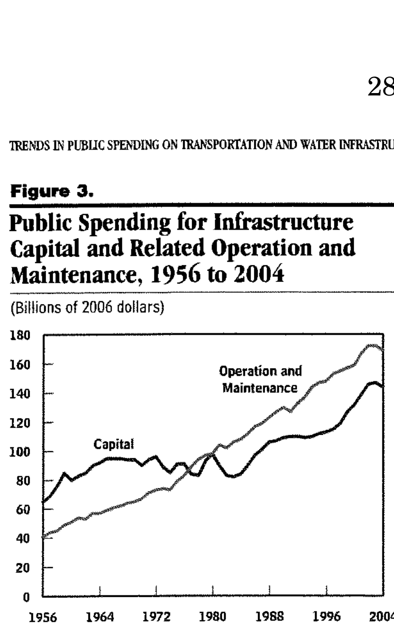
7. Stocks of infrastructure capital, which incorporate both new investment as well as assumptions about how quickly the existing infrastructure capital depreciates, are calculated by both the Office of Management and Budget (see *Budget of the United States, Fiscal Year 2008: Analytical Perspectives*, pp. 63–65) and the Department of Commerce's Bureau of Economic Analysis (available at www.bea.gov/bea/dn/FA2004/SelectTable.asp#S7).

8. The Rural Utilities Service of the Department of Agriculture and the Community Development Block Grants program of the Department of Housing and Urban Development fund such projects in disadvantaged communities; such funding is also available through the Environmental Protection Agency's Drinking Water State Revolving Fund. See Environmental Protection Agency, *Handbook on Coordinating Funding for Water and Wastewater Infrastructure—A Compilation of State Approaches* (October 2003), pp. 1–2).

Figure 3.

Public Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2004

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: Data on state and local spending do not include expenditures on freight rail or, after 1990, water resources.

tion and maintenance amounted to $168.7 billion. The shares of capital expenditures and operation and maintenance expenditures within the total have been fairly stable at arouud 45 percent and 55 percent, respectively, since the early 1980s. Before then, capital expenditures usually exceeded spending on operation and maintenance (see Figure 3 and Table A-4). Since 1981, real growth in spending on capital has averaged 2.0 percent a year; for operation and maintenance, it has averaged 2.1 percent.

As a share of GDP, capital spending has remained relatively flat; it was 1.09 percent in 1983 and 1.10 percent in 2004. The increase in public capital spending between 1983 and 2004 in real terms—from $81.9 billion to $143.6 billion—was due primarily to the growth of capital spending by states and localities, which now account for more capital spending on infrastructure than does the federal government, as they did prior to the mid-1970s (even with federal grants and loan subsidies excluded from states' and localities' spending) (see Box 2 on page 9).[9] Adjusted for inflation, annual capital expenditures by states and localities rose from $41 billion in 1983 to $87.2 billion in 2004.[10] From the late 1990s through about 2003, federal capital expenditures also rose rapidly, in part as a result of several transportation measures enacted by the Congress and the President (including the Transporration Equity Act for the 21st Century, Public Law 105-178, 112 Stat. 107 (1998), and the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century, P.L. 106-181, 114 Stat. 61 (2000)).[11] Nevertheless, state and local governments currently account for about 60 percent of total public capital spending.

Total spending for operation and maintenance has been a fairly constant share of GDP over the past three decades. During that period, the federal government has allocated somewhat over one-fourth of its infrasrructure spending to operation and maintenance, whereas the corresponding proportion for state and local governments has risen steadily, from 41 percent in 1956 to 63 percent in 2004 (see Figures 4 and 5 and Tables A-5 and A-6). State and local governments account for the vast majority—close to 90 percent—of spending on operation and maintenance.

Economic Returns to Public Spending on Infrastructure

Federal spending on infrastructure increases the stock of publicly owned capital and, in that sense, is an investment in the future productivity of the private sector. The economic literature on the topic today supports two con-

9. OMB notes, however, that some federal grants and loan subsidies classified as capital spending are not always ultimately disbursed as such because the state or local government ultimately determines how the money is used. See *Budget of the United States Government, Fiscal Year 2008: Analytical Perspectives*, p. 55. Additionally, because OMB classifies federal outlays according to how most of the money is expected to be spent, some portion of a grant or loan that is classified as capital spending may be used by a state or locality for some other purpose.

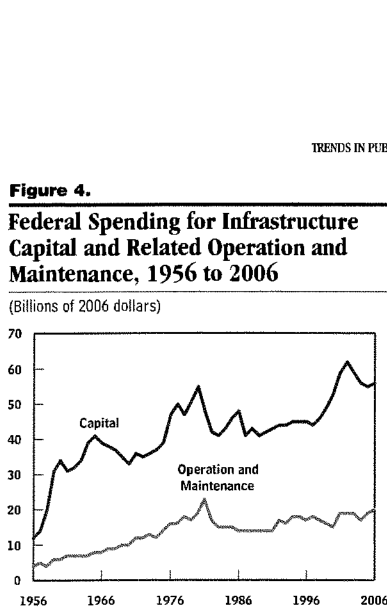
10. A comparison of federal and state and local spending on infrastructure on the basis of outlays does not, however, recognize the financial burden that the federal government incurs by making exempt from most taxes the income from bonds issued by state and local governments to finance infrastructure. Debt financing is especially appropriate to capital projects, which often require substantial up-front investment but which generate revenues only over time. The cost to the federal government from tax-exempt bond financing is considered below.

11. Those spending programs have since been reauthorized in, respectively, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, P.L. 109-59, 119 Stat. 1144 (2005), and Vision 100—Century of Aviation Reauthorization Act, P.L. 108-176, 117 Stat. 2490 (2003).

Figure 4.

Federal Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2006

(Billions of 2006 dollars)



Source: Congressional Budget Office.

clusions: first, that public spending on infrastructure often displays positive economic returns and, second, that both the average return and the range of returns among projects will probably vary significantly and depend upon a number of factors. The early research on the economic payoff from public spending on infrastructure found very large returns. For example, one prominent study from the late 1980s found that a 1 percent increase in the stock of "core infrastructure" (consisting basically of the types of infrastructure included in this paper, plus electrical and natural gas facilities) was associated with a 0.24 percent increase in the level of national output from 1949 to 1985.[12] That result suggested that public capital enhanced the economy's ability to produce goods and services so much that $1 spent on infrastructure could generate close to $1 of output within roughly a year. An implication of such findings was that a substantial part of the productivity slump of the 1970s and 1980s was due to a shortfall of investment in infrastructure.

But estimates of such large returns have proved controversial. For example, some of those estimates have been found to be very sensitive to minor changes in the data that generated them—such as changing slightly the time period or sectors of the economy covered by the analysis. Follow-on research has identified other methodological weaknesses and, after attempting to correct for them, has in some cases come to a different conclusion about the economic returns to public spending on infrastructure. For example, the size of the stock of public capital and the level of economic output can vary together over time for reasons unrelated to a causal link between them. One study that has attempted to control for that spurious covariance finds that, as a result, the estimated positive association of public capital with economic performance disappears.[13] Further, the direction of causality may not be certain: For example, additions to public capital may not be what is making states more productive; it may be that more productive and prosperous states spend more on infrastructure. One study finds that, once such state-specific characteristics are recognized, public capital plays no role in the differences among states' economic performance.[14]

Recent surveys that include a number of countries in addition to the United States find a positive economic payoff from investment in public capital. For example, a 2007 study concludes that the recent literature reflects more consensus about the "growth-enhancing effect of

12. Most of the issues considered in the 1990s were raised by David Alan Aschauer, "Is Public Expenditure Productive?" *Journal of Monetary Economics*, vol. 23, no. 2 (March 1989), pp. 177–200, and discussed in a large number of papers reviewed by Alicia H. Munnell, "Policy Watch: Infrastructure Investment and Economic Growth," *Journal of Economic Perspectives*, vol. 6, no. 4 (Autumn 1992), pp. 189–198, and Edward M. Gramlich, "Infrastructure Investment: A Review Essay," *Journal of Economic Literature*, vol. 32, no. 3 (September 1994), pp. 1176–1196. See also Congressional Budget Office, *The Economic Effects of Federal Spending on Infrastructure and Other Investments* (June 1998). A more recent examination is Jeffrey P. Cohen and Catherine J. Morrison Paul, "Public Infrastructure Investment, Interstate Spatial Spillovers, and Manufacturing Costs," *Review of Economics and Statistics*, vol. 86, no. 2 (May 2004), pp. 551–559. The precise definition of public capital and the periods covered by those papers vary.

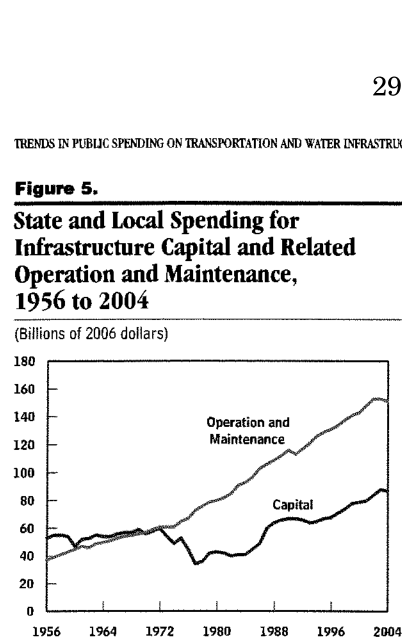
13. See Charles R. Hulten and Robert M. Schwab, "Public Capital Formation and the Growth Process in Developing Countries," *National Tax Journal*, vol. 44, no. 1, part 1 (December 1991), pp. 121–134. A criticism of such efforts that focus on year-to-year changes is that they can mask any long-term relationship between accumulated stocks of public capital and subsequent economic performance—when additions to the stock of public capital could influence economic activity for a number of years after they occur.

14. See Douglas Holtz-Eakin, "Public-Sector Capital and the Productivity Puzzle," *Review of Economics and Statistics*, vol. 76, no. 1 (February 1994), pp. 12–21.

Figure 5.

State and Local Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2004

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: Data on state and local spending do not include expenditures on freight rail or, after 1990, water resources.

public capital" than existed before. Similarly, a study sponsored by the Organization for Economic Cooperation and Development finds a "positive effect of infrastructure."[15] The implications of those findings for public spending on infrastructure in the United States, though, are unclear because much of the newer research supporting those favorable assessments took place under circumstances that may not be relevant in this country. Those studies range from analyses of national and regional spending on infrastructure within various countries in Europe, South America, and Asia to investigations of economic returns to infrastructure spending in a large sample of countries at different levels of development.

15. For a comprehensive overview of the relevant economic literature, with brief descriptions of individual papers and their results, see Ward Romp and Jakob de Haan, "Public Capital and Economic Growth: A Critical Survey," *Perspektiven der Wirtschaftspolitik*, vol. 8, special issue no. 1 (April 2007), pp. 6–52. See also Vincent Ribeyrol, "Impact of Infrastructure on the Economy: Review of the Literature" (paper presented at the Organization of Economic Cooperation and Development's conference entitled Global Infrastructure Needs: Prospects and Implications for Public and Private Actors, Paris, June 3, 2005).

Moreover, some important results cited by those surveys rely on a concept of infrastructure that is broad, including public investment in basic telecommunications, for example, and other areas that in the United States are funded by private rather than public investment.[16]

Altogether, recent research finds that the returns to investment in public capital in the United States are positive, but below earlier estimates. For example, a 2006 study concludes that public spending on highways and roads from 1982 to 1996 reduced annual congestion costs to drivers by $0.11 for every dollar spent.[17] However, because the measure of spending in that study combines expenditures for capital and operation and maintenance, the amount by which public spending during any particular year reduces congestion costs in subsequent years would be considerably less than the average annual estimate of $0.11—as expenditures for operation and maintenance typically continue on an annual basis.

Consistent with such findings, other economic research points out that the payoff from investments in public infrastructure such as highways falls off significantly after the initial impact that those investments had on economic activity. For example, according to data spanning 1953 to 1989, construction of the interstate highway system in the United States made vehicle-intensive industries in particular more productive; however, the capital spending that took place after completion of that system in 1973 effectively had no impact on differences in

16. See Lars-Hendrik Röller and Leonard Waverman, "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach," *American Economic Review*, vol. 91, no. 4 (September 2001), pp. 909–923, and Christophe Hurlin, "La Contribution du Capital Public à la Productivité des Facteurs Privés: une Estimation sur Panel Sectoriel pour Dix Pays de l'OCDE (May 1999), available at www.dauphine.fr/eurisco/CH_Recherche/Panel.pdf. The latter study applies two definitions of infrastructure: one that includes only equipment used in the provision of public services and the other that includes investment undertaken in conjunction with all types of activities provided by government (ranging from telecommunications to national defense).

17. Congestion costs basically reflect both the amount of gasoline consumed as well as the value of the time that motorists lose as a result of traffic delays. See Clifford Winston and Ashley Langer, "The Effect of Government Highway Spending on Road Users' Congestion Costs," *Journal of Urban Economics*, vol. 60, no. 3 (November 2006), pp. 463–483.

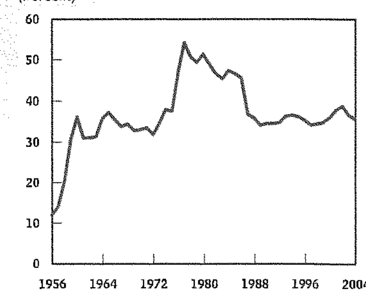
Box 2.

Federal Grants and Loan Subsidies to States and Localities for Infrastructure

Federal grants and loan subsidies account for a significant share of capital expenditures by states and localities. (In this paper, federal grants and loan subsidies are included in the category of federal spending.) Amounting to $50.6 billion in 2006, such grants and loans also represent a large portion—almost two-thirds—of total federal spending on infrastructure. Most indirect federal outlays are intended for capital purchases. Since the late-1980s, such outlays have accounted for a bit over one-third of state and local governments' total capital expenditures on infrastructure (see the figure). From the late 1970s through the mid-1980s, that share was substantially higher, reflecting a temporary increase in the federal government's portion of expenditures at the state and local levels for highways and roads and for water supply and wastewater treatment systems. Currently, almost all indirect federal outlays for infrastructure consist of grants and loan subsidies for highways and roads, mass transit, aviation, and water supply and wastewater treatment. The importance that such outlays have for states and localities varies among the types of infrastructure: In 2004, the capital portion of federal grants and loan subsidies accounted for almost one-half of total state and local capital expenditures for highways and mass transit and about one-third and one-tenth, respectively, of such expenditures for aviation and for water supply and wastewater treatment.

Federal Grants and Loan Subsidies as a Share of State and Local Governments' Capital Spending for Infrastructure, 1956 to 2004

(Percent)



Source: Congressional Budget Office.

industries' productivity.[18] The evidence thus suggests positive returns to investments in infrastructure, but those returns depend on the type of infrastructure and the amount of infrastructure already in place.

Infrastructure Spending by Type of Project

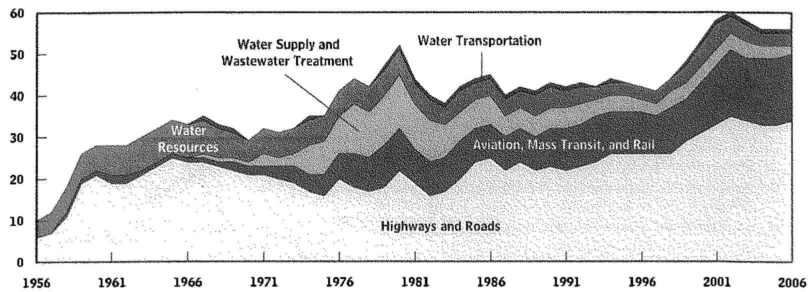
Priorities for infrastructure programs have changed more at the federal level than at the state and local levels. Although the largest part of federal spending for infrastructure has been for highways and roads, the shares devoted to water supply and wastewater treatment and to mass transit and rail significantly increased during the 1970s. Beginning in the mid-1980s and continuing to the present, highways and roads once again and, to lesser degrees, aviation followed by mass transit and water resources have been the primary sectors for federal

18. See John G. Fernald, "Roads to Prosperity? Assessing the Link Between Public Capital and Prosperity," *American Economic Review*, vol. 89, no. 3 (June 1999), pp. 619–638.

Figure 6.

Federal Capital Spending for Infrastructure, by Type, 1956 to 2006

(Billions of 2006 dollars)



Source: Congressional Budget Office.

dollars. (Some of those highway and water resource projects undertaken in the past several years were in response to damage from the hurricanes in 2005.)

In contrast to federal spending, the priorities for state and local spending have changed little since the 1970s: Expenditures for highways and roads have always been predominant. However, expenditures at the state and local levels are distributed somewhat more evenly among the various types of infrastructure—in particular, highways and roads, aviation, and mass transit and rail—than they are at the federal level.

The Composition of Federal Spending on Infrastructure

Capital spending, much of which is for highway and road projects, accounts for about three-fourths of all infrastructure expenditures by the federal government. Over 80 percent of that capital spending is typically done through grant and loan subsidy programs for states and localities. In contrast, only around 10 percent of spending for operation and maintenance is done through grants and loan subsidies.

Capital. By far, the largest amount of federal capital spending is for highways and roads. In 2006, approximately $34 billion in capital expenditures, or 60 percent of the total, went for highway and road projects (see Figure 6).[19] Mass transit accounted for $8.4 billion, followed by aviation ($6.2 billion), water resources ($3.4 billion), and water supply and wastewater treatment ($2.2 billion). Water transportation projects and rail accounted for about $1 billion each.[20]

Almost all of the capital spending on highways and roads, mass transit, and water supply and wastewater treatment was done through grant and loan programs. Federal capital expenditures on aviation took the form of both grants (through the Airport Improvement Program) and direct outlays for the facilities and equipment account of the Federal Aviation Administration. Capital spending on the remaining types of infrastructure consisted of direct outlays by the Bureau of Reclamation and the Army Corps of Engineers for water resource projects, by the Coast Guard for water transportation, and by the Federal Railroad Administration for rail.

Although highways and roads have always dominated federal capital spending, that share has fluctuated

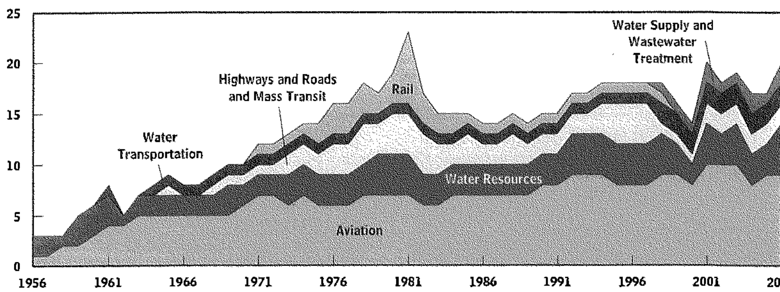
19. Included in that total are expenditures of about $849 million through the Emergency Relief Program of the Federal Highway Administration to repair damage caused by Hurricane Katrina to highways and roads.

20. Most of those federal capital outlays correspond quite closely to the spending totals reported in *Budget of the United States Government, Fiscal Year 2008: Analytical Perspectives*, Table 6-2, "Federal Investment Budget Authority and Outlays: Grant and Direct Federal Programs," p. 58.

Figure 7.

Federal Spending on the Operation and Maintenance of Infrastructure, by Type, 1956 to 2006

(Billions of 2006 dollars)



Source: Congressional Budget Office.

between roughly 40 percent and 70 percent. In particular, highway and road expenditures accounted for a substantially smaller share (48 percent) of all federal capital spending from 1971 through 1980 than they did before that time. In contrast, in the 1971–1980 period, water supply and wastewater treatment accounted for 21 percent and aviation, mass transit, and rail, 15 percent of total federal spending on infrastructure capital; the corresponding spending shares on those types of infrastructure prior to that time were 2 percent and 4 percent, respectively.[21] The shifting emphasis of federal spending on infrastructure has reflected some particular priorities at different times: establishing and improving highways and roads in the 1950s and facilities for providing clean water in the 1970s.

Operation and Maintenance. In 2006, spending on aviation operation and maintenance by the Federal Aviation Administration to run the nation's air traffic control system amounted to $8.9 billion, representing 45 percent of total federal spending for infrastructure operation and maintenance (see Figure 7). Such spending on water resources—which for the most part funded the activities of the Corps of Engineers and the Bureau of Reclamation—was $5.4 billion (or 27 percent of the total), while $2.1 billion (or 11 percent) went to the Coast Guard for its role in supporting water transportation. Water supply and wastewater treatment accounted for $1.8 billion and highways, $1.2 billion.

During the past several years, operation and maintenance spending for water resources has spiked as a result of expenditures from the Flood Control and Coastal Emergencies account of the Corps of Engineers. From $150 million in 2005, those outlays increased to $2.5 billion in 2006. Those expenditures are intended to improve the Corps of Engineers' ability to address future flooding, hurricanes, and other natural disasters.

The federal government has also devoted substantial resources in the wake of the terrorist attacks of September 11, 2001, to making public infrastructure more secure. However, because those expenditures are made primarily for purposes of national defense and law enforcement, they are excluded from public spending on infrastructure as defined in this paper (but considered separately in Box 3). Within the federal programs whose infrastructure expenditures are reported by this paper,

21. The boost in spending on infrastructure capital for water supply and wastewater treatment was the result of the Clean Water Act of 1972, which required (and made federal money available for) greater efforts to clean wastewater before it could be discharged to surface waters. See Congressional Budget Office, *Future Investment in Drinking Water and Wastewater Infrastructure* (November 2002), p. 6.

Box 3.

Federal Spending to Protect Critical Infrastructure

Federal funding of homeland security related to infrastructure—though not included in this paper—has been sizable.[1] The largest sum of federal spending specifically intended to protect public infrastructure against terrorist attack has been by the Transportation Security Administration (currently part of the Department of Homeland Security) to increase aviation security. Totaling $28.8 billion in nominal dollars from 2002 through 2006 (and financed in part by $8.7 billion in revenues from security and air cargo fees), those expenditures have paid for a variety of security measures, including hiring additional federal air marshals and conducting more-rigorous screening of passengers, baggage, and other cargo. Of that amount, spending for aviation security operations was $24.8 billion (or 86 percent of the total); outlays for security equipment accounted for the remainder. Those outlays for aviation security operations are equal to 58 percent of the federal spending for aviation operation and maintenance during the 2002–2006 period (for the air traffic control system and other purposes).[2] Spending to make the nation's water transportation system more secure has also

1. With its focus on public infrastructure, this paper does not include federal funding of programs specifically intended to make infrastructure more secure, nor projects that mainly serve military or police functions. Thus, the federal funding of the Army Corps of Engineers reported here applies only to civil works, and the expenditures reported for the Coast Guard do not reflect its drug interdiction, migrant interdiction, or other law enforcement.

2. From 2001 through 2005, airlines also received $4.6 billion from the federal government in compensation for losses they incurred through the ground stop ordered for civil aviation after the terrorist attacks of September 11, 2001, and for other (incremental) losses that the airlines incurred through the end of that year. This paper has not included those outlays as infrastructure spending.

spending to protect infrastructure (and thus related to homeland security) typically accounted for less than 5 percent of the total funds available from 2003 to 2006. Hence, spending for homeland security by federal infrastructure programs does not represent a large reallocation of public resources for infrastructure as defined by this paper and earlier ones by CBO.[22]

With only a few exceptions since 1956, federal spending for the operation and maintenance of infrastructure has been concentrated on aviation—which has been around 50 percent of total spending for those purposes—followed by spending on water resources and, from the 1970s through the 1990s, highways and mass transit. Additionally, from the mid-1970s to late 1980s, rail spending claimed a sizable share of federal resources for infrastructure, peaking in 1981 as a result of the settlement of litigation related to the government's acquisition of the assets of Conrail.[23]

22. See *Budget of the United States Government: Fiscal Years 2005–2008: Analytical Perspectives, Homeland Security Mission Funding by Agency and Budget Account.* CBO's calculations of funding shares are in terms of budget authority (basically the amount of money that federal programs are approved to spend each year). However, those shares are not exhaustive of federal agencies' spending to protect the infrastructure for which they are responsible, because agencies may also allocate funds to efforts related to homeland security in ways that cannot be linked to specific infrastructure programs (see, for example, the discussion by Mary Tiemann, *Safeguarding the Nation's Drinking Water: EPA and Congressional Actions,* CRS Report for Congress RL31294 (Congressional Research Service, January 25, 2006).

23. The Regional Rail Reorganization Act of 1973 (known as the 3R Act) established the Consolidated Rail Corporation (Conrail) to assume the assets, routes, and service of the Penn Central and other bankrupt railroads in the Northeast. The 3R Act set the stage for Amtrak to take over the rights of way, tracks, and facilities between Boston and Washington, D.C.—that is, the Northeast Corridor. That takeover was subsequently accomplished through passage of the Railroad Revitalization and Regulatory Reform Act of 1976 (the 4R Act). In 1981, the federal government reached a settlement with Penn Central and its subsidiaries and affiliates on the value of properties transferred to Conrail in 1976. That settlement amounted to $2.1 billion in principal and interest (about $4.6 billion in 2006 dollars). Smaller settlements were also reached with other litigants over the next several years.

Box 3.

Continued

The Department of Homeland Security's Grants to Protect Critical Infrastructure

	Grants Through 2006		Grants Expected in 2007	
	Amount	Percent	Amount	Percent
Transit Security Grant Program	$388	28.2	$172	43.4
Intercity Passenger Rail Program	$13	1.0	Included above	Included above
Trucking Security Program	$50	3.6	$12	2.9
Port Security Grant Program	$874	63.6	$201	50.8
Intercity Bus Security Program	$49	3.5	$12	2.9
	$1,374	100.0	$396	100.0

Source: Congressional Budget Office based on Department of Homeland Security, "DHS Announces Close to $400 Million in Grants Available to Secure the Nation's Critical Infrastructure" (press release, July 6, 2006), "DHS Awrds $399 Million in Grants to Secure the Nation's Critical Infrastructure" (press release, September 25, 2006), and "DHS Announces $445 Million to Secure Critical Infrastructure" (press release, January 9, 2007).

been substantial. Obligations (that is, binding agreements that will result in expenditures) by the Coast Guard's Ports, Waterways and Costal Security program have exceeded $1 billion annually since that program's inception in 2003 and totaled almost $5 billion over the 2003–2006 period.[3]

The Department of Homeland Security has also made grants to both governments at the state and local levels and private entities to protect critical infrastructure. Currently administered by the Office of Grants and Training, those grants have been available for various types of surface transportation as well as for ports (which have received the bulk of the funds). Through 2006, such grants amounted to $1.4 billion, with another $400 million expected in 2007 (see the table).[4]

3. See *Budget of the United States Government, Fiscal Years 2005–2008, Appendix for the Department of Homeland Security.*

4. Data on homeland security spending by states and localities are not available. As part of its State and Local Finance statistics program, the Bureau of the Census does, however, collect data on state and local governments' expenditures on several categories of public safety: police protection, fire protection, correction (facilities), and protective inspection and regulation. See Steven Maguire and Shawn Reese, *Department of Homeland Security Grants to State and Local Governments: 2003 to 2006*, CRS Report for Congress RL33770 (Congressional Research Service, January 19, 2007), pp. 15–20.

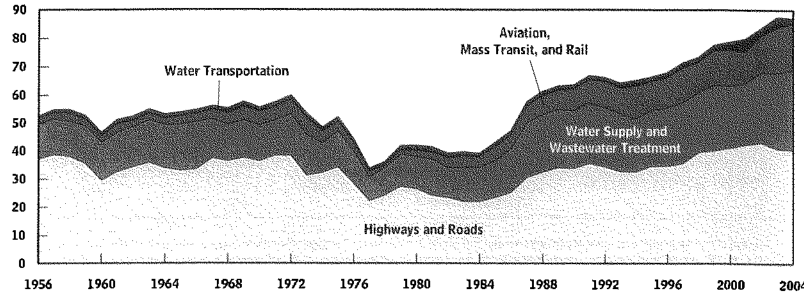
The Composition of State and Local Spending on Infrastructure

State and local expenditures on infrastructure differ from spending at the federal level in several ways. First, expenditures for operation and maintenance account for about two-thirds of the total for states and localities but typically slightly more than one-fourth for the federal government. Second, spending on highways and roads constitutes the largest share of both operation and maintenance as well as capital expenditures by states and localities, while federal spending for the operation and maintenance of highways and roads is small relative to such federal spending on other types of infrastructure. Third, infrastructure spending by states and localities for either capital or operation and maintenance is less concentrated on a particular type of infrastructure than is federal spending. Finally, states and localities' priorities fot both capital and operation and maintenance expenditures have remained fairly stable.

Figure 8.

State and Local Capital Spending for Infrastructure, by Type, 1956 to 2004

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: State and local spending does not include expenditures on freight rail.

Capital. In 2004, state and local spending (after an adjustment for inflation) on highways and roads totaled $40.6 billion and accounted for 47 percent of total capital expenditures by those levels of government. States and localities also spent $28.3 billion (32 percent) on water supply and wastewater treatment, $8.9 billion (10 percent) on mass transit (which includes passenger rail), $7.5 billion (9 percent) on aviation, and $1.9 billion (2 percent) on water transportation. The increases in real capital spending at the state and local levels since 1983 represent a marked departure from the trend prior to that time, when that spending was either stable or declining depending on the type of infrastructure (see Figure 8). Such growth has been especially pronounced for aviation, mass transit, and rail and for water supply and wastewater treatment—the latter probably because of states' and localities' need (as federal funding declined) to meet requirements of the Clean Water Act of 1972.

Operation and Maintenance. In 2004, states and localities' spending for the operation and maintenance of highways and roads was $58.5 billion, or 39 percent of their total spending for operation and maintenance. (Such state and local spending accounted for 98 percent of total public spending for the operation and maintenance of highways and roads.) Spending by states and localities on water supply and wastewater treatment was $51.2 billion (34 percent of their spending on operation and maintenance); on mass transit (including passenger rail), $29.9 billion (20 percent); on aviation, $9.3 billion (6 percent); and on water transportation, $2.5 billion (2 percent). Operation and maintenance spending at the state and local levels has persistently increased since the mid-1950s (see Figure 9).

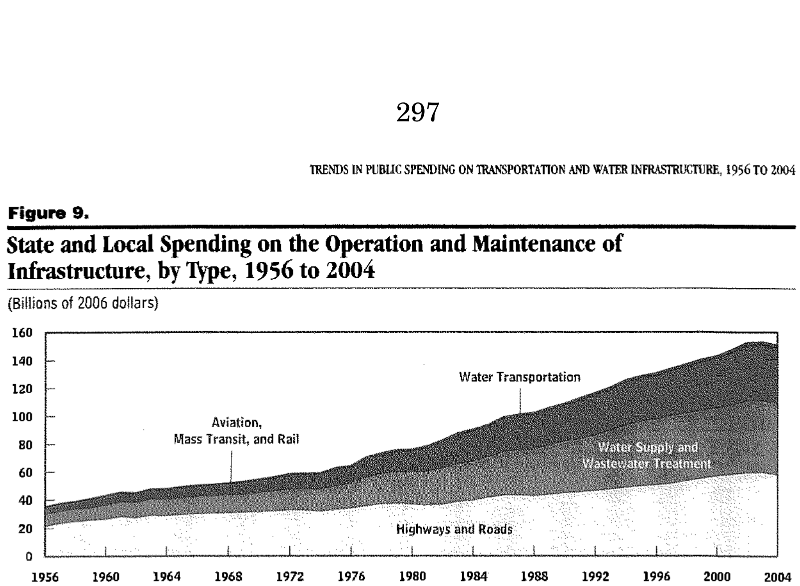
Tax-Exempt Bond Financing and the Private Sector's Role in Supplying Public Infrastructure

In addition to making grants and subsidized loans for infrastructure spending by states and localities, the federal government also provides a source of funding to those levels of government through the tax revenues it forgoes by offering tax exemptions on debt they issue—estimated at $7.9 billion in 2006, or 16 percent of the $50.6 billion in federal grants and loan subsidies that year. The proceeds from tax-exempt bonds can, in certain cases, be used to fund private-sector activities (which is also true for funds available through some federal grant and loan programs). According to the available data, such privatization for public infrastructure has been modest. However, recent developments suggest a potentially larger role for the private sector in providing public infrastructure.

Figure 9.

State and Local Spending on the Operation and Maintenance of Infrastructure, by Type, 1956 to 2004

(Billions of 2006 dollars)



Source: Congressional Budget Office.

Note: State and local spending does not include expenditures on freight rail.

Tax-Exempt Bond Financing

Tax-exempt bonds issued by states and localities can be of two types: general governmental obligations and private activity bonds that are used by a nongovernmental entity to finance certain types of projects. The tax exemption for governmental obligations is greater than for private activity bonds, because interest income from private activity bonds is subject to the alternative minimum tax. According to data from the Internal Revenue Service, governmental obligations account for most (approximately 87 percent) of the tax-exempt debt that has been issued to finance public infrastructure since the early 1990s. (That share applies both to funding for new projects and refinancing of debt on existing projects.) On an annual basis, the amount of governmental obligations and private activity bonds issued by state and local governments to finance infrastructure projects has fluctuated markedly (see Figure 10).[24]

Although a small amount of private activity bonds has been issued relative to governmental obligations, they tend to be concentrated on only a few types of infrastructure projects, and, as a result, they make an important contribution to covering the capital costs. In particular, about 80 percent of the total value of private activity bonds issued between 1991 and 2004 to finance infrastructure projects, as defined by this paper, funded airport construction, according to data from the Internal Revenue Service. Some studies suggest that, for that purpose, private activity bonds may have been as important over the past decade as other types of funding such as federal grants or airport user charges.[25] In addition to

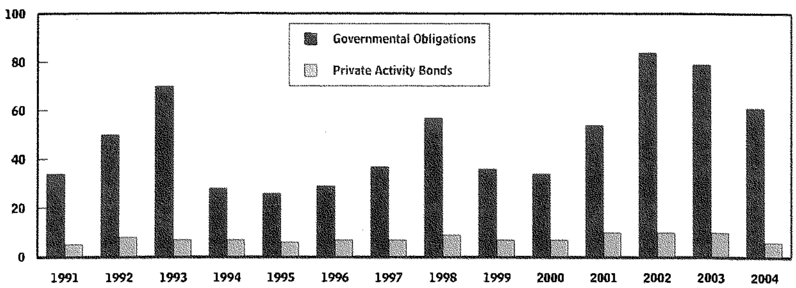
24. All of the data apply to long-term bonds (ones with maturities of 13 months or more), which are the predominant type of tax-exempt bond. According to the Internal Revenue Service, for governmental obligations, an infrastructure bond can fund either a transportation or utilities project. (From 1987 through 2005, typically between 85 percent and 90 percent of the value of the tax-exempt utilities bonds issued annually funded water supply and wastewater treatment facilities.) See Thomson Financial, *The Bond Buyer Yearbook* (New York, 2007 and earlier issues). Private activity infrastructure bonds may be issued to fund airports, docks and wharves, mass commuting and select surface transportation facilities, and water and sewage projects.

25. See ACI–NA Policy Center, *Reforming the Federal Tax Treatment of Airport Bonds, Executive Summary* (February 28, 2006), available upon request from the Airports Council International–North America at www.aci-na.org. Note, however, that the various sources of funding may not be entirely independent, because airport user charges can be used to secure or to pay off loans. Additionally, federal grants through the Airport Improvement Program appear to be more important to smaller airports than larger ones, because the latter are better able to tap financial markets to fund their capital projects. See Robert S. Kirk, *Airport Improvement Program: Issues for Congress*, CRS Report for Congress RL33891 (Congressional Research Service, February 26, 2007), p. 7.

Figure 10.

Governmental Obligations and Private Activity Bonds to Finance Public Infrastructure, 1991 to 2004

(Billions of dollars)



Source: Congressional Budget Office based on data from the Internal Revenue Service.

airports, private activity bonds provide some financing for highway and intermodal freight transfer facilities, mass transit and high-speed intercity rail, water transportation facilities, and water supply and wastewater treatment.[26]

According to OMB, the federal government's loss of revenues because of tax-exempt bonds—also referred to as tax expenditures—was about $23 billion in 2006. The agency provides an estimate only of the total amount, but because bonds that financed either transportation or water projects accounted for a stable share of about 27 percent of the total value of governmental obligations issued between 1991 and 2004, a reasonable inference of the loss of federal revenues in 2006 attributable to governmental obligations' financing public infrastructure is approximately $6.3 billion (27 percent of $23 billion).[27] For private activity bonds backing projects involving airports, docks, and similar transportation facilities (one of the two groups of projects for which estimates are available), the loss of federal revenues was about $1.1 billion in 2006, and for such bonds for water and sewer facilities (the other group), about $510 million.[28] Thus, the revenue loss to the federal government from all tax-exempt infrastructure bonds amounted to about $7.9 billion in 2006.[29]

That sum is over and above the $50.6 billion in federal grants and loan subsidies for infrastructure in 2006, but it overstates the amount by which tax exemptions on governmental obligations and private activity bonds actually

26. In 2005, The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users added highway and intermodal freight transfer facilities to the list of projects that can be financed through private activity bonds, with a cap of $15 billion on the amount of debt that can be issued (see P.L. 109-59, section 11143).

27. See *Budget of the United States Government, Fiscal Year 2008: Analytical Perspectives*, Table 19.2, "Estimates of Total Income Tax Expenditures," p. 294. An estimate of a loss in revenues does not imply an equivalent gain if the tax exemption was eliminated. In particular, the calculation of the tax expenditure does not take into account how the behavior of lenders would change as a result of removing the exemption.

28. Private activity bonds in OMB's category for water and sewer projects can also apply to the financing of hazardous waste disposal facilities. However, only a very small amount of such debt has been issued.

29. States typically exempt from taxation income from municipal bonds issued in state and, in a few cases, those issued out of state. However, states' income tax rates are much lower than the federal government's; hence, any forgone revenues for state governments would be as well—although estimates of such losses for states or municipalities are unavailable. See Thomson Financial, *The Bond Buyer Yearbook* (New York, 2007), pp. 118–119.

reduced states and localities' costs of borrowing to finance infrastructure projects: The savings in financing costs that states and localities gain through the tax exemption (and which is determined by the tax rate applied to municipal bond purchasers at the margin, that is, to those last purchasers who reflect the final extent of demand) are less than the federal revenues forgone from the tax exemption (which is determined by the tax rate of the average purchasers). Tax-exempt bond financing is generally not considered to be a cost-effective way of transferring revenues from the federal government to states and localities.[30]

The Supply of Public Infrastructure by the Private Sector

The federal government also fosters the private sector's support of infrastructure through other means. For example, private investment to improve the nation's surface transportation system (namely, highways and transit and rail systems) is encouraged through federal credit assistance made available under the Transportation Infrastructure Finance and Innovation Act (TIFIA) of 1998 (P.L. 105-178, sections 1501-1504). Through TIFIA, the federal government has contributed $3.2 billion (mostly in the form of direct loans) to projects with costs totaling $13.2 billion.[31] Businesses and commercial enterprises may also receive loans for projects involving water systems from state revolving funds that are capitalized with grants made by the Environmental Protection Agency.[32] Private entities are also eligible to receive federal grants through the Airport Improvement Program for the development or improvement of airports that are "significant to national air transportation."[33]

Public–Private Partnerships

Infrastructure projects in which a private entity plays a role beyond simply supplying its services to a government agency are often referred to as public–private partnerships. Among the various types of public infrastructure, such partnerships appear to be most common for projects involving highway and road transportation, rail, and water supply and wastewater treatment, which can lend themselves to private operation. For example, a private entity can control access to and charge for the use of a toll road or a drinking water system, whereas it would be harder to charge users to recoup costs given the more diffuse benefits from a dam or flood-control project.[34]

The fundamental difference between the traditional role of the private sector in infrastructure and the role it plays in a public–private partnership is the greater amount of risk that the private entity assumes in the partnership. The degree of risk for the private entity can range from almost complete responsibility to only a modest stake in the project. In some public–private partnerships for highway and road construction, for example, the private entity raises most or all of the funds and is also responsible for the design, construction, and operation and maintenance. It recoups its investment through charging user fees.[35] The Dulles Greenway highway in Virginia and the SR-91 and SR-125 toll roads in California are examples of the results of two such public–private partnerships. In contrast, having more-limited involvement, private enti-

30. See Statement of Donald B. Marron, Acting Director, Congressional Budget Office, *Economic Issues in the Use of Tax-Preferred Bond Financing*, before the Subcommittee on Federal Revenue Measures, House Committee on Ways and Means (March 16, 2006).

31. The federal government's financing share of such projects is capped at 33 percent, and projects that qualify must have investment grade credit ratings on the remaining debt they take on. As a result, of the total amount of credit that it has extended or guaranteed through TIFIA, the federal government has provided a credit subsidy of approximately $240 million by lending at interest rates lower than its own borrowing costs or by assuming defaulted debt. See TIFIA Joint Program Office, *TIFIA Credit Program Overview* (September 27, 2006), available at http://tifia.fhwa.dot.gov, and *Budget of the United States Government, Fiscal Year 2008: Department of Transportation*. In this paper, the outlays for credit subsidies under TIFIA are included in the data for indirect federal capital spending.

32. See Environmental Protection Agency, *Financing America's Clean Water Since 1987—A Report on Progress and Innovation*, EPA-832-R-00-011 (May 2001), pp. 2–3.

33. See Federal Aviation Administration, "National Plan of Integrated Airport Systems," available at www.faa.gov/airports_airtraffic/airports/planning_capacity/npias.

34. Those factors reflect two potential rationales for a government's role in providing infrastructure. First, because they can have high fixed (or up-front) costs and low marginal costs, infrastructure projects may lend themselves less well than other types of investment to a competitive market: It may be economically feasible for only one producer to undertake such a project, so some type of government intervention or regulation may be necessary in order to maintain the price and supply of the infrastructure services at or near a competitive and economically efficient level. Second, when it is not possible for a private entity to charge all who make use of infrastructure services on the basis of the benefits received, then the private sector may not provide enough of such services. A government could remedy that undersupply by recouping the cost of the infrastructure through taxation.

ties may simply bid to supply various services such as maintaining public roads or operating water supply facilities. In the more extensive type of public–private partnership, the risk to the private entity depends on the accuracy of predictions about many things, most important, construction and financing costs. In the partnerships based on contract services, the risk to the private partner depends on its ability to deliver agreed-upon services at the contract price.[36]

Several factors may have combined recently to make public–private partnerships more attractive to the various levels of government responsible for public infrastructure: in particular, a demand by the public for improved infrastructure services coupled with a large supply of investment funds, such as public- and private-sector pension funds, whose managers seek stable long-term returns.

However, potential drawbacks to the private sector's involvement in public infrastructure exist. For example, in cases in which private entities bid for the right to undertake infrastructure projects and/or provide services, too few bidders could (absent government scrutiny that allowed the competition to be called off) lead to a contract award that favored the private sector over taxpayers. Furthermore, profit-driven behavior in the private sector may sometimes not be compatible with public goals for infrastructure (for instance, ensuring access to all). Finally, if the private entity responsible for a particular type of public infrastructure fails to complete the project, the government may need to step in to provide services.

According to a regularly cited survey, the cumulative project costs of public–private partnerships in the United States that had been funded or completed by October 2006 totaled a bit over $48 billion (in nominal dollars).[37] In contrast, nominal capital spending on infrastructure by the federal government and states and localities totaled $1.6 trillion between 1985 and 2004 (averaging $80 billion annually). Hence, public–private partnerships—and the amount of private-sector funds committed to them—have not accounted for a significant share of public infrastructure spending in the United States. Other studies have come to a similar conclusion for highway and transit projects.[38]

35. The risk to the private entity of not recouping its investment is often reduced by advantageous financing available through government sponsorship of the project and by terms granting the private entity the exclusive right to provide the infrastructure services.

36. An extensive treatment of public–private partnerships in transportation can be found in Department of Transportation, *Report to Congress on Public–Private Partnerships* (December 2004), available at www.fhwa.dot.gov/reports/pppdec2004/index.htm.

37. The figure is based on data from the 2006 International Major Projects Survey, which accompanied *Public Works Financing,* vol. 209 (October 2006). The data have important limitations: For the purposes of this analysis in particular, they do not distinguish between the public- and private-sector components of such projects. More generally, the data were not collected to provide an exhaustive inventory of public–private partnerships and, as a result, probably understate the extent of them.

38. See General Accounting Office, *Private Sector Sponsorship and Investment in Major Projects Has Been Limited,* GAO-04-419 (March 2004).

Appendix: Spending on Transportation and Water Infrastructure Since 1956

The tables in this appendix provide the amounts spent year by year on transportation and water infrastructure since 1956 and are the basis for the figures that appear in the text.

Table A-1.

Public Spending on Infrastructure, 1956 to 2004

(Millions of 2006 dollars)

		Federal		State and Local	
	Total	Amount	Percent	Amount	Percent
1956	105,628	15,998	15.1	89,630	84.9
1957	113,215	18,713	16.5	94,503	83.5
1958	120,683	24,032	19.9	96,651	80.1
1959	133,742	36,972	27.6	96,769	72.4
1960	131,273	40,100	30.5	91,173	69.5
1961	136,779	38,531	28.2	98,247	71.8
1962	138,190	39,047	28.3	99,143	71.7
1963	146,238	41,600	28.4	104,638	71.6
1964	149,125	45,746	30.7	103,379	69.3
1965	153,831	48,767	31.7	105,064	68.3
1966	156,140	47,603	30.5	108,537	69.5
1967	157,852	46,653	29.6	111,199	70.4
1968	157,794	46,439	29.4	111,355	70.6
1969	159,029	44,767	28.2	114,262	71.8
1970	156,969	43,437	27.7	113,532	72.3
1971	164,791	47,591	28.9	117,200	71.1
1972	168,620	47,071	27.9	121,549	72.1
1973	163,206	48,415	29.7	114,791	70.3
1974	158,743	48,785	30.7	109,958	69.3
1975	170,699	52,877	31.0	117,822	69.0
1976	173,644	62,419	35.9	111,225	64.1
1977	173,609	66,496	38.3	107,113	61.7
1978	177,147	64,658	36.5	112,489	63.5
1979	189,598	68,504	36.1	121,094	63.9
1980	196,318	74,060	37.7	122,258	62.3
1981	194,547	70,478	36.2	124,070	63.8

Continued

Table A-1.

Continued

	Total	Federal		State and Local	
		Amount	Percent	Amount	Percent
1982	185,053	59,417	32.1	125,636	67.9
1983	187,699	56,140	29.9	131,559	70.1
1984	192,071	58,292	30.3	133,779	69.7
1985	202,740	60,744	30.0	141,996	70.0
1986	213,993	61,951	29.0	152,042	71.0
1987	220,775	55,150	25.0	165,624	75.0
1988	228,880	56,514	24.7	172,366	75.3
1989	233,906	55,562	23.8	178,344	76.2
1990	239,220	56,728	23.7	182,491	76.3
1991	237,175	57,159	24.1	180,016	75.9
1992	243,268	60,049	24.7	183,219	75.3
1993	245,042	59,871	24.4	185,171	75.6
1994	253,712	62,384	24.6	191,328	75.4
1995	258,517	62,859	24.3	195,658	75.7
1996	260,850	61,779	23.7	199,071	76.3
1997	268,005	62,118	23.2	205,887	76.8
1998	274,113	62,910	23.0	211,203	77.0
1999	283,936	65,339	23.0	218,597	77.0
2000	290,518	68,180	23.5	222,338	76.5
2001	305,811	77,956	25.5	227,855	74.5
2002	317,570	81,146	25.6	236,424	74.4
2003	319,110	77,934	24.4	241,176	75.6
2004	312,217	73,517	23.5	238,700	76.5

Source: Congressional Budget Office.

Note: State and local spending is reported net of federal grants and loan subsidies. Those data do not include expenditures on freight rail or, after 1990, water resources.

Table A-2.

Federal Spending on Infrastructure as a Share of Nondefense Expenditures, 1956 to 2006

(Percentage)

	Share of Total Federal Spending	Share of Nondefense Expenditures		Share of Total Federal Spending	Share of Nondefense Expenditures
1956	2.6	6.5	1982	3.7	4.9
1957	2.9	7.1	1983	3.3	4.5
1958	3.5	8.2	1984	3.4	4.7
1959	4.9	10.4	1985	3.3	4.5
1960	5.3	11.2	1986	3.3	4.6
1961	5.0	10.2	1987	3.0	4.2
1962	4.8	9.4	1988	3.0	4.1
1963	5.0	9.6	1989	2.8	3.9
1964	5.3	9.8	1990	2.8	3.6
1965	5.8	10.1	1991	2.7	3.4
1966	5.2	9.2	1992	2.8	3.6
1967	4.6	8.3	1993	2.8	3.6
1968	4.2	7.8	1994	2.9	3.6
1969	4.2	7.6	1995	2.9	3.6
1970	4.2	7.1	1996	2.8	3.4
1971	4.6	7.3	1997	2.8	3.4
1972	4.4	6.6	1998	2.8	3.4
1973	4.5	6.5	1999	2.9	3.5
1974	4.5	6.4	2000	3.0	3.6
1975	4.4	6.0	2001	3.4	4.1
1976	4.9	6.5	2002	3.4	4.1
1977	5.1	6.7	2003	3.1	3.9
1978	4.7	6.1	2004	2.9	3.6
1979	4.9	6.3	2005	2.9	3.6
1980	5.0	6.4	2006	2.9	3.5
1981	4.5	5.9			

Source: Congressional Budget Office.

Table A-3.

Public Spending on Infrastructure as a Percentage of Gross Domestic Product, 1956 to 2004

	Total	Capital	Operation and Maintenance		Total	Capital	Operation and Maintenance
1956	2.58	1.58	1.00	1981	2.66	1.22	1.43
1957	2.73	1.67	1.06	1982	2.58	1.15	1.43
1958	2.92	1.84	1.08	1983	2.51	1.09	1.42
1959	3.06	1.93	1.13	1984	2.41	1.05	1.36
1960	2.94	1.80	1.15	1985	2.46	1.09	1.36
1961	3.04	1.84	1.20	1986	2.52	1.14	1.38
1962	2.94	1.81	1.13	1987	2.54	1.17	1.38
1963	3.02	1.85	1.17	1988	2.52	1.17	1.35
1964	2.93	1.81	1.12	1989	2.48	1.14	1.35
1965	2.87	1.76	1.11	1990	2.51	1.14	1.36
1966	2.78	1.69	1.10	1991	2.48	1.15	1.33
1967	2.80	1.69	1.11	1992	2.46	1.11	1.35
1968	2.70	1.60	1.10	1993	2.42	1.07	1.35
1969	2.68	1.57	1.11	1994	2.42	1.05	1.37
1970	2.71	1.54	1.17	1995	2.42	1.05	1.37
1971	2.82	1.59	1.23	1996	2.36	1.02	1.34
1972	2.78	1.57	1.21	1997	2.33	1.00	1.33
1973	2.59	1.41	1.18	1998	2.30	1.00	1.30
1974	2.57	1.38	1.19	1999	2.31	1.03	1.28
1975	2.79	1.48	1.31	2000	2.33	1.06	1.27
1976	2.70	1.41	1.29	2001	2.45	1.11	1.34
1977	2.60	1.26	1.34	2002	2.52	1.16	1.36
1978	2.49	1.16	1.33	2003	2.51	1.16	1.36
1979	2.59	1.27	1.32	2004	2.40	1.10	1.30
1980	2.73	1.36	1.37				

Source: Congressional Budget Office.

Note: Data on state and local spending do not include expenditures on freight rail or, after 1990, water resources.

Table A-4.

Public Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2004

(Millions of 2006 dollars)

		Capital		Operation and Maintenance	
	Total	Amount	Percent	Amount	Percent
1956	105,628	64,694	61	40,934	39
1957	113,215	69,315	61	43,901	39
1958	120,683	75,905	63	44,777	37
1959	133,742	84,583	63	49,159	37
1960	131,273	80,320	61	50,953	39
1961	136,779	82,999	61	53,780	39
1962	138,190	85,107	62	53,083	38
1963	146,238	89,740	61	56,498	39
1964	149,125	92,258	62	56,867	38
1965	153,831	94,710	62	59,121	38
1966	156,140	94,896	61	61,244	39
1967	157,852	95,461	60	62,391	40
1968	157,794	93,864	59	63,930	41
1969	159,029	93,762	59	65,268	41
1970	156,969	89,581	57	67,388	43
1971	164,791	93,828	57	70,963	43
1972	168,620	95,728	57	72,892	43
1973	163,206	89,414	55	73,792	45
1974	158,743	85,390	54	73,354	46
1975	170,699	91,267	53	79,432	47
1976	173,644	91,116	52	82,528	48
1977	173,609	84,176	48	89,433	52
1978	177,147	82,950	47	94,197	53
1979	189,598	93,086	49	96,511	51
1980	196,318	97,973	50	98,345	50
1981	194,547	90,080	46	104,468	54

Continued

Table A-4.

Continued

	Total	Capital		Operation and Maintenance	
		Amount	Percent	Amount	Percent
1982	185,053	82,615	45	102,438	55
1983	187,699	81,867	44	105,833	56
1984	192,071	83,746	44	108,325	56
1985	202,740	90,474	45	112,266	55
1986	213,993	97,010	45	116,983	55
1987	220,775	101,297	46	119,477	54
1988	228,880	106,175	46	122,706	54
1989	233,906	107,040	46	126,865	54
1990	239,220	109,223	46	129,997	54
1991	237,175	109,731	46	127,444	54
1992	243,268	109,879	45	133,389	55
1993	245,042	108,533	44	136,509	56
1994	253,712	110,036	43	143,677	57
1995	258,517	111,896	43	146,622	57
1996	260,850	112,546	43	148,304	57
1997	268,005	115,366	43	152,640	57
1998	274,113	119,438	44	154,675	56
1999	283,936	126,958	45	156,978	55
2000	290,518	131,752	45	158,766	55
2001	305,811	138,693	45	167,118	55
2002	317,570	145,867	46	171,703	54
2003	319,110	146,935	46	172,175	54
2004	312,217	143,557	46	168,659	54

Source: Congressional Budget Office.

Note: Data on state and local spending do not include expenditures on freight rail or, after 1990, water resources.

Table A-5.

Federal Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2006

(Millions of 2006 dollars)

		Capital		Operation and Maintenance	
	Total	Amount	Percent	Amount	Percent
1956	15,998	11,903	74	4,095	26
1957	18,713	14,140	76	4,572	24
1958	24,032	20,408	85	3,624	15
1959	36,972	30,969	84	6,003	16
1960	40,100	33,692	84	6,407	16
1961	38,531	31,437	82	7,094	18
1962	39,047	32,382	83	6,665	17
1963	41,600	34,405	83	7,195	17
1964	45,746	38,525	84	7,221	16
1965	48,767	40,545	83	8,222	17
1966	47,603	39,260	82	8,342	18
1967	46,653	38,019	81	8,634	19
1968	46,439	37,353	80	9,086	20
1969	44,767	35,212	79	9,555	21
1970	43,437	33,310	77	10,127	23
1971	47,591	35,712	75	11,880	25
1972	47,071	35,357	75	11,714	25
1973	48,415	35,698	74	12,718	26
1974	48,785	36,655	75	12,130	25
1975	52,877	38,647	73	14,230	27
1976	62,419	46,545	75	15,873	25
1977	66,496	50,219	76	16,277	24
1978	64,658	46,773	72	17,884	28
1979	68,504	51,013	74	17,490	26
1980	74,060	55,400	75	18,660	25
1981	70,478	47,922	68	22,556	32

Continued

Table A-5.

Continued

		Capital		Operation and Maintenance	
	Total	Amount	Percent	Amount	Percent
1982	59,417	42,352	71	17,065	29
1983	56,140	40,818	73	15,322	27
1984	58,292	43,083	74	15,209	26
1985	60,744	45,612	75	15,132	25
1986	61,951	47,752	77	14,199	23
1987	55,150	41,313	75	13,837	25
1988	56,514	42,571	75	13,943	25
1989	55,562	41,074	74	14,488	26
1990	56,728	42,475	75	14,253	25
1991	57,159	42,820	75	14,339	25
1992	60,049	43,508	72	16,541	28
1993	59,871	44,103	74	15,768	26
1994	62,384	44,828	72	17,556	28
1995	62,859	45,348	72	17,511	28
1996	61,779	44,552	72	17,228	28
1997	62,118	43,942	71	18,176	29
1998	62,910	45,959	73	16,951	27
1999	65,339	49,135	75	16,204	25
2000	68,180	52,829	77	15,352	23
2001	77,956	58,673	75	19,283	25
2002	81,146	62,242	77	18,904	23
2003	77,934	59,259	76	18,675	24
2004	73,517	56,332	77	17,185	23
2005	73,646	55,102	75	18,544	25
2006	76,334	56,344	74	19,990	26

Source: Congressional Budget Office.

Table A-6.

State and Local Spending for Infrastructure Capital and Related Operation and Maintenance, 1956 to 2004

(Millions of 2006 dollars)

		Capital		Operation and Maintenance	
	Total	Amount	Percent	Amount	Percent
1956	89,630	52,791	59	36,839	41
1957	94,503	55,174	58	39,328	42
1958	96,651	55,497	57	41,154	43
1959	96,769	53,613	55	43,156	45
1960	91,173	46,627	51	44,546	49
1961	98,247	51,561	52	46,686	48
1962	99,143	52,725	53	46,418	47
1963	104,638	55,335	53	49,303	47
1964	103,379	53,733	52	49,647	48
1965	105,064	54,165	52	50,899	48
1966	108,537	55,635	51	52,901	49
1967	111,199	57,441	52	53,758	48
1968	111,355	56,511	51	54,844	49
1969	114,262	58,549	51	55,713	49
1970	113,532	56,271	50	57,261	50
1971	117,200	58,116	50	59,083	50
1972	121,549	60,371	50	61,179	50
1973	114,791	53,717	47	61,074	53
1974	109,958	48,735	44	61,223	56
1975	117,822	52,620	45	65,202	55
1976	111,225	44,571	40	66,654	60
1977	107,113	33,957	32	73,155	68
1978	112,489	36,177	32	76,312	68
1979	121,094	42,073	35	79,021	65
1980	122,258	42,573	35	79,685	65
1981	124,070	42,158	34	81,912	66

Continued

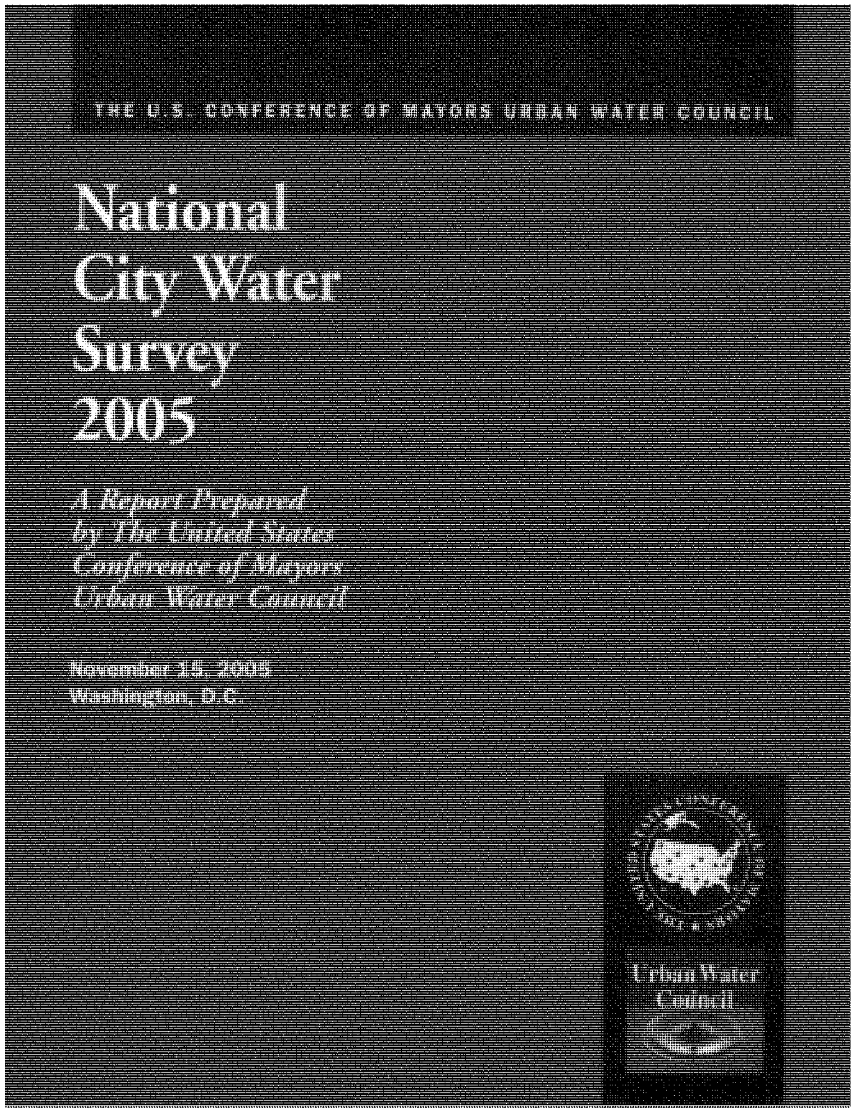
Table A-6.

Continued

	Total	Capital		Operation and Maintenance	
		Amount	Percent	Amount	Percent
1982	125,636	40,263	32	85,373	68
1983	131,559	41,049	31	90,511	69
1984	133,779	40,663	30	93,116	70
1985	141,996	44,862	32	97,134	68
1986	152,042	49,258	32	102,784	68
1987	165,624	59,984	36	105,640	64
1988	172,366	63,604	37	108,763	63
1989	178,344	65,967	37	112,378	63
1990	182,491	66,747	37	115,744	63
1991	180,016	66,911	37	113,105	63
1992	183,219	66,371	36	116,848	64
1993	185,171	64,430	35	120,741	65
1994	191,328	65,207	34	126,121	66
1995	195,658	66,548	34	129,110	66
1996	199,071	67,994	34	131,077	66
1997	205,887	71,424	35	134,464	65
1998	211,203	73,479	35	137,724	65
1999	218,597	77,823	36	140,774	64
2000	222,338	78,923	35	143,415	65
2001	227,855	80,020	35	147,835	65
2002	236,424	83,625	35	152,799	65
2003	241,176	87,677	36	153,500	64
2004	238,700	87,226	37	151,474	63

Source: Congressional Budget Office.

Note: State and local spending is reported net of federal grants and loan subsidies. Those data do not include expenditures on freight rail or, after 1990, water resources.



THE U.S. CONFERENCE OF MAYORS URBAN WATER COUNCIL

National City Water Survey 2005

A Report Prepared by The United States Conference of Mayors Urban Water Council

November 15, 2005
Washington, D.C.

The United States Conference of Mayors

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Acknowledgement

The U.S. Conference of Mayors' Urban Water Council would like to acknowledge and thank the 414 city Mayors and their staff who provided survey information for this report.

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Executive Summary

The United States Conference of Mayors' Urban Water Council (UWC) conducted a survey of the nation's principal cities to examine water resources priorities and trends. Mayors were asked in the survey to provide current information in four key water resources areas: issues and priorities; recent and planned major capital investments in water and wastewater infrastructure; adequacy of water supplies; and, water conservation activities. The UWC has tracked these four areas (and other subjects) of concern for over a decade.

The survey was distributed to nearly 1,200 cities with mayoral forms of government. These are considered the nation's principal cities because they have populations of 30,000 or greater. Nearly 35 percent of the principal cities (414 cities) responded to the survey, and form the basis for this report. The survey response, in this case, was greater than usual. Thus, the survey information provides a robust data base.

Water Priorities and Issues

The top priorities identified, measured by frequency of survey response, include a combination of chronic "every-day" problems associated with maintaining and rehabilitating aging water and wastewater infrastructure, and a number of priorities associated with potential "catastrophic events", (see Table 2).

- The chronic "every-day" problems include the number one priority-aging infrastructure (identified by 60.6 percent of the survey cities) and priorities four and five: permits and regulatory issues (also referred to as unfunded federal mandates, at 45.2 percent), and water quality (42.3 percent), respectively.

- The potential "catastrophic events" issues include the number two priority: water infrastructure security (54.6 percent); the number six priority, flooding (38.4 percent); and the number seven priority, emergency planning and management for storms and hurricanes (34.3 percent).

- Concern over water supply availability was identified as the third highest priority (46.4 percent); three other related priorities were identified among the top ten concerns: drought management (32.6 percent); regional conflict over water use (26.8 percent); and, water rights (25.1 percent).

Water and Wastewater Infrastructure Investment and Financing

The nation's principal cities are engaged in wide ranging and significant investment in building and rehabilitating the five major forms of water and wastewater infrastructure during this decade: water supply; water treatment plants; water distribution systems; wastewater treatment plants; and, wastewater collection systems, (see Tables 3, 4-B and 5).

- 92 percent of the survey cities made major capital investments in water infrastructure between 2000 and 2004; 92 percent of the cities plan to make major capital investments between 2005 and 2009.

- 23 percent of the survey cities made simultaneous major capital investments in all five water infrastructure categories.

- Significant investment in underground infrastructure has been made or planned:

    - 83.7 percent of cities invested in water distribution pipes, and 72.2 percent of cities invested in wastewater collection pipes during the first half of the decade.

    - 79.0 percent of cities plan investment in water distribution pipes, and 69.8 percent of cities plan investments in wastewater collection pipes for the second half of the decade.

- Roughly one-half of the survey cities either made or plan major capital investments in water supply, water treatment plants and wastewater treatment plants.

- Many smaller cities made or plan water infrastructure investment during this decade, but clearly a higher proportion of large and medium size cities are making investments than smaller cities.

Traditional municipal financing methods continue to dominate city water infrastructure capital investments (see Tables 6, 7 and 8):

- A small majority of cities (52.3 percent) relied on a single-source for water infrastructure financing in the first half of the decade, but a small majority of cities (53.5 percent) plan to use mulriple-source financing during the second half of the decade.

- The financing method used most frequently by the survey cities was the category "other," which was described as "Pay-As-You-Go." This approach relies on user charges, rate increases and capital reserves generated from user charges. 21.0 percent of the survey cities relied on a Pay-As-You-Go single-source finance method between 2000 and 2004; Pay-As-You-Go was used in combination with other financing methods hy 51.7 percent of the survey cities.

- In descending order of frequency, the following multi-source financing methods are used by cities for water infrastructure investments: Pay-As-You-Go, 51.7 percent; revenue bonds, 46.1 percent; State Revolving Fund (SRF) loans, 38.3 percent; general obligation bonds, 28.8 percent; and, private activity bonds, 0.8 percent.

Adequacy of City Water Supply

Water supply availability was identified as the third top priority by the survey cities. For the most part, cities try to be self-sufficient when it comes to water supplies. Two-thirds of the survey cities provide their own warer supply; and roughly 19 percent of the cities are served by private water companies. Some cities face a convergence of issues, including drought management, water rights, inter-basin rransfers, ground water depletion, and regional conflict over water use that may impact their ability to provide adequate and affordable water in their communities.

- 55.6 percent of the survey cities indicated that they have an adequate water supply for more than 20 years, (see Table 11).

- 35 percent of the survey cities indicated that they have an adequate water supply for less than 20 years, they could face a critical water shortage by 2025.

- Water shortages may be more pronounced in medium size cities.

Sixty-nine percent of the cities that do not have adequate water supplies for more than 20 years have made major capital investments in water supply infrastructure between 2000 and 2004 (see Table 12).

City Water Conservation Activities

The potential for cities to experience critical water shortages in 2015 and 2025 elevates the importance of water conservation activities. Even if cities do not face a critical water shortage it makes good economic and environmental sense to conserve water resources. The survey findings indicate that cities are currently actively engaged in water conservation programs. See Tables 13 through 15.

- Two-thirds of the survey cities indicated they had water conservation plans in place. A high proportion of large cities (about 80 percent) indicated they had programs. The proportion of smaller cities with conservation programs was lower (58.6 percent).

- Cities were three times more likely to have water conservation programs where water supply infrastructure investments were made in the period 2000 to 2004.

- Cities planning to make major capital investments in water supply infrastructure for the period 2005 to 2009 are nearly four times as likely to have an established water conservation program.

- Two system-wide methods that can be effective in water conservation programs are automated meters because they accurately gage use and billing; and altering water rate structures as a demand-management tool.

    - Traditional water meters remain the most common conservation technique, employed by 72.5 percent of the survey cities. However, 68.8 percent of the cities indicated they would consider modernizing with automated water meters if they could save water or money.

    - While the number of cities altering water rate structures is fairly constant over the three population size categories, the proportion of cities employing the technique is clearly related to increasing population size (Table 15). Almost half of the larger cities use the technique, while only about 40 percent of medium size cities and about 30 percent of smaller size cities do.

Introduction

The Urban Water Council (UWC) is a Task Force of The U.S. Conference of Mayors. It is open to all Mayors, and its purpose is to provide a forum for discussion of issues impacting how cities provide and protect community water and wastewater services. Some of the issues that the UWC focuses on include: development and rehabilitation of surface and subsurface water infrastructure; water infrastructure financing; watershed management; water supply planning; water conservation; wetlands construction and education programs; and water system program management and asset management. Additionally, the UWC serves as an educational clearinghouse for cities by compiling and disseminating water resources "Best Practices."

Periodically, the UWC conducts national surveys to determine trends in water resources programs and planning in the nation's large population cities. Generally speaking, the surveys conducted over the last decade address specific areas of concern regarding water resource issues that are prominent at any given time. This report is intended to identify trends in 2005 from Mayors and their cities participating in the survey.

The 2005 survey focused on four areas of concern: general water problems and priorities; infrastructure investments; water supply issues; and water conservation measures. These are briefly described below.

General Water Priorities and Problems

Mayors were asked to identify which of 24 water resources issues is either a current or future problem for their cities. The list of 24 water resources issues was derived from discussions with Mayors and their staffs, as well as consultation with federal agencies. The list was not intended to be comprehensive. An 'other' response category was included to allow cities to identify issues that were not on the pre-selected list. Mayors were also asked to rank the five most pressing water resources issues on the list. This convention was intended to distinguish priorities among the problem issues, providing invaluable information for federal policy discussions.

Water and Wastewater Infrastructure Investment

Water and wastewater infrastructure development, rehabilitation and financing have been critical concerns for the UWC since its inception in 1995. The American Society of Civil Engineer's Report Card on Infrastructure suggests that water and wastewater infrastructure is in serious need of rehabilitation in America. The US EPA estimates that new investment necessary to comply with existing law will cost more than $534 billion by the year 2019. Conventional wisdom suggests that local government far outspends state and federal government for water and wastewater infrastructure in the United States.

Mayors were asked to respond to questions concerning five categories of major capital investments in the past 5 years (2000-2004) and the next 5 years (2005-2009). The five categories include: water supply; water treatment plant; water distribution systems; wastewater treatment plant; and, wastewater collection systems.

Additional questions focused on how the cities did or will finance these projects. The major forms of financing include: general obligation bonds, revenue bonds, the Clean Water Act or Safe Drinking Water Act State Revolving Fund loan programs (SRF); private activity bonds; and 'other'. It is common for cities to use multiple forms of financing on major capital investments in water related projects. A special focus was placed on the use of SRF financing to determine its extent in capital spending. An open-ended question asked cities to explain why they do not rely on the SRF financing option.

Water Supply

The U.S. Geological Survey (USGS) recently reported that substantial reductions in water consumption have been achieved in both the agricultural and industrial sectors in the United States since 1985. Water consumption related to electricity production remains stable and accounts for the greatest single category of use. The municipal sector, however, is the only sector that continues to grow. The USGS estimates that municipal water use has increased 25 percent since 1985. The USGS suggests that growth in this sector tracks population growth, in spite of reduced consumption due to water conservation programs.

The survey asked Mayors to identify whether their water supplies are owned by the city, or if they contract with a private water provider. Similarly, the survey asked Mayors if they or their private water provider has established and implemented a water supply plan.

The survey also asked Mayors if their cities have an adequate future water supply for the next 10, 20 or greater than 20 years. Additional questions were geared toward determining if city water supplies rely on groundwater, surface water, or some combination. Finally, the survey asked if cities were contemplating shifting water supply from groundwater to surface water.

Water Conservation

Cities may face future water shortages because there is a finite supply of potable water and the population of the United States continues to increase. Therefore, in order to avert critical shortages that would adversely impacr local and regional economies, and most certainly impact the quality of life for our citizens it is imperative that cities establish, implement and succeed in their water conservation programs. Water conservation is a hedge against water shortages. While it will not prevent water shortages, it has considerable potential to forestall critical shortages and buy the time necessary to advance technology, market forces and federal, state and local policy developmeuts to ensure adequate and affordable water supplies in the future.

Similar to the water supply questions asked in the survey, the water conservation questions asked Mayors if they or their private water provider have established and implemented water conservation programs. Mayors were asked if their city administration operates a water conservation department.

Other questions were intended to determine if cities were actively experimenting with conservation. For example, Mayors were asked if their cities were altering water use rate structures as a form of demand management. They were also asked if they were modernizing meter technology to accurately audir and bill water consumption.

Materials and Methods

The United States Conference of Mayors (USCM) represents cities with populations of 30,000 or greater. There are roughly 1,200 cities in this size category, and the Urban Water Council (UWC) conducted a saturation survey, (including all cities in this population group, regardless of whether or not they were members of the USCM).

The survey (Attachment A) was mailed or faxed to the Mayor's office in each city. Mayors were asked to fill out the survey questionnaire and either mail or fax them back to the UWC. The survey was also available on the USCM website, and could be filled out and transmitted via a web-based format. Roughly one half of the 414 responding cities provided their response information via the internet.

The 414 city respondents were categorized by population size (Table 1) in order to examine some of the findings relative to size of city. The categories were delineated as follows: 170 smaller cities (41 percent); 140 medium sized cities (34 percent); 104 large cities (25 percent).

Table 1
414 City Survey Respondents Categorized By Population Size (City Size)

Sort by Population Size	(%)
Smaller Cities — Less Than 50,000	41
Medium Cities — 50,000 to 100,000	34
Large Cities — Greater Than 100,000	25

Follow-up efforts involved one or more telephone calls to urge Mayors to respond to the survey questionnaire in the case of survey non-response. Additionally, telephone follow-up was conducted to improve question non-response. Telephone interviews were conducted with half a dozen cities that submitted multiple survey responses. Each of these cases was dealt with by questioning the Mayor or the Mayor's representative about which survey responses were correct and should be included in the tabulation of findings. These cases involved situations where the city might own/operate either the water or wastewater treatment facilities, and/or a private water service provider might be involved. In each case, the convention followed was to include the priorities and information provided by the Mayor's office; or, based on the Mayor's advice, include the private water service provider's information.

The survey questionnaire information was computer coded for data input. Statisrical analyses were performed via a mixture of applying the Statistical Package for the Social Sciences software (SPSS), or by applying statistical procedures provided in Microsoft Excel. Simple frequencies of data distributions and arithmetic averages were calculated and reported, as appropriate. Bivariate analyses involved sorring and filtering and the application of crosstabulations for descriptive purposes. Special attention was paid to open-ended questions. The convention used for analyzing these variables was to review each response and construct broad categories of similar responses. Professional judgment was used in these cases; and multiple reviews of the same responses conducted.

Attachment A reports the percentage of cities answering individual questions. The percentages reported were based on 414 cities, the total sample of survey respondents. The reader is cautioned here that the text of this reporr and the tables presenred may vary from reliance on the 414 cities as the denominator in calculating percentages. Each "Table" of findings will indicate the "N", or number of cases (cities) used to make the calculations presented in the table if it does not rely on the full 414 city responses. For example, in Table 3 the percentage of cities making infrastructure investments in a particular category is based on the total number of cities making water and wastewater infrastructure investment for that time period.

Findings

City Water Resource Priorities

General Water Issues and Priorities

Mayors were asked to identify which of 24 water resources issues is either a current or future issue or priority for their cities. The list of issues was derived from discussions with Mayors and their staffs, as well as consultation with federal agencies. The list was not intended to be comprehensive. An 'other' response category was included to allow cities to identify issues that were listed.

The survey cities identified their water resource issues and priorities, which are listed in Table 2 in descending order of frequency. The top three priorities were: aging infrastructure (60.6 percent); water system security (54.6 percent); and, water supply availability (46.4 percent). These findings indicate that cities are concetned about a mixture of ***"every-day"*** problems and ***"catastrophic events."***

The most frequently identified priority is aging water resources infrastructure. This is a chronic or "every-day" problem experienced by many cities. Mainraining and replacing existing water infrastructure has long been a critical challenge for cities. The cost of maintenance and replacement is considerahle. The U.S. Environmental Protecrion Agency (USEPA) has estimated a water and wastewater infrastructure "Needs Gap" of over $500 billion in investment to comply with water laws by the year 2019.

Another ***"every-day"*** problem that is high on the priority list is ensuring an adequate water supply. This was identified by 46.4 percent of the survey cities, and ranked number three on the list of 24 issues. Other issues related to water supply were among the top ten priorities identified: drought management; regional conflict over water use; and water rights. Additionally, the 11th and 13th priority issues were related to water supply, i.e., ground water depletion and inter-basin transfers, respectively.

The second most frequently idenrified priority was water infrastructure security and protection; this is generally viewed by cities as a potentially "catastrophic event" issue. This has become an important concern, especially since the 9/11 terrorist attacks in the United States. Congress and the USEPA have directed resources toward vulnerability assessments at large and medium sized water supplies and distribution systems. Both public and private water suppliers have been aggressively developing vulnerahility plans in an attempt to secure water supplies from chemical and biological sabotage.

Other ***"catastrophic event"*** issues included the 6th and 7th priorities: flooding, and emergency planning and management for storms and hurricanes, respectively. Note that the survey was conducted in the first quarter of 2005, long before the hurricanes Katrina and Rita struck and devastated Gulf Coast communities.

Permits and regulatory issues ranked as the 4th most important priority. This issue has been a subject of considerable concern to the Conference of Mayors for some time. It is generally considered a priority because it involves unfunded federal mandates that are extremely costly for cities to meet. Another recent survey conducted by the Conference of Mayors identified unfunded federal water mandates as the single largest category of costs facing the nation's principal cities.

The top four priorities were examined based on city size (based on population). Aging infrastructure was identified as a priority by 40.4 percent of small cities, 33.6 percent of medium cities, and 26 percent of large cities. Water system security was identified as a priority by 36.6 percent of small cities, 29.9 percent of medium cities, and 33.5 percent of large cities. Water supply availability was identified as a priority by 34.9 percent of small cities, 33.9 percent of medium cities, and 31.2 percent of large cities. Permits and regulatory issues were identified as a priority by 35.7 percent for both small and medium cities, and 28.6 percent of large cities. Other than aging infrastructure, that appears to be especially problematic for small cities, the other three top ranking priorities do not substantially vary by city size.

Table 2
City Water Resource Priorities

Rank Order	Water Resources Issue	Percent Of Cities
1	Aging Water Resources Infrastructure	60.6
2	Security/Protection of Water Resources Infrastructure	54.6
3	Water Supply Availability	46.4
4	Permits, Regulatory Issues	45.2
5	Water Quality of Urban Streams and Rivers	42.3
6	Flooding	38.4
7	Emergency Planning and Management for Storms, Hurricanes	34.3
8	Drought Management	32.6
9	Regional Conflict Over Water Use	26.8
10	Water Rights	25.1
11	Groundwater Depletion	23.4
12	Sediment Management	19.6
13	Inter-basin Transfers	16.2
14	Best Practices – Technology Transfer	13.0
15	Endangered Species	11.6
16	Loss of River Corridors/Green-space	10.6
17	Loss of Wetlands	10.4
18	Other	9.7
19	Water Transportation (Channels, Ports, Dredging)	8.5
20	Beach/Shoreline Erosion	7.5
21	Neglected/Decaying Waterfront Areas	6.8
22	Channel/Harbor Adequacy	4.8
23	Insufficient Water-Oriented Recreation	3.9
24	Waterborne Traffic	3.4

Water and Wastewater Infrastructure
Investment and Financing

Major Capital Investment

The survey cities were asked to identify the types of water infrastructure investment they made over the last five years, and what investments they are planning to make over the next five years. The investments were limited to major capital investments as determined by the survey cities. This information is intended to provide a broad view of water infrastructure investment by cities, encompassing a decade's worth of spending activity. Not surprisingly, cities have been very active in making water infrastructure investments. Ninety-two percent of the survey cities made major capital investments in water and wastewater infrastructure between 2000 and 2004; 92.0 percent of the survey cities plan to make similar infrastructure investments between 2005 and 2009.

The survey findings indicate that cities are making extensive major capital investments in the underground (or sub-surface) infrastructure involving pipes (Table 3).

- 83.7 percent of the responding cities made major capital investments in water distribution systems between 2000 and 2004
- 72.2 percent of the responding cities made major capital investments in sewage collection systems between 2000 and 2004

More than 50 percent of the responding cities made major capital investments in water supply, water treatment and wastewater treatment infrastructure between 2000 and 2004.

Table 3
Major Capital Investments in City Water and Wastewater Infrastructure

Infrastructure	2000 – 2004* (% of Cities)	2005 – 2009** (% of Cities)
Water Supply	61.5	59.3
Water Treatment Plant	56.5	49.6
Water Distribution System	83.7	79.0
Wastewater Treatment Plant	55.5	52.8
Wastewater Collection System	72.2	69.8

* Actual investments made by 382 cities, percentage of cities based on a total of 382 cites, not 414 cities.
** Planned investments by 381 cities, percentage of cities based on a total of 381 cites, not 414 cities.

Water infrastructure investment planning over the next five years indicates a similar pattern of major capital spending.

- 79.0 percent of the responding cities plan major capital investments in water distribution systems between 2005 and 2009
- 69.8 percent of the responding cities plan major capital investments in sewer collection systems between 2005 and 2009

Roughly 50 percent of the responding cities plan major capital investments in water supply, water treatment and wastewater treatment infrastructure between 2005 and 2009.

Actual (2000–2004) and planned (2005–2009) water infrastructure capital investments were examined to determine if city size (measured by population) had any effect on investment decisions. Two comparisons were made. First, infrastructure categories for both actual and planned investment were sorted by city size (Table 4-A). For each category, the percentage of small, medium and large cities was calculated. As expected, the smaller cities made up the higher proportions of investments with few exceptions. This was expected because the smaller cities represented 41 percent of the survey city population.

Table 4-A
Major Capital Investments in City Water and Wastewater Infrastructure and Size of City

Infrastructure Category	Small Cities %	Medium Cities %	Large Cities %
Actual Investments 2000–2004			
Water Supply	35.3	34.9	29.8
Water Treatment Plant	35.8	34.9	29.3
Water Distribution System	39.7	33.1	27.2
Wastewater Treatment Plant	36.8	31.1	32.1
Wastewater Collection System	38.2	33.1	28.7
Planned Investments 2005–2009			
Water Supply	34.5	31.9	33.6
Water Treatment Plant	36.0	32.0	33.8
Water Distribution System	38.9	33.2	27.9
Wastewater Treatment Plant	35.4	32.3	32.3
Wastewater Collection System	37.6	33.8	28.6

Second, each infrastructure category was sorted by city size represented by the proportion of cities in a particular city size category (Table 4-B). Thus, the calculation employed the use of the overall proportion of cities in a particular size category as the denominator. A trend (Table 4-B) indicated that as city size increased so did the percentage of cities making water infrastructure investment. This trend appears to be more pronounced in the water supply, water treatment plants and wastewater treatment plants categories. The trend was slightly less pronounced for the infrastructure categories involving water and sewer pipes. While there may be a greater number of smaller cities making or planning water infrastructure investment, clearly, a higher proportion of large and medium size cities are making investments than smaller cities.

Table 4-B
Major Capital Investments in City Water and Wastewater Infrastructure by Proportion of City Size Category

Infrastructure Category	Small Cities %	Medium Cities %	Large Cities %
Actual Investments 2000–2004			
Water Supply	47.6	58.6	66.3
Water Treatment Plant	44.7	54.3	60.6
Water Distribution System	73.5	76.4	83.0
Wastewater Treatment Plant	45.3	47.8	67.3
Wastewater Collection System	61.8	65.7	75.0
Planned Investments 2005–2009			
Water Supply	44.7	52.1	71.1
Water Treatment Plant	38.8	40.7	61.5
Water Distribution System	68.2	72.1	79.8
Wastewater Treatment Plant	41.2	46.4	62.5
Wastewater Collection System	58.2	64.3	72.1

It is common for cities to make multiple investment commitments to the same category of water or wasrewater infrastructure over extended periods of time (Table 5). For example, 72.0 percent of cities making a major capital investment in water distribution systems in 2000 to 2004 also plan to make major capital investments in water distribution systems in 2005 to 2009. The other infrastructure categories exhibited similar but less intensive levels of repeat investment: 62.3 percent of cities plan repeat major capital investments in wastewater collection systems (sewer pipes); 47.9 percent in water supply; 45.5 percent in wastewater treatment plants; and 39.0 percent in water treatment plants. This finding indicates that the level of financial commitment to water infrastructure by cities is both significant and sustained.

The survey data revealed that the level of city capital investment in water infrastructure is not only significant and sustained, but is in some cases rather broad. 23 percent of the survey respondents indicated that they had made simultaneous major capital investments in all five of the infrastructure categories listed in Table 3 between 2000 and 2004. The proportion of cities that plan simultaneous major capital investments in all five infrastructure categories increases to 27.2 percent for the 2005 to 2009 period.

Table 5
Percentage of Repeat City Major Capital Investments in Water Infrastructure by Category

Repeat Infrastructure Investment	Investment 2000-2004 and 2005-2009 (% of Cities)*
Water Supply	47.9
Water Treatment Plant	39.0
Water Distribution System	72.0
Wastewater Treatment Plant	45.5
Wastewater Collection System	62.3

* Percentage of cities based on a total of 382 cites, not 414 cities.

Financing Mechanisms

As mentioned above, 92 percent of the survey cities made major capital investments in water and wastewater infrastructure between 2000 and 2004. Of those cities, 97.4 percent reported the type of financing employed.

The survey responses were examined to determine how frequently the cities relied on single and multiple source financing, (Tables 6 and 7). Five categories of capital investment financing were considered in the survey. 52.3 percent of cities relied on a single source of financing for their major capital investments in water and wastewater infrastructure.

Table 6
Frequency of Single-Source Financing Of Major Capital Investments in Water Infrastructure

Type of Financing	2000 – 2004 (% of Cities)	2005 – 2009* (% of Cities)
General Obligation Bonds	9.4	7.3
Revenue Bonds	15.9	13.9
Private Activity Bonds	0.0	0.0
State Revolving Fund	5.9	4.6
Other	21.0	20.6
Overall % of Cities Using Single-Source Financing	52.3	46.5

* Planned major capital investments in water infrastructure.

"Other" was the most frequently identified form of single-source financing, accounting for 21.0 percent of cities. Survey respondents described "other" financing to include: capital reserves from user charges; increased user rates; and transfer from the general fund. These are generally referred to by the survey respondents as "pay-as-you-go" approaches to financing.

The second most frequently identified single-source financing category was revenue bonds, at 15.9 percent. General obligation bonds accounted for 9.4 percent; and the State Revolving Fund Loan (SRF) accounted for only 5.9 percent. Private activity bonds accounted for less than one percent.

Nearly 48 percent of the survey cities utilized multiple financing sources. They rank in order of frequency as follows: "Other" combined with either general obligation bonds, revenue bonds, private activity bonds or the state revolving fund loan at 51.7 percent; revenue bonds and other financing at 46.1 percent; the state revolving fund loan program and other financing at 38.8 percent; general obligation bonds and "other" financing at 28.8 percent; and, private activity bonds and other financing at 0.8 percent.

Table 7
Frequency of Multiple-Source Financing
of Major Capital Investments in Water Infrastructure

Type of Financing	2000 – 2004 (% of Cities)	2005 – 2009* (% of Cities)
General Obligation Bonds	28.8	28.0
Revenue Bonds	46.1	50.8
Private Activity Bonds	0.8	1.4
State Revolving Fund	38.3	38.6
Other	51.7	53.5

* Planned major capital investments in water infrastructure.

A similar pattern of water and wastewater infrastructure financing is planned by the survey cities for the years 2005 to 2009 (Table 6). Slightly over 96 percent of the cities planning major capital investments in water and wastewater infrastructure reported the types of financing methods they anticipate using. Roughly 46 percent of the survey cities plan to utilize single source financing. In descending order of importance, they identified the following plans: "other" 20.6 percent; revenue bonds 13.9 percent; general obligation bonds 7.3 percent; tbe state revolving fund loans 4.6 percent; and, private activity bonds at 0.0 percent.

Not surprisingly, the 2005 to 2009 financing plans for water infrastructure investment utilizing multiple financing sources is similar to the earlier five year period, (Table 7). In descending order, they are: "other" 53.5 percent; revenue bonds and other financing 50.8 percent; state revolving fund loans and other financing 38.6 percent; general obligation bonds and other financing 28.0 percent; and private activity bonds and other financing 1.4 percent.

Table 8 provides a summary of both single source and multiple source financing of major capital investments in water and wastewater projects. The main diagonal of Table 8 depicts single source financing, while the remaining cells depict multiple financing approaches.

Table 8
Frequency of Single-Source and Multiple-Source Financing
Of Major Capital Investments in Water Infrastructure (% of Cities)*

Finance Method	General Obligation Bond	Revenue Bond	Private Activity Bond	State Revolving Fund	Other
General Obligation Bond	9.4	6.5	0.3	12.7	9.2
Revenue Bond		15.9	0.3	16.2	17.3
Private Activity Bond			0.0	0.3	0.3
State Revolving Fund				5.9	15.6
Other					21.0

* Based on 371 cities reporting finance methods for the period 2000 to 2004.

Survey cities (53.1 percent) indicated that they were willing to consider a Public-Private Partnership (PPP) approach to water infrastructure projects if cost savings in operation and maintenance or construction could be achieved. Slightly over 17 percent of the survey cities did not provide a response to this question. City size does not appear to influence the willingness to consider PPPs. The 53.1 percent of cities that said they would consider a PPP approach had the following city size distribution pattern: 51 percent of small cities; 53 percent of medium cities; and, 58 percent of large cities.

The Role Played by the SRF

The State Revolving Fund loan program (SRF) appears to play a consistent role in the way cities finance major water and wastewater infrastructure capital investments over periods of 2000 to 2004 and 2005 to 2009. The SRF provided a single-source of financing for 5.9 percent of the survey cities in 2000-2004 and is expected to provide financing for 4.6 percent of the survey cities in 2005-2009. In this respect the SRF is the fourth most important source of financing.

The SRF provided one component of multiple-source financing for 38.3 percent of the survey cities in 2000-2004. It is expected to be one component of multiple-source financing for 38.6 percent of the survey cities in 2005-2009. In this respect the SRF is the third most important source of financing.

Generally speaking, the SRF is not a major source of financing for water infrastructure investments among the survey cities. It does, however, play a significant role for the 5.9 percent of the survey cities where it provides 100 percent of project financing. The SRF also provides a substantial (over 50 percent) source of financing for another 17.2 percent of the survey cities (Table 9). It appears to be somewhat more important as a source of financing for smaller cities (Table 10).

Water Supply Information, Issues and Priorities

Two-thirds of the survey cities provide their own water supply; roughly 19 percent of the cities are served by private water companies. Nearly three-quarters of the survey cities have a watet supply plan. The survey cities rely on a combination of ground and surface water, (51.7 and 70.3 percent, respectively). Switching from ground water to surface water supplies is rare; with only 6.8 percent of the survey cities planning to switch.

The survey findings suggest that a critical water shortage could occur by 2025 in cities nationwide. Thirty-five percent of the survey cities indicated that they have an adequate water supply for less than 20 years; 55.6 percent indicated that they have an adequate water supply for more than 20 years (Table 11).

Table 9
Frequency of SRF Financing Of Major Capital Investments in Water Infrastructure, 2000-2004

Percent of Major Capital Investment	% of Cities
10 % or less	5.9
20 % or less	3.0
50 % or less	7.3
> 50 % but < 100 %	17.2
100 %	5.9

Table 10
Frequency of SRF Financing Of Major Capital Investments in Water Infrastructure, 2000-2009

Percent of Major Capital Investment	% of Small Cities	% of Medium Cities	% of Large Cities
10 % or less	1.0	1.3	3.5
20 % or less	0.3	0.5	2.2
50 % or less	3.5	1.6	2.2
> 50 %	10.2	8.6	4.3

Table 11
Adequacy of Current Water Supply and City Size

Adequacy of Water Supply	% of Small Cities	% of Medium Cities	% of Large Cities
10 Years or Less	19.3	24.0	17.3
20 Years or Less	15.3	19.2	22.4
Greater than 20 Years	65.3	56.8	60.2
Number of Cities (NOT %)	150	125	98

When city size, based on population, is taken into account, it appears that about a third of small cities will face potential water shortages by 2015 and 2025. The problem is more pronounced for medium size cities with 43.2 percent; and 39.7 percent of large cities.

Water supply availability was identified by 46.4 percent of the survey cities as one of the three top water resources priorities. Focusing on just these (46.4 percent) cities, 68 percent of those cities provide their own water supply while 17 percent rely on private water companies. Cities that provide their own water supply are four times more likely to have indicated water supply availability problems than cities relying on private suppliers. Additionally, focusing just on the 46.4 percent of the survey cities indicating water supply availability as a priority issue, 45.8 percent of those cities will face water supply shortages by 2025, while 44.3 percent have a supply that is adequate for more than 20 years. Eighty-three percent of the cities ranking water availability as a top priority have established water supply plans (even though the supply may be inadequate after 20 years), and 13 percenr have no water supply plans for the future.

Sixty-nine percent of the cities that do not have adequate water supplies for more than 20 years have made major capital investments in water supply infrastructure between 2000 and 2004 (Table 12). However, 31 percent have not made capital commitments in new water supply infrastructure. More than half (54.8 percent) of the cities with an adequate water supply beyond 20 years have made major capital investments in new water supply infrastructure between 2000 and 2004.

A similar pattern is observed for the period 2005 to 2009 for planned investment (Table 12). Roughly 71 percent of cities without an adequate water supply after 20 years are planning to make major capital investments in water supply infrastructure. More than half (56.6 percent) of the cities with an adequate water supply beyond 20 years are planning major capital investments in new water supply infrastructure between 2005 and 2009.

Table 12
Adequacy of Current Water Supply And Major Capital Investments in Water Supply Infrastructure Between 2000 and 2004

Adequacy Water Supply	Not Investing In Water Supply Infrastructure (% of Cities)	Investing in Water Supply Infrastructure (% of Cities)
	2000–2004*	
10 Years or Less	6.3	13.9
20 Years or Less	5.5	12.6
Greater than 20 Years	27.3	34.4
	2005–2009**	
10 Years or Less	5.8	15.7
20 Years or Less	5.2	12.5
Greater than 20 Years	26.4	34.4

* Actual investment based on 366 cities
** Planned investment based on 344 cities

Water Conservation Information, Issues and Priorities

Two-thirds of the survey cities indicated they had water conservation plans in place. A higher proportion of large cities (about 80 percent) indicated they had programs; while the proportion of smaller cities with programs was lower (58.6 percent). Water conservation departments as discrete units of local government are relatively rare (11.1 percent). About half of the survey cities use some percent of automated meters; and the average percent of automated meters in the cities that employed them was 38.4 percent but ranged from less than 1 percent to 100 percent. Traditional water meters remain the most common technique, employed by 72.5 percent of the survey cities. However, 68.8 percent of the cities indicared they would consider modernizing with automared water merers if they could save water or money.

A high proportion (82.8 percent) of survey cities that indicated water supply availability was a priority issue had water conservation plans. The vast majority of these cities use traditional water meters (80.7 percent); less than half of them (46.8 percent) use automated water meters and about half of them (50.5 percent) alter water rate structures to improve billing and/or conserve water. Three-quarters of these cities indicated they would consider modernizing their Survey cities that have made or are planning major capital investments in water supply infrastructure are more likely to have established water conservation plans (Table 13). During the period 2000 to 2004, cities were three times more likely to have water conservation programs where water supply infrastructure investments were made. Cities planning to make major capital investments in water supply infrastructure for the period 2005 to 2009 are nearly four times as likely to have an established water conservation program. Even where cities did not plan a water supply infrastructure investment, they were slightly more likely to have established water conservation plans.

Table 13
Cities with Water Conservation Programs and Make or Plan Major Capital Investments in Water Supply Infrastructure Between 2000 and 2004 and 2005 and 2009

Has Water Conservation Plan	Not Investing In Water Supply Infrastructure (% of Cities)	Investing in Water Supply Infrastructure (% of Cities)
	2000–2004*	
Yes	23.5	45.3
No	16.9	14.3
	2005–2009**	
Yes	21.5	48.9
No	17.1	12.5

* Actual Investment Based on 391 cities
** Planned Investment Based on 368 cities

Survey cities that have made or are planning major capital investments in water supply infrastructure are less likely to alter water rate structures to achieve water conservation (Table 14). There are two uncertainties concerning these figures that impact how one interprets these findings. First, the survey information does not include knowledge of whether or not altering rate structures in the past significantly reduced the volume of water use. Therefore, it is difficult to say whether the design volume of the water supply infrasrructure involved was affected by altering the rate structure. Indeed, the design volume could he driven by population growth, an expanding local/regional economy, or other important factors. Second, cities planning major capital investment in the period 2005 to 2009 may begin altering water rate structures as a conservation measure, and that mechanism may be part of the overall water supply plan.

While the number of cities altering water rate structures is fairly constant over the three population size categories, the proportion of cities employing the technique is clearly related to increasing population size (Table 15). Almost half of the larger cities use the technique, while only about 40 percent of medium size cities and about 30 percent of smaller size cities do.

Table 14
Cities that Alter Water Rate Structures and Make or Plan Major Capital Investments in Water Supply Infrastructure Between 2000 and 2004 and 2005 and 2009

Alters Water Rate Structure	Not Investing in Water Supply Infrastructure (% of Cities)	Investing in Water Supply Infrastructure (% of Cities)
	2000–2004*	
Yes	11.7	25.7
No	26.3	36.3
	2005–2009**	
Yes	11.5	27.9
No	25.4	35.2

* Actual Investment Based on 369 cities
** Planned Investment Based on 347 cities

Table 15
Cities that Alter Water Rate Structures and Population Size*

Alters Water Rate Structure	% of Small Cities	% of Medium Cities	% of Large Cities
Yes	29.1	39.5	48.4
No	70.9	60.5	51.5
Number of Cities (NOT %)	158	124	95

* Based on 377 cities

ATTACHMENT A

URBAN WATER RESOURCES SURVEY
The United States Conference of Mayors Urban Water Council
January 10, 2005

STATEMENT OF SURVEY PURPOSE

The U.S. Conference of Mayors' Urban Water Council (UWC) is gathering information on water infrastructure, water supply/conservation, and water resource problems. The information we hope you provide will help us develop public policy positions, and help us focus priorities on the activities pursued by the UWC to aid local government.

RESPONDENT INFORMATION

Mayor: ____________________
Water Authority Coordinator: ____________________
Address: ____________________
____
Phone: ____________________
Fax: ____________________
E-mail: ____________________

PART I: Water and Wastewater Infrastructure

	% of Cities	
1) Does your City own a drinking water treatment facility?	65.9 Yes	34.1 No
2) Does your City operate a drinking water treatment facility?	63.5 Yes	36.5 No
3) Does your City own a wastewater treatment facility?	57.5 Yes	42.5 No
4) Does your City operate a wastewater treatment facility?	50.1 Yes	49.9 No

5) Has your City made a major capital investment in the last five years in any of the following infrastructure categories?

	% of Cities		
Water supply	56.8 Yes	40.1 No	3.1 No Response
Water distribution system	77.3 Yes	21.0 No	1.7 No Response
Water treatment plant	51.9 Yes	44.0 No	4.1 No Response
Wastewater treatment plant	51.2 Yes	43.7 No	5.1 No Response
Wastewater collection system	66.7 Yes	27.3 No	6.0 No Response

6) If yes, was that capital investment financed by: (check all that apply)

% of Cities

- 25.8 General obligation bonds
- 41.3 Revenue bonds
- 0.7 Private Activity Bonds
- 34.3 State Revolving Fund
- 45.2 Otber

7) If the State Revolving Loan Fund was used, did it comprise:

% of Cities

- 5.3 10 % or less of the total project cost
- 2.9 20 % or less of the total project cost
- 6.5 50 % or less of the total project cost
- 20.8 more than 50 % of the total project cost

8) Does your City plan to make a major capital investment in the next five years in any of the following infrastructure categories?

	% of Cities		
Water supply	54.6 Yes	36.0 No	9.4 No Response
Water distribution system	72.7 Yes	21.7 No	5.6 No Response
Water treatment plant	45.6 Yes	45.4 No	9.0 No Response
Wastewater treatment plant	48.5 Yes	42.0 No	9.5 No Response
Wastewater collection system	64.3 Yes	28.7 No	7.0 No Response

9) If yes, will that capital investment be financed by: (check all that apply)

% of Cities

24.9 General obligation bonds
44.7 Revenue bonds
1.2 Private Activity Bonds
34.3 State Revolving Fund
46.6 Other

10) If the State Revolving Loan Fund will be used, will it comprise:

% of Cities

6.5 10 % or less of the total project cost
6.3 20 % or less of the total project cost
4.8 50 % or less of the total project cost
19.1 more than 50 % of the total project cost

11) If your City does not rely on the State Revolving Fund Loan program to finance water or wastewater facility capital investment please state why.

____

____

12) Would your City consider a Public-Private Partnership approach to water infrastructure projects if cost-savings in operation and maintenance or construction can be achieved?

% of Cities

53.2 Yes 29.7 No 17.1 NR

PART II: Water Supply Information

	% of Cities		
1) Does your City provide its own water supply?	66.2 Yes	32.1 No	1.7 NR
2) Does your City rely on a private company to provide its water supply?	18.9 Yes	76.8 No	4.3 NR
3) Does your City have a water supply plan?	74.2 Yes	20.5 No	5.3 NR

4) Does your City have an adequate water supply for the next:

% of Cities

18.3 10 years
16.7 20 years
55.6 more than 20 years
9.4 No Response

	% of Cities		
5) Does your city's water supply come from ground water?	51.7 Yes	42.3 No.	6.0 NR
6) Does your city's water supply come from surface water?	70.3 Yes	24.4 No.	5.3 NR
7) Does your City plan to switch from ground water to surface water supply?	6.8 Yes	68.8 No.	24.4 NR

8) If yes, why are you switching?______________________________

PART III: Water Conservation Information

	% of Cities		
1) Does your City have a water conservation program?	66.9 Yes	30.2 No	2.9 NR
2) Does your City have a water conservation department?	11.1 Yes	85.3 No	3.6 NR
3) Does your water supply include water conservation?	59.9 Yes	33.6 No	6.5 NR
4) Does your City use automated water meter reading?	50.2 Yes	43.7 No	6.1 NR
5) Does your City use traditional water meter reading?	72.5 Yes	19.3 No	8.2 NR
6) Does your City alter the water rate structure to achieve water conservation?	34.3 Yes	57.2 No	8.5 NR
7) Would your City consider modernizing with automated meter reading if it could save water or money?	68.6 Yes	10.6 No	20.8 NR

8) Other water conservation measures? ____________________

PART IV: General Water Resources Problems and Priorities

Here are some water resources issues. Please indicate whether each issue is an existing problem or a forecast problem for your community: (Please mark applicable problems in the box [X] below and rank all that apply the top five problems (1–5) with 1 being the most significant in the line ___ below, please do not assign same rankings).

% of Cities	
46.4	Water supply availability
16.2	Inter-basin transfers
23.4	Groundwater depletion
25.1	Water rights
38.4	Flooding
32.6	Drought management
26.8	Regional conflict about water use
8.5	Water transportation (channels, ports, dredging, etc.)
45.2	Permits, regulatory issues
6.8	Neglected/decaying waterfront areas
10.6	Loss of river corridors/greenspace
10.4	Loss of wetlands
7.5	Beach/shoreline erosion

% of Cities	
34.3	Emergency planning and management for storms, hurricanes, etc
60.6	Aging water resources infrastructure
54.6	Security/protection of water resources infrastructure
3.9	Insufficient water-oriented recreation
19.6	Sediment management
11.6	Endangered species
13.0	Best practices technology transfer
42.3	Water quality of urban streams and rivers
3.4	Waterborne traffic
4.8	Channel/Harbor adequacy
9.7	Other (specify below)

ATTACHMENT B

List of Cities Responding to the Survey

Survey City	State	Population
Anchorage	AK	260,283
Auburn	AL	42,987
Bessemer	AL	29,672
Birmingham	AL	242,820
Dothan	AL	57,737
Florence	AL	36,264
Huntsville	AL	158,216
Montgomery	AL	201,568
Fortsmith	AR	80,268
Little Rock	AR	183,133
North Little Rock	AR	60,433
Springdale	AR	45,798
Avondale	AZ	35,883
Chandler	AZ	176,581
Gilbert	AZ	109,697
Mesa	AZ	396,375
Scottsdale	AZ	202,705
Tucson	AZ	486,699
Alameda	CA	72,259
Alhambra	CA	85,804
Aliso Viejo	CA	45,000
Anaheim	CA	328,014
Bellflower	CA	72,878
Beverly Hills	CA	33,784
Brea	CA	35,410
Buena Park	CA	78,282
Campbell	CA	38,138
Cerritos	CA	51,488
Chino	CA	67,168
Compton	CA	93,493
Concord	CA	121,780
Fairfield	CA	96,178
Folsom	CA	51,884
Fresno	CA	427,652
Gardena	CA	57,746

Survey City	State	Population
Glendora	CA	49,415
Hanford	CA	41,686
Hawthorne	CA	84,112
Hayward	CA	140,130
Hemet	CA	58,812
Inglewood	CA	112,580
La Habra	CA	58,974
La Mesa	CA	54,749
La Mirada	CA	46,783
La Verne	CA	31,638
Lakewood	CA	79,345
Los Angeles	CA	3,694,820
Lynwood	CA	69,845
Manteca	CA	49,258
Modesto	CA	188,856
Norwalk	CA	103,298
Oxnard	CA	170,358
Pasadena	CA	133,936
Pittsburg	CA	56,769
Pomona	CA	149,473
Porterville	CA	39,615
Rancho Palos Verdes	CA	41,145
Redlands	CA	63,591
Redondo Beach	CA	63,261
Redwood City	CA	75,402
Rialto	CA	91,873
Richmond	CA	99,216
Rocklin	CA	36,330
Salinas	CA	151,060
San Bernardino	CA	185,401
San Clemenete	CA	49,936
San Diego	CA	1,223,400
San Francisco	CA	776,733
San Jose	CA	894,943
San Mateo	CA	92,482
Santa Barbara	CA	92,325
Santa Clarita	CA	151,088

Survey City	State	Population
Santa Cruz	CA	54,593
Santa Maria	CA	77,423
Santa Monica	CA	84,084
Seaside	CA	31,696
Simi Valley	CA	111,351
South San Francisco	CA	60,552
Stockton	CA	243,771
Sunnyvale	CA	131,760
Temple City	CA	33,377
Thousand Oaks	CA	117,005
Torrance	CA	137,946
Ventura	CA	100,916
Vernon	CA	91
Vista	CA	89,857
Walnut Creek	CA	64,296
Whittier	CA	83,680
Arvada	CO	102,153
Colorado Springs	CO	360,890
Grand Junction	CO	41,986
Littleton	CO	40,340
Longmont	CO	71,093
Thornton	CO	82,384
Bridgeport	CT	139,529
Manchester	CT	54,740
Norwalk	CT	82,951
Stamford	CT	117,083
Trumbull	CT	34,243
West Haven	CT	52,360
Dover	DE	32,135
Wilmington	DE	72,664
Altamonte Springs	FL	41,200
Clearwater	FL	108,787
Coconut Creek	FL	43,566
Coral Springs	FL	42,249
Deerfield Beach	FL	64,583
Doral	FL	3,295
Dunedin	FL	35,691

Survey City	State	Population
Fort Lauderdale	FL	152,397
Hallandale Beach	FL	34,282
Hialeah	FL	226,419
Holly Hill	FL	12,119
Jupiter	FL	39,328
Key West	FL	25,478
Lakeland	FL	78,452
Largo	FL	69,371
Lauderlakes	FL	31,705
Melbourne	FL	71,382
North Miami Beach	FL	40,786
Orlando	FL	185,951
Pembroke Pines	FL	137,427
Pinellas Park	FL	45,658
Plantation	FL	82,934
Port St. Lucie	FL	88,769
Sarasota	FL	52,715
St. Petersburg	FL	248,232
Tallahassee	FL	150,624
Tamarac	FL	55,588
Tampa	FL	303,447
West Palm Beach	FL	82,103
Athens	GA	101,489
Atlanta	GA	416,474
Augusta	GA	199,775
Dekalb	GA	39,018
Roswell	GA	79,334
Savannah	GA	131,510
Wailuku	HI	12,296
Cedar Rapids	IA	120,758
Iowa City	IA	62,220
Sioux City	IA	85,013
Waterloo	IA	68,747
Coeur d'Alene	ID	34,514
Pocatello	ID	51,466
Addison	IL	35,914
Alton	IL	30,496

Survey City	State	Population
Arlington Heights	IL	76,031
Bartlett	IL	36,706
Belleville	IL	41,410
Berwyn	IL	54,016
Bolingbrook	IL	62,948
Calumet City	IL	39,071
Carpentersville	IL	30,586
Champaign	IL	67,518
Chicago	IL	2,896,016
Decatur	IL	81,860
Evanston	IL	74,239
Glen Ellyn	IL	26,999
Glencoe	IL	8,762
Glendale Heights	IL	31,765
Hanover Park	IL	38,278
Highland Park	IL	31,365
Lansing	IL	28,332
Lombard	IL	42,322
Moline	IL	43,768
Naperville	IL	128,358
Niles	IL	30,068
Northbrook	IL	33,435
Oak Brook	IL	8,702
Orland Park	IL	51,077
Park Ridge	IL	37,775
Quincy	IL	40,366
Rock Island	IL	39,684
Rockford	IL	150,115
Schaumnurg	IL	75,386
Tinley Park	IL	48,401
Villa Park	IL	22,075
Wheaton	IL	55,416
Wilmington	IL	5,134
Carmel	IN	37,733
Columbus	IN	39,059
East Chicago	IN	32,414
Elkhart	IN	51,874
Evansville	IN	121,582

Survey City	State	Population
Gary	IN	102,746
Indianapolis	IN	791,926
Marion	IN	31,320
Michigan City	IN	32,900
Kansas City	KS	146,866
Manhattan	KS	44,831
Overland Park	KS	149,080
Topeka	KS	122,377
Frankfort	KY	27,741
Amesbury	MA	16,450
Amherst	MA	34,874
Chicopee	MA	54,653
Everett	MA	38,037
Fall River	MA	91,938
Fitchburg	MA	39,102
Haverhill	MA	58,969
New Bedford	MA	93,768
Pittsfield	MA	45,793
Quincy	MA	88,025
Somerville	MA	77,478
Weymouth	MA	53,988
Worcester	MA	172,648
Annapolis	MD	35,838
Gaithersburg	MD	52,613
Hagerstown	MD	36,687
Bangor	ME	31,473
Lewiston	ME	35,690
Ann Arbor	MI	114,024
Dearborn	MI	97,775
Detroit	MI	951,270
Farmington Hills	MI	82,111
Flint	MI	124,943
Grosse Pointe Woods	MI	17,080
Jackson	MI	36,316
Lansing	MI	119,128
Muskegon	MI	40,105
Novi	MI	47,386
Pontiac	MI	66,337

Survey City	State	Population
Southgate	MI	78,296
Taylor	MI	65,868
Brooklyn Park	MN	67,388
Burnsville	MN	60,220
Duluth	MN	86,918
Minnetonka	MN	51,301
Plymouth	MN	65,894
Richfield	MN	34,439
Woodbury	MN	46,463
Kansas City	MO	441,545
St. Peters	MO	51,381
Biloxi	MS	50,644
Jackson	MS	184,256
Meridian	MS	39,968
Billings	MT	89,847
Butte	MT	34,606
Asheville	NC	68,889
Cary	NC	94,536
Charlotte	NC	540,828
Durham	NC	187,035
Gastonia	NC	66,277
Goldsboro	NC	39,043
Greensboro	NC	223,891
Kannapolis	NC	36,910
Salisbury	NC	26,462
Wilson	NC	44,405
Winston-Salem	NC	185,776
Fargo	ND	90,599
Bellevue	NE	44,382
Grand Island	NE	42,940
Lincoln	NE	225,581
Manchester	NH	107,006
Bayonne	NJ	61,842
Bloomfield	NJ	47,683
Fair Lawn	NJ	31,637
Freehold	NJ	31,537
North Bergen	NJ	58,092
Piscataway	NJ	50,482

Survey City	State	Population
Sayreville	NJ	40,377
Trenton	NJ	85,403
Vineland	NJ	56,271
Wayne	NJ	54,069
Turnersville	NJ	3,867
Alamogordo	NM	35,582
Clovis	NM	32,667
Las Cruces	NM	74,267
Los Lunas	NM	10,034
Rio Rancho	NM	51,765
Sante Fe	NM	62,203
Las Vegas	NV	478,434
Reno	NV	180,480
Albany	NY	95,658
Binghamton	NY	47,380
Endwell	NY	61,179
Freeport	NY	43,783
Hempstead	NY	56,554
Huntington	NY	195,289
Long Beach	NY	35,462
Mount Vernon	NY	68,381
New York City	NY	8,008,278
North Tonawanda	NY	33,262
Rochester	NY	219,773
Schenectady	NY	61,821
Syracuse	NY	147,306
Troy	NY	49,170
Akron	OH	217,074
Bedford Heights	OH	11,375
Canton	OH	80,806
Cleveland	OH	478,403
Cleveland Heights	OH	49,958
Columbus	OH	711,470
Dublin	OH	31,392
East Cleveland	OH	27,217
Fairborn	OH	30,529
Garfield Heights	OH	30,734
Hamilton	OH	60,690

Survey City	State	Population
Huber Heights	OH	38,212
Kettering	OH	57,502
Lancaster	OH	35,335
Lima	OH	40,081
Loveland	OH	11,677
Mansfield	OH	49,346
Marion	OH	35,318
Newark	OH	46,279
North Olmsted	OH	34,113
Shaker Heights	OH	29,405
Solon	OH	21,802
Springfield	OH	65,358
Stow	OH	32,139
Toledo	OH	313,619
University Heights	OH	14,146
Upper Arlington	OH	33,686
Warren	OH	46,832
Westerville	OH	35,318
Westlake	OH	31,719
Broken Arrow	OK	74,859
Lawton	OK	92,757
Norman	OK	95,694
Oklahoma City	OK	506,132
Albany	OR	40,852
Bend	OR	52,029
Eugene	OR	137,893
Hillsboro	OR	70,186
Allentown	PA	106,632
Erie	PA	103,717
Fairless Hills	PA	8,365
Glenshaw	PA	29,757
Harrisburg	PA	48,950
Lower Paxton	PA	44,424
Reading	PA	81,207
Township of Lower Merion	PA	59,850
Upper Darby	PA	81,821
York	PA	40,862
Caguas	PR	40,502

Survey City	State	Population
Canovanas	PR	43,335
Cidra	PR	42,753
Corozal	PR	36,867
Hormigueros	PR	16614
Lajas	PR	26,261
Lares	PR	34,415
Trujillo Alto	PR	75,728
Cumberland	RI	31,840
Pawtucket	RI	72,958
Warwick	RI	85,808
Woonsocket	RI	43,224
Bartlett	TN	40,543
Germantown	TN	37,348
Johnson City	TN	55,469
Murfreesboro	TN	68,816
Beaumont	TX	113,866
Bryan	TX	65,660
Carrollton	TX	109,576
College Station	TX	67,890
Coppell	TX	35,958
Copperas Cove	TX	29,592
Corpus Christi	TX	277,454
Desoto	TX	37,646
Duncanville	TX	36,081
Euless	TX	46,005
Frisco	TX	33,714
Galveston	TX	57,247
Grand Prairie	TX	127,427
Grapevine	TX	42,058
Houston	TX	1,953.631
Hurst	TX	36,273
Irving	TX	191,615
Laredo	TX	176,575
Lewisville	TX	77,737
Longview	TX	73,344
Mission	TX	45,408
Nacogdoches	TX	29,914
Pearland	TX	37,640
Pharr	TX	46,660

Survey City	State	Population
Plano	TX	222,030
Round Rock	TX	61,136
Sugar Land	TX	63,328
Texas City	TX	41,521
Murray City	UT	34,024
Salt Lake City	UT	181,743
Sandy City	UT	88,418
Chesapeake	VA	199,184
Manassas	VA	35,135
Newport News	VA	180,150
Richmond	VA	197,790
Alexandria	VA	128,283
Danville	VA	48,411
Norfolk	VA	234,403
Suffolk	VA	63,677
Edmonds	WA	39,515
Everett	WA	91,488
Federal Way	WA	83,259
Kent	WA	79,524
Lacey	WA	31,226
Puyallup	WA	33,011
Redmond	WA	45,256
Renton	WA	53,840
Seattle	WA	563,374
Tacoma	WA	193,556
Vancouver	WA	143,560
Yakima	WA	71,845
Beloit	WI	35,918
Brookfield	WI	38,649
Kenosha	WI	90,352
La Crosse	WI	51,818
Manitowoc	WI	34,053
Milwaukee	WI	596,974
Racine	WI	81,855
Waukesha	WI	64,825
Wausau	WI	38,426
Wauwatosa	WI	47,271
Parkersburg	WV	33,099
Cheyenne	WY	53,011

The Urban Water Council

A Task Force of the U.S. Conference of Mayors

The UWC is open to all Mayors, and functions like a USCM task force. It provides Mayors with a forum for discussion of issues impacting how cities provide and protect community water and wastewater services. Some of the issues that the UWC focuses on include: watershed management; water supply planning; water infrastructure financing; rehabilitation of surface and sub-surface water infrastructure; water conservation; wetlands construction and education programs; water system program management and asset management.

The UWC will continue to develop local government positions on federal legislation, regulations and policy. The UWC acts through the USCM Environment Committee and other Committees, as appropriate, to propose and adopt resolutions on water related matters that benefit the nation's cities.

THE URBAN WATER COUNCIL

The Urban Water Council acts as a task force for the U.S. Conference of Mayors

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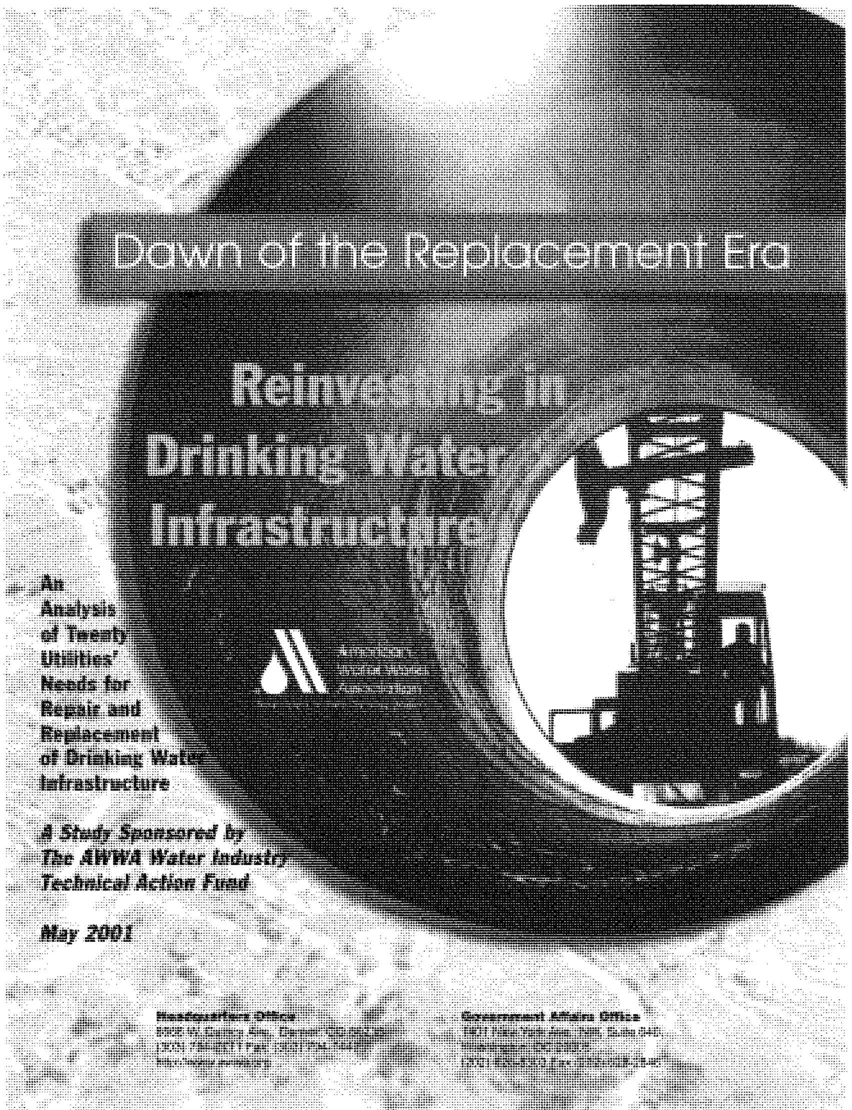

Dawn of the Replacement Era
Reinvesting in Drinking Water Infrastructure
An Analysis of Twenty Utilities' Needs for Repair and Replacement of Drinking Water Infrastructure
A Study Sponsored by The AWWA Water Industry Technical Action Fund
May 2001
American Water Works Association
Headquarters Office
Government Affairs Office

Reinvesting in Drinking Water Infrastructure

Dawn of the Replacement Era

TABLE OF CONTENTS

Reinvesting in Drinking Water Infrastructure

Dawn of the Replacement Era

EXECUTIVE SUMMARY

The importance of safe drinking water to public health and the nation's economic welfare is undisputed. However, as we enter the 21st Century, water utilities face significant economic challenges. For the first time, in many of these utilities a significant amount of buried infrastructure—the underground pipes that make safe water available at the turn of a tap—is at or very near the end of its expected life span. The pipes laid down at different times in our history have different life expectancies, and thousands of miles of pipes that were buried over 100 or more years ago will need to be replaced in the next 30 years. Most utilities have not faced the need to replace huge amounts of this infrastructure because it was too young. Today a new age has arrived. We stand at the dawn of the replacement era.

Extrapolating from our analysis of 20 utilities, we project that expenditures on the order of $250 billion over 30 years might be required nationwide for the replacement of worn-out drinking water pipes and associated structures (valves, fittings, etc). This figure does not include wastewater infrastructure or the cost of new drinking water standards. Moreover, the requirement hits different utilities at different times and many utilities will need to accelerate their investment. Some will see rapidly escalating infrastructure expenditure needs in the next 10–20 years. Others will find their investment decisions subject to a variety of factors that cause replacement to occur sooner or at greater expense, such as urban redevelopment, modernization, coordination with other city construction, increasing pipe size, and other factors.

Overall, the findings confirm that replacement needs are large and on the way. There will be a growing conflict between the need to replace worn-out infrastructure and the need to invest in compliance with new regulatory standards under the Safe Drinking Water Act. In addition, the concurrent demands for investment in wastewater infrastructure and compliance with new Clean Water Act regulations, including huge needs for meeting combined sewer overflow (CSO) and stormwater requirements, will compete for revenue on the same household bill.

Ultimately, the rate-paying public will have to finance the replacement of the nation's drinking water infrastructure either through rates or taxes. AWWA expects local funds to cover the great majority of the nation's water infrastructure needs and remains committed to the principle of full-cost recovery through rates. However, many utilities may face needs that are large and unevenly distributed over time. They must manage a difficult transition between today's level of investment and the higher level of investment that is required over the long term. Facing an inexorable rise in infrastructure replacement needs driven by demographic forces that were at work as much as 100 years ago, compounded by the negative effects of changing demographics on per-capita costs in center cities, many utilities face a significant challenge in keeping water affordable for all the people they serve.

Meeting this challenge requires a new partnership in which utilities, states, and the federal government all have important roles. Utilities need to examine their rate structures to assure long-term viability. States need to streamline their programs. And the federal government needs to significantly increase assistance for utilities.

To better understand this problem, the American Water Works Association undertook studies of 20 large and medium utilities. The findings and recommendations of this report provide the basis for this new partnership to achieve the goal to which we all aspire—the provision of safe and affordable drinking water for all Americans.

Findings:

- Water utilities must make a substantial reinvestment in infrastructure over the next 30 years. The oldest cast iron pipes, dating to the late 1800s, have an average life expectancy of about 120 years. Because of changing materials and manufacturing techniques, pipes laid in the 1920s have an average life expectancy of about 100 years, and pipes laid in the post-World War II boom can be expected to last about 75 years. The replacement bill for these pipes will be hard on us for the next three decades and beyond.
- Most utilities are just now beginning to face significant investments for infrastructure replacement. Indeed, it would have been economically inefficient to make large replacement investments before now. The utilities we studied are well managed and have made the right decisions. But the bills are now coming due, and they loom large.
- On average, the replacement cost value of water mains is about $6,300 per household in today's dollars in the relatively large utilities studied. If water treatment plants, pumps, etc., are included, the replacement cost value rises to just under $10,000 per household, on average.
- Demographic shifts are a significant factor in the economics of reinvestment. In some older cities, the per-capita replacement value of mains is more than three times higher than the average in this sample due to population declines since 1950.
- By 2030, the average utility in the sample will have to spend about three and a half times as much on pipe replacement due to wear-out as it spends today. Even so, the average utility will also spend three times as much on repairs in that year as it spends today, as the pipes get older and more prone to breakage.
- The water utilities studied concurrently face the need to replace infrastructure and upgrade treatment plants to comply with a number of new regulations to be implemented under the Safe Drinking Water Act. Many municipalities also face significant needs for investments in wastewater infrastructure and compliance. This concurrent demand significantly increases the financial challenge they face.
- Overall, in the 20 utilities studied, infrastructure repair and replacement requires additional revenue totaling about $6 billion above current spending over the next 30 years. This ranges from about $550 per household to almost $2,300 per house-

hold over the period. These household impact figures do not include compliance with new regulations or the cost of infrastructure replacement and compliance for wastewater.

- The pattern and timing of the need for additional capital will be different in each community, depending on its demographically driven replacement "wave."
- Household impacts will be two to three times greater in smaller water systems ($1,100 to $6,900 per household over 30 years) due to disadvantages of small scale and the tendency for replacement needs to be less spread out over time.
- Because of demographic changes, rate increases will fall disproportionately on the poor, intensifying the challenge that many utilities face keeping water affordable to their customers.

Recommendations:

America needs a new partnership for reinvesting in drinking water infrastructure. There are important roles at all levels of government.

1) Measures by Utilities and Local Governments

Although the AWWA analysis has looked at the infrastructure issue in the aggregate, many key issues must be addressed at the local utility level. Utilities should develop a comprehensive local strategy that includes:

- Assessing the condition of the drinking water system infrastructure.
- Strengthening research and development
- Working with the public to increase awareness of the challenge ahead, assess local rate structures, and adjust rates where necessary.
- Building managerial capacity.

2) Reform of State Programs

The states too have an important role to play in addressing our infrastructure funding needs. States may need to match an appropriate share of any new federal funds that are provided for infrastructure assistance. Moreover, states need to reform their existing programs to make them more effective. States should commit to:

- Respecting the universal eligibility of all water systems for federal assistance.
- Streamlining their programs for delivery of assistance and allow alternative procurement procedures that save money.
- Making their financing mechanisms more attractive by committing to grants and very low or negative interest loans.
- Using federal funds in a timely fashion or face the reprogramming of those funds to other states.

3) A Significant Increase in Federal Assistance

The federal government has a critical role to play in preventing the development of a gap in water infrastructure financing. AWWA recommends either changing and expanding the existing Drinking Water State Revolving Fund and other drinking water programs, or creating a new, infrastructure-focused fund. The federal role should include:

- Significantly increased federal funding for projects to repair, replace, or rehabilitate drinking water infrastructure.
- An increase in federally supported research on infrastructure management, repair and replacement technologies.
- Steps to increase the availability and use of private capital.

Reinvesting in Drinking Water Infrastructure

Dawn of the Replacement Era

Introduction

The importance of safe drinking water to the nation's public health and economic welfare is undisputed. About 54,000 community drinking water systems provide drinking water to more than 250 million Americans. By keeping water supplies free of contaminants that cause disease, our public water systems reduce sickness and related health costs as well as absenteeism in the workforce. By providing safe and sufficient supplies of water, America's public water systems create direct economic value across nearly every sector of the economy and every region of the country. However, significant economic changes are confronting the water profession as we enter the 21st Century. The new century poses new challenges in sustaining the infrastructure—particularly the underground pipes—that provides the broad public benefits of clean and safe water.

Recognizing that we are at the dawn of a major change in the economics of water supply, the American Water Works Association (AWWA) has undertaken an analysis of the infrastructure challenge facing utilities. The project involved correlating the estimated life of pipes with actual operations experience in a sample of 20 utility systems geographically distributed throughout the nation (see Figure 1). Projecting future investment needs for pipe replacement in those utilities yields a forecast of the annual replacement needs for a particular utility, based on the age of the pipes and how long they are expected to last in that utility. This analysis graphically portrays the nature of the challenge ahead of us. It also serves as the foundation for AWWA's call for a new national partnership to address the looming need to reinvest in our drinking water infrastructure.

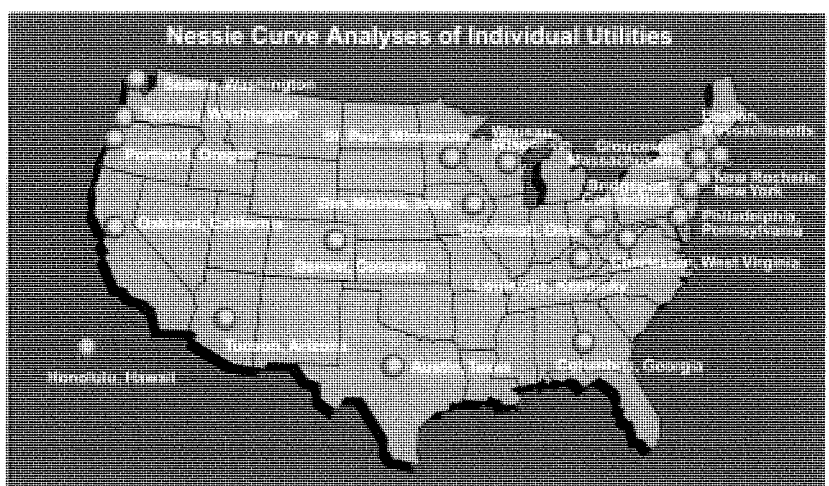


Figure 1

Pipes are expensive, but invisible.

Most people do not realize the huge magnitude of the capital investment that has been made to develop the vast network of distribution mains and pipes—the infrastructure—that makes clean and safe water available at the turn of a tap. Water is by far the most capital intensive of all utility services, mostly due to the cost of these pipes, water infrastructure that is literally a buried treasure beneath our streets. But buried means out of sight. And as the old saying goes, out of sight means out of mind. Moreover, most of our pipes were originally installed and paid for by previous generations. They were laid down during the economic booms that characterized the last century's periods of growth and expansion. So not only do we take these pipes for granted because we can't see them, we also take them for granted because, for the most part, we didn't pay for them initially. What's more, they last a long time (some more than a century) before they cost us very much in maintenance expense near the end of their useful lives or ultimately need replacement. For the most part, then, the huge capital expense of the pipes is a cost that today's customers have never had to bear. It has always been there, but it's always been invisible to us.

The original pattern of water main installation from 1870 to 2000 in 20 utilities analyzed by AWWA is graphically presented in Figure 2. This graph reflects the total cost in current dollars of replacing the pipes laid down between 1870 and 1998 in the 20 utilities studied. It is a reflection of the development of these utilities, and in turn, mirrors the overall pattern of population growth in large cities across the country. There was an 1890s boom, a World War I boom, a roaring '20s boom, and the massive post-World War II baby boom.

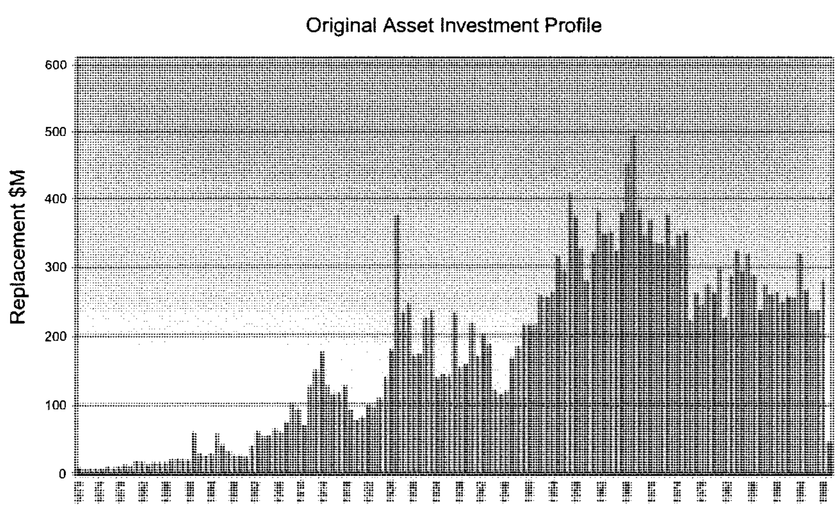


Figure 2

The cumulative replacement cost value of water main assets (that is, the cost of replacing water mains in constant year 2000 dollars) has increased steadily over the last century in our sample of 20 utilities. In aggregate across our sample of utilities, the replacement value of water mains in today's dollars is about $6,300 per household. If water treatment plants, pumps, etc., are included, this figure rises to just under $10,000 per household. This is more than three times what it was in 1930 in constant dollar terms. The difference is not due to inflation; rather, there is simply more than three times as much of this infrastructure today as there was in 1930, in order to support improved service standards and the changing nature of urban development.

In general, then, there is a lot more water infrastructure in place today on a per-capita basis, implying an increased per-capita share of the liability for replacing these assets as they wear out. This invisible replacement liability has been accumulating gradually over several generations of water system customers, managers and governing boards. They have not had to recognize this liability because the bill was not yet due. For many utilities, board/council/commission relationships and customer relationships have developed in recent decades in the absence of a recognized need for significant investment in replacing the utility's assets as they age and wear out.

Pipes are hearty, but ultimately mortal.

The oldest cast iron pipes—dating to the late1800s—have an average useful life of about 120 years. This means that, as a group, these pipes will last anywhere from 90 to 150 years before they need to be replaced, but on average they need to be replaced after they have been in the ground about 120 years. Because manufacturing techniques and materials changed, the roaring '20s vintage of cast-iron pipes has an average life of about 100 years. And because techniques and materials continued to evolve, pipes laid down in the Post-World War II boom have an average life of 75 years, more or less. Using these average life estimates and counting the years since the original installations shows that these water utilities will face significant needs for pipe replacement over the next few decades.

The modern public water supply industry has come into being over the course of the last century. From the period known as the "Great Sanitary Awakening," that eliminated waterborne epidemics of diseases such as cholera and typhoid fever at the turn of the last century, we have built elaborate utility enterprises consisting of vast pipe networks and amazing high-tech treatment systems. Virtually all of this progress has been financed through local revenues. But in all this time, there has seldom been a need to provide for more than modest amounts of pipe replacement, because the pipes last so very long. We have been on an extended honeymoon made possible by the long life of the pipes and the fact that our water systems are relatively young. Now that honeymoon is over. From now on and forevermore, utilities will face significant requirements for pipe repair, rehabilitation, and replacement. Replacement of pipes installed from the late1800s to the 1950s is now hard upon us, and replacement of pipes installed in the latter half of the 20th Century will dominate the remainder of the 21st.

We believe that we stand today at the dawn of a new era—the replacement era—for water utilities. Over the next three decades, utilities will be in an adjustment period during which they will incorporate the costs of pipe replacement in routine utility spending. This will require significant adjustments in utility revenues. The magnitude of the need and the invisibility of that need to the person on (top of) the street will make this a particularly challenging adjustment. The need for significantly greater investment in pipe replacement is all the more difficult to convey because it was never there before. It's hard to explain why it's going to cost more to do the same job in the future than it cost in the past.

Many water systems all across America have seen this day coming and have already begun to ramp up their expenditures on pipe rehabilitation and replacement. But for many utilities this problem is just emerging and is enormous in scope. For them the water supply business will never be the same.

Back to the future: pipe replacement needs are a "demographic echo."

To understand the nature and scope of the emerging infrastructure challenge, AWWA undertook an analysis of 20 utilities throughout the nation. The analysis projects future investment needs for pipe replacement in the 20 utilities and provides a forecast called a "Nessie Curve." The Nessie Curve is a graph of the annual replacement needs in a particular utility, based on when pipes were installed and how long they are expected to last in that utility before it becomes economically efficient to replace them. There are, of course, a number of factors that can require the replacement investment to be made earlier. In many cities, for example, there are urban redevelopment efforts or similar major construction projects that could require up-sizing or other modernization of the pipe network before the pipes reach the end of their useful lives.

Data on repair and replacement needs for each of the 20 cities in our sample is presented in Appendix A. This information is presented for each city as a "Nessie Curve," that is, a projection of the city's economically efficient investment in pipe repair and replacement, based on the city's original pipe installation profile and how long the pipes last in that utility. The aggregate Nessie Curve for all 20 utilities is presented in Figure 3. The rising wave shape suggests why the curve is named after the Loch Ness Monster.

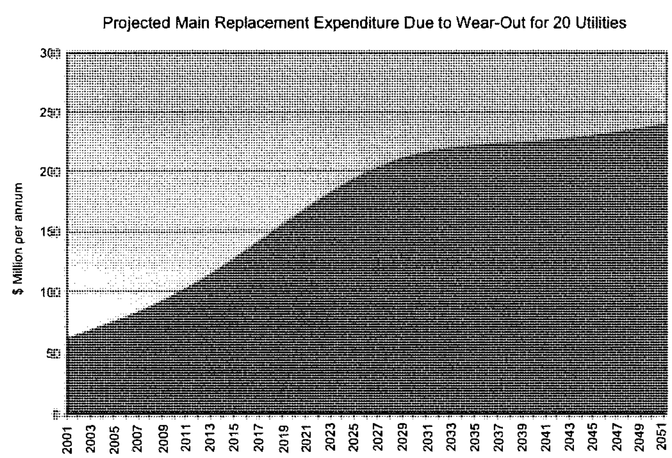


Figure 3

The Nessie Curve reflects an "echo" of the original demographics that shaped a particular utility. It is very similar to the echo of demographics that predicts future liabilities for the Social Security Trust Fund. Indeed, this is exactly the same type of problem that faces Social Security. Historical demographic trends—in our case, pipes laid down as long as a century ago—created a future financial obligation that is now coming due. By modeling the demographic pattern and knowing the life expectancy of the pipes, we can estimate the timing and magnitude of that obligation.

Just as in Social Security, a threat to affordability arises when there were powerful demographic and economic trends at work originally, but the liability arrives at a later time when the demographic and economic conditions have changed. In the water business, the challenge is magnified by pipes that last through several generations of customers before they need to be replaced.

Reflecting the pattern of population growth in large cities over the last 120 years, the Nessie Curves in Appendix A forecast investment needs that will rise steadily like a ramp, extending throughout the 21st Century. The curves show that replacement expenditures will have to rise steadily for the next 30 years. By 2030, the utilities in our sample of 20 will have to spend on average over three-and-a-half times as much per year as they do now (in constant dollars) to replace pipes that have reached the end of their economic lives. Some of the utilities in our sample will encounter the steepest part of the incline in the first 10 years. Others will encounter most of the rise over 20 years, while some will experience a sustained increase over 30 years.

Of course, every city has a different demographic history. In addition, numerous local factors will affect the life of a utility's pipes and therefore its Nessie Curve. Each utility has a unique set of circumstances and therefore a different set of infrastructure funding challenges in the future. Nonetheless, demographics will produce the same type of lagged replacement schedule in any major city.

If that were not enough of a challenge, there is an important corollary. As pipe assets age, they tend to break more frequently. But it is not cost-effective to replace most pipes before, or even after, the first break. Like the old family car, it is cost-efficient for utilities to endure some number of breaks before funding complete replacement of their pipes.

Considering the huge wave of aging pipe infrastructure created in the last century, we can expect to see significant increases in break rates and therefore repair costs over the coming decades. This will occur even when utilities are making efficient levels of investment in replacement that may be several times today's levels. In the utilities studied by AWWA, there will be a three-fold increase in repair costs by the year 2030 despite a concurrent increase of three and a half times in annual investments to replace pipes.

It is important to note that a Nessie Curve is a prediction, not a destiny. That is, a utility can choose to manage its infrastructure replacement needs in various ways. For example, the utility may accept increased break repair costs up to a point and delay the replacement of an old pipe, rehabilitate certain pipes to "buy time," or adopt other asset management techniques to extend the life of the pipes as long as possible. Nevertheless, it appears inevitable that many utilities will face substantial increases in infrastructure investments over the next 30 years, to replace pipes laid down as long as 120 years ago.

A final observation from our sample of 20 Nessie Curves is that the large "demographic wave" of replacement needs is only just now upon us. We are just now at the time when there is a compelling need to significantly increase the levels of replacement spending in most utilities. Importantly, there is no evidence that utilities are "behind the curve" or that America is in ruins. That is not the nature of the challenge. We are not faced with making up for a historical gap in the level of replacement funding. In fact, break rates in our sample of 20 utilities are within a range that is considered representative of best management practices for water utilities, indicating that the utilities have made efficient decisions and managed well up to this point. The challenge is ramping up utility budgets to prevent a "replacement gap" from developing in the near future. Unfortunately, keeping up with replacement needs is about to get a lot harder than ever before, and it's going to stay that way. We are coming face-to-face with a serious challenge that could become a crisis if we ignore it.

Water infrastructure is local and therefore vulnerable to demographic changes.

Water utilities are the last natural monopolies. The large investment required in pipe networks makes it impossible to have more than a single provider of water service within a given area. These large investments are also a major source of financial vulnerability for water utilities as the result of the very fixed nature of the assets and the very mobile nature of the customers. When populations grow, the infrastructure is expanded, but when people move away, the pipe assets and the liability for repair and replacement remain behind, creating a financial burden on the remaining customers.

Figure 4 is a plot of U.S. Census population data for Philadelphia from 1850 to 1996. Over the 100 years from 1850 to 1950, the population grew from 100,000 to 2 million people. But from 1950 to the end of the century, Philadelphia lost 25 percent of its population, dropping to 1.5 million. This picture tells a story that was replicated again and again

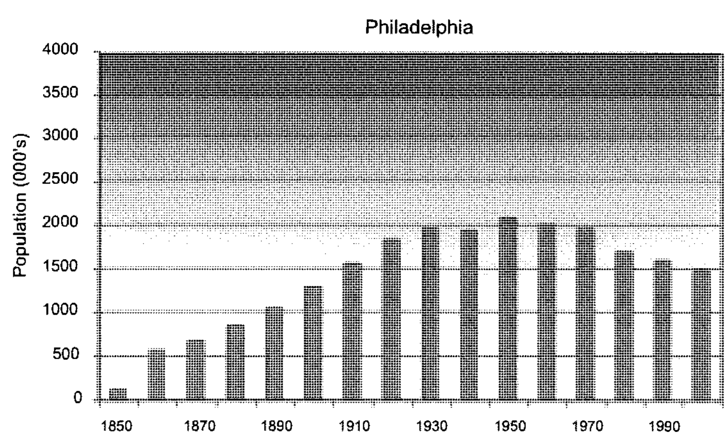


Figure 4

throughout the Rustbelt cities of the Northeast and Midwest. The effect is to significantly increase the burden of replacement funding on the remaining residents of the city.

As previously discussed, the average per-capita value of water main assets in place today across our sample of 20 utilities is estimated to be three times the amount that was present in 1930. In Philadelphia, however, that ratio is almost eight times the value in 1930 due to population declines since about 1950. This problem, known as "stranded capacity" (essentially, capital facilities that are not matched by rate revenue from current customers), is typical of Rustbelt demographics and adds considerably to the challenge of funding replacement in these cities.

Urban demographic history also explains many other dimensions of the infrastructure replacement challenge facing the water industry. Both gains and losses in urban populations created small system infrastructure problems in their wake. During the first half of the 20th Century, many of the people swelling the populations of the urban centers came from smaller rural towns, leaving small water system infrastructure behind to struggle with fewer customers. In the latter half of the century, the departure of big city residents for the suburbs fueled an explosion of new, small water systems in suburban areas. Today about half of all small water systems are within Standard Metropolitan Statistical Areas defined by the U.S. Census. Built in boom times, many of these suburban systems were not built to enduring standards, creating another liability. When these systems are absorbed by larger metropolitan systems, it is commonly necessary to completely rebuild them.

The pattern reflected in Sunbelt cities is the other side of the story from that in the Rustbelt. These cities are experiencing rapid growth and expansion which places capital financing demands upon them that are truly the opposite side of the coin. When water utilities are expanding, they must build some of the most expensive components—new source development, storage facilities, transmission mains, and treatment plants—in advance of population growth in order to serve people when they arrive. This is, in effect, another form of stranded capacity—capital facilities that must be paid for despite the fact the customers are not yet in place. Investor-owned utilities are, in fact, generally prohibited by state regulatory commissions from recovering such costs in rates.

Demographic change thus places financial strain on all our public water systems. It is the same whether they are large or small; urban or rural or suburban; and Rustbelt or Sunbelt. The inescapable fact is that water infrastructure is fixed while populations are mobile. The result is a form of "market failure"—an adverse side effect of market activity that creates an unfunded liability. America derives tremendous economic strength from the fact that it has a highly mobile labor force. When people move around, however, there are costs imposed on the local water infrastructure. It is the same whether it is people moving from rural towns to the city, from the city to the suburbs, or from the Rustbelt to the Sunbelt. Our labor mobility imposes a significant cost on water utilities on both the giving end and the receiving end of this market process, while the benefits are generally disseminated throughout the national economy.

Replacement of water treatment plants is also coming due.

Replacement of water treatment assets presents a different picture from that of the pipes, but greatly complicates infrastructure funding for utilities. Major investments in water and wastewater treatment plants were made in several waves following the growing understanding of public health and sanitary engineering that evolved during the 20th Century. Of course, the installation pattern of treatment assets also reflects major population growth trends. But whereas pipes can be expanded incrementally to serve growth, treatment must be built in larger blocks. Investments in treatment thus present a more concentrated financing demand than investments in pipes.

Treatment assets are also much more short-lived than pipes. Concrete structures within a treatment plant may be the longest lasting elements in the plant, and may be good for 50 to 70 years. However, most of the treatment components themselves typically need to be replaced after 25 to 40 years or less. Replacement of treatment assets is therefore within the historical experience of today's utility managers. Even so, many treatment plants built or overhauled to meet EPA standards over the last 25 years are too young to have been through a replacement cycle. Many are about due for their first replacement in the next decade or so.

The concurrent need to finance replacement of pipes and of treatment plants greatly increases the challenge facing utilities. Figure 5 presents a Nessie Curve showing both pipe replacement and treatment replacement needs for the Bridgeport Hydraulic Company. Similar Nessie curves for a number of other utilities are included in Appendix A.

The distinguishing characteristic of this graph is the manner in which spending for the replacement of pipes rises like a ramp over the first part of the century, pushing up the overall level of annual expenditure required. Whereas pipe repair and replacement are generally funded out of current revenues, treatment costs are typically debt-financed. As

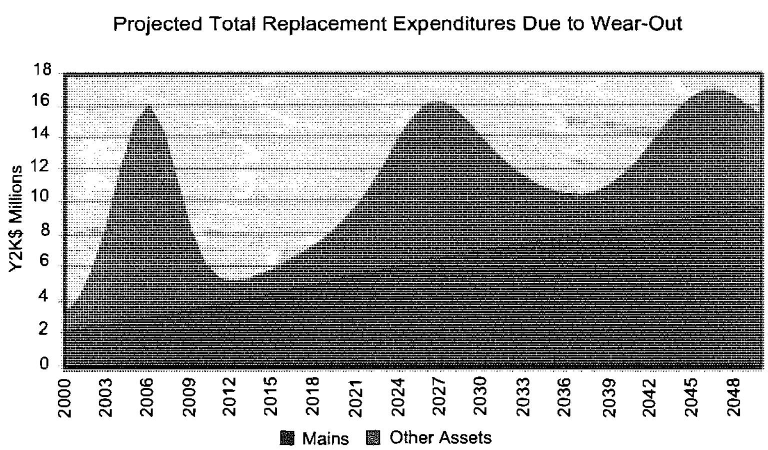


Figure 5

utilities face ever rising costs for repair and replacement of pipes, more and more of the utility's rate revenue will be required for those investments. This will leave the utility with increasingly weakened credit every time it gets to another "treatment hump," unless rates can be raised to match the slope of the curve. A final point to note about the treatment cost estimates used in developing Figure 5 and others like it in Appendix A is that these do not include the cost of new drinking water regulations likely to be implemented over the coming decades.

Increased expenditures are needed to climb the ramp and avoid a gap.

The Water Infrastructure Network (WIN) has developed a "gap analysis" to estimate the total increased spending that is required by water and wastewater utilities in order to avoid getting behind in funding infrastructure replacement over the next 20 years.[1] The first step in the WIN estimate is accomplished by extrapolating from Census data on historical utility expenditures for 20 years into the future. The resulting baseline expenditure forecast is then examined to see how much it must be increased in order to meet new expenditure "needs" for both new EPA compliance requirements and infrastructure repair and replacement over the same 20-year period. The "gap" between the baseline expenditure forecast and the future "needs" forecast is the amount of additional expenditure that must be forthcoming in order for water and wastewater utilities to maintain their critical infrastructure in a healthy condition.

The findings of this "gap analysis" indicate that the baseline expenditures of water utilities must be increased by about $300 billion over 20 years to keep up with both compliance and infrastructure needs. In similar fashion, the baseline expenditure trend in wastewater utilities must be increased by about $400 billion to meet such needs. Taken together, and accounting for the cost of capital, WIN has estimated that water and wastewater utilities together need to increase their investments in infrastructure by almost $1 trillion over the next 20 years.

The WIN "gap analysis" is easily misunderstood. Many have interpreted it to mean that a trillion-dollar deficiency already exists. It is important to stress that the gap estimate represents the challenge ahead—the ramp that we must climb—in increasing utility expenditures in order to avoid such a deficiency. The AWWA Nessie Curve analysis of 20 utilities indicates that we are not now behind in maintaining our water infrastructure. There is no current crisis in these 20 utilities. Rather, they are challenged with finding significant additional funds over the next 30 years for investments in repair and replacement, in order to avoid getting behind.

Extrapolation from aggregate baseline trends, such as in the WIN gap analysis, is akin to "technical analysis" of the stock market using charts, graphs and trending techniques. Investment analysts typically like to supplement such "technical analysis" with "fundamental analysis" of the situation existing within individual companies. The AWWA Nessie Curve analysis provides this type of supplemental perspective on increased expenditure needs.

[1]Water Infrastructure Network (WIN), Clean & Safe Water for the 21st Century, April 2000.

As illustrated in Figure 5, the Nessie Curve analysis indicates that expenditures on infrastructure repair and replacement must be significantly ramped-up over a period extending from 2000 through 2030. The steep rise is shown to level off after that, but it does not go away. Expenditures will have to continue to climb, albeit more gradually, throughout most of the rest of the 21st Century. This shape is the signature pattern of the new replacement era that we have entered. It is not a short-term "hump" that we have to get over. The shape of the challenge is that of a sustained rise in expenditures. This period of ramping-up is going to be a period of significant adjustments.

The Nessie Curves of the individual utilities shown in Appendix A present wide-ranging needs for increased expenditure for replacement of pipes and treatment assets due to wear-out. In the 20 utilities studied, such needs total about $6 billion above current spending over the next three decades. On a household basis, needs range from $550 to $2,300 over 30 years. These figures do not include the prospective costs of numerous new SDWA regulations likely to be implemented over the coming decade, nor any costs from the wastewater or stormwater side of the urban utility business. Moreover, as seen in Appendix A, the utilities vary widely in the timing of these needs; some face sharp needs in the next 10 years, while others don't face their highest needs for 10 or 20 years. The slope and the "humpy" patterns of increasing capital requirements are unique to each utility.

Our sample of 20 utilities represents relatively large water utilities. On a per household basis, the total 20-year capital needs for replacement illustrated in our sample is about the same as that estimated by EPA for large water systems in their newly released Drinking Water Needs Survey.[2]

The EPA Drinking Water Needs Survey uses a site visit methodology and a large sampling program to document needs in small systems and is probably the best information available on small system needs. Extrapolating from EPA's estimated 20-year capital need for small systems, we project the total 30-year expenditure for infrastructure repair and replacement in small systems might be in a range of $1,490 per household to $6,200 per household.

The result of this "fundamental analysis" using Nessie Curves is not inconsistent with the order of magnitude of the need that WIN estimates to be facing water utilities ($300 billion over 20 years). Extrapolation from our 20 sets of Nessie Curves suggests that the need might be on the order of $250 billion nationally and extend over three decades. However, the Nessie Curve forecast is based on an assumption that pipes are left in the ground until their economic life is over. The reality in utility operation is that myriad other influences can cause the replacement need to arise sooner. These include urban redevelopment, modernization, coordination with other city construction schedules, increasing pipe size, and other factors.

[2] U.S. Environmental Protection Agency, 1999 Drinking Water Infrastructure Needs Survey (EPA 816-R-01-004), February 2001.

Addressing affordability is the heart of the challenge.

The central question for policy makers and utilities is whether the increased rate of infrastructure spending that utilities must face over the next 30 years can be financed by the utilities themselves at rates customers can afford. AWWA remains, committed to the principle that utilities should be self-sustaining through their rates. For many utilities, however, the degree of change involved in adapting to the dawning replacement era, the adverse effect of demographic change on per household costs, and the competing demand for investment in wastewater and other municipal services, will combine to present a significant affordability challenge.

There are two related dimensions to the affordability concern. First is the ability of utilities to finance the needed additional expenditures within their rates. Second is the impact of higher rates on households.

In developing this study, AWWA brought together a group of utility managers from across the country to discuss infrastructure issues. This group characterized the question from a local perspective as an "affordability gap" or a "reality gap" and defined it as "the difference between what you think you should be spending on infrastructure and what you or your customers can afford to spend in reality." This characterization of the problem reflects the difficulty of obtaining significant utility rate increases. Rate increases are best received when implemented gradually in a number of installments over several years. Unfortunately, the rate increases required to meet the challenges of pipe replacement that utilities now face cannot be smoothly implemented in many cases.

There is small likelihood that the $550 to $2,300 per household projected to be required for infrastructure repair and replacement in our 20 utilities over the next 30 years can be spread evenly or taken on gradually over that period. As illustrated in Appendix A, some Nessie curves present a steeper funding challenge and some present a gentler slope due to local variations in the historical demographic trends. There are "humps" on the up-ramp for replacement of treatment plants and other equipment. Additional "humpy" expenditures for compliance with anticipated new regulations are not included. In small systems, the estimated $1,490 to $6,200 range of household impact is likely to be even more concentrated since the original demographics were themselves more concentrated.

Compliance-driven requirements to replace treatment plants and invest to meet new mandates will also dominate expenditures and push aside the more subtle need for investments in pipe replacement. This is exacerbated by the fact that the costs of water and wastewater service appear on the same bill in most communities. Thus, the needs to replace wastewater treatment plants and to replace wastewater lines compete with drinking water needs for the same consumer dollar. Sewer pipes generally impose higher unit replacement costs than water pipes, owing to their inherent characteristics (size, depth, etc.). Figure 6 presents a Nessie curve for a combined water and wastewater utility showing replacement funding needs for both water and wastewater pipes and other assets (treatment, pumping, etc.). The figure illustrates the typical relationship between water supply and wastewater costs—wastewater facilities cost noticeably more to replace.

The combined repair and replacement needs for water and wastewater infrastructure amount to a significant financing challenge in their own right. But the cost of compliance

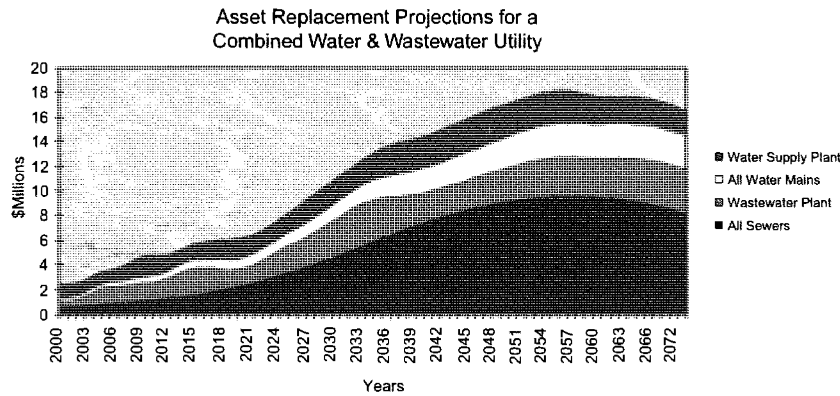


Figure 6

with combined sewer overflow (CSO) and stormwater regulations may dwarf everything else in water and wastewater utilities. The scale of the expenditure required in these programs may sweep everything else aside in some utilities, causing deferral of other needs and allowing a "gap" to open up. Note that CSO and stormwater compliance costs are not included in Figure 6.

To avoid an infrastructure gap, utilities are going to have to increase expenditures to keep up with both compliance requirements and infrastructure replacement. If rate increases do not keep pace with the increased rate of expenditures, the financial ratios used to evaluate a utility's creditworthiness will deteriorate, making it more difficult and more expensive to raise capital.

If a utility attempts to balance a deficiency in allowable rates by deferring infrastructure expenditures, then the stage is set for an infrastructure investment gap to begin to develop, creating a future liability for the utility and its customers. With the new accounting requirements being implemented under the Governmental Accounting Standards Board Statement No. 34 (GASB 34), such a deferral of infrastructure expenditures will be reported to the financial markets and begin to impair the utility's credit rating and ability to raise capital.

Since the Nessie Curve represents replacement timing based on the economic life of the pipes, it follows that deferral of replacement will produce higher overall costs due to increased repairs than would be the case if replacement occurred on time. If replacement is deferred too far beyond the economic trade-off point between replacement and repair costs, the repair cost burden will spiral upwards and have significant impacts on utility cash flows. Such a scenario will indeed impair a utility's ability to repay debt and will be made plain to the credit markets by the new GASB 34 requirements.

In either of these scenarios—rates that don't keep up with expenditures or expenditures that don't keep up with needs—the bottom line is the same. If both expenditures and rate revenues cannot be increased at the required rate, then the utility's credit may be impaired, and it may face even higher costs as a result. For some utilities, there is the potential for this to become a vicious cycle—a financial trap. These systemic financial risks are the reason why we have a clear and present need for an enhanced partnership between utilities, states and the federal government. We need to provide the means to assist utilities "up the ramp and over the humps." We need to minimize the credit risks utilities face over the next three decades as we make the adjustments in rates required to assure sustainability in the new replacement era.

The second, and all important, dimension of the affordability challenge is the bottom-line impact of increased water rates on household budgets. AWWA believes it is critical to avoid sudden and significant changes in rates that can induce "rate shock" among customers. The broader issue involved in rate shock ties back to the pivotal role of safe drinking water in promoting public health.

America has by far the safest drinking water in the world. Standards promulgated under the Safe Drinking Water Act aspire to the highest levels of technology and treatment optimization known to science. As we push farther into the limits of science and technology, we unavoidably encounter diminishing returns in terms of quantifiable health benefits at the same time that we must take on increasing marginal costs. Many new standards relate to very subtle health concerns that are difficult to substantiate and quantify. Yet, to be protective of health, there is a tendency to err on the side of safety, especially when the threats may relate to sensitive subpopulations such as children, the unborn, the elderly and the health-impaired.

This is where the issue of rate shock must be brought into focus as a public health concern. Whenever the sensitive subpopulations we are striving to protect are also among the low-income segment of the population and are forced to forego medical care or nutrition in order to pay their utility bills, we could be doing more harm than good. The fact that we are now entering a significantly more expensive replacement era in water infrastructure makes it all the more difficult to maintain the right balance in this aspect of public health. By some comparisons, it may appear that water is still cheap and there is room to increase water rates. But such comparisons are not relevant to low-income households. The only comparison that matters in these households is the size of the incremental increase. If it is large enough to trigger a budget substitution that negatively affects family health—for example, giving up a prenatal visit in order to pay a utility bill—then we may be losing ground.

Over the past decade, utilities have formed an increasingly closer partnership with EPA, states, the environmental community, the public health community and other groups to continue to make progress for public health despite significant scientific challenges. This partnership must now be broadened to address the financial challenges of infrastructure replacement in order to preserve the fruits of our labors in the public health arena.

RECOMMENDATIONS

Considering all of these facts, the American Water Works Association believes it is time for a new American partnership for clean and safe water. This partnership requires that all levels of government and utilities play a role in working through the significant challenges ahead. Specifically, we recommend:

1) Measures by Utilities and Local Governments

The infrastructure funding issue varies from place to place, reflecting the age, character and history of the community. Although AWWA has looked at the infrastructure issue in the aggregate, many key questions must be asked and answered at the local utility level. The development of a comprehensive local strategy can bring these elements into focus and create a new "reality" that will help make infrastructure repair and replacement more affordable. Such a comprehensive strategy includes:

- **Assessing the condition of the drinking water system infrastructure.** Over the last few decades, utilities around the world have been developing innovative new approaches to managing long-lived buried infrastructure. In North America and overseas, some utilities are already taking advantage of tools such as geographic information systems, using new information to advance the state of the art and aggressively managing infrastructure replacement. Planning tools can help identify and plan for needed investment decades in advance of the actual need for funds. We should learn from, adapt, and use such tools.
- **Strengthening research and development.** Although there is not likely to be a single "silver bullet" to solve infrastructure management problems, an impressive array of technological tools have been moving through the research and development process in recent years. Efforts to develop and deliver such tools should be strengthened.
- **Working with the public to increase awareness of the challenge ahead, assess local rate structures, and adjust rates as necessary.** For many years, water and wastewater utilities have been nicknamed "the silent service." Utilities have quietly provided an extremely reliable supply of high-quality water at relatively low rates compared to other public utilities and services. Partly as a result, a large number of utilities, particularly smaller ones, do not have appropriate rate structures. The 1996 SDWA requirement for Consumer Confidence Reports provides a vehicle for many utilities to take the first step in broadening their dialogue with customers and the public at-large. Comprehensive, focused, and strategic communications programs serve the dual function of providing consumers with important information about their water systems and building support for needed investments in infrastructure.
- **Building the managerial capacity of many water systems.** Congress took new steps in the 1996 SDWA Amendments to assure the institutional capacity of small systems applying for state revolving fund loans. Much more remains to be done in this area. EPA, in conjunction with water associations, could sponsor training programs on appropriate rate structures, designed specifically to deliver assistance to small systems in planning for full cost recovery through rates.

2) Reform of State Programs

The states, too, have an important role to play in addressing our infrastructure funding needs. States may need to match an appropriate share of any new federal funds that are provided for infrastructure assistance. Moreover, they need to reform their existing programs to make them more effective. For example, some states have not allowed larger systems to access the existing state revolving fund, or have excluded investor-owned systems. Some states encumber their revolving funds with nonproductive red tape, charge high loan origination and other fees, or charge loan rates that are equivalent to market rates. Some states preclude the use of alternate procurement methods that minimize infrastructure procurement costs. For example, the "design/build" process for infrustructure procurement has been documented to save 20–40% of construction costs for new treatment plants in some cases. Public procurement laws in many states, while not explicitly banning design/build, mandate a process that prevents its use where local authorities have determined it would be advantageous.

The result is that, in many states, revolving loan funds have not proved to be useful or attractive even to drinking water utilities desperately in need of capital. States should commit to:

- Respecting the universal eligibility of all water systems for federal assistance.
- Streamlining their programs for delivery of assistance and allowing alternative procurement procedures that save money.
- Making their financing mechanisms more attractive by committing to grants and very low or negative interest loans.
- Using federal funds in a timely fashion or facing the reprogramming of those funds to other states.

3) A Significant Increase in Federal Assistance

After accounting for the cost savings that can come from best practices in asset management, the development of new technologies, efforts to increase ratepayer awareness and support, and possible alternative compliance scenarios, for many utilities there is likely to remain a gap between the required expenditure increases and the practical ability to raise water rates. This gap could grow over the next few decades as infrastructure built in the late-1800s to mid-1900s must be repaired, replaced, and rehabilitated at the same time that we are trying to enhance the level of water treatment under the Safe Drinking Water Act (SDWA).

AWWA remains committed to the principle that utility operations should be fully supported by rates. In the long run, the objectives must be to manage the costs of replacing pipes and treatment plants and ensure financial sustainability through local rate structures. However, many utilities are going to face a period of adjustment in adapting to the new reality of the replacement era described in this report. Many utilities and their customers will need additional assistance in working through extraordinary replacement needs in the next 20 years.

The difference between drinking water utilities' current expenditures for infrastructure replacement and the needed level of expenditure is estimated by WIN to be about $11 billion per year over the next 20 years. If the federal government were to provide half the cost of this gap, the federal share of total utility spending would amount to under 12 percent of total utility spending. For comparison, the federal share of investment in roads, bridges, and airports is 80 percent.

To prevent the development of a gap in critical water infrastructure financing, AWWA recommends either changing and expanding the existing Drinking Water State Revolving Fund and other drinking water programs or creating a new, infrastructure-focused fund. Such a fund should provide:

- Significantly increased federal funding.
- Clear eligibility of projects to repair, replace, or rehabilitate drinking water infrastructure.
- Universal eligibility of all water systems, both public and investor owned, regardless of size.
- Ability to make grants or loans in any combination and to use other financing tools to leverage public and private capital.
- Reasonable terms and conditions such as demonstration of system viability and ability to repay a loan.
- Streamlined procedures for those accessing the funds.

Research is a critical component of a comprehensive federal program on infrastructure. Research stimulates the development of new techniques and unleashes American ingenuity. It offers the chance to save billions of dollars over the years to come through more efficient management, repair, and replacement technologies. The federal government should significantly increase its support for research on infrastructure management, repair and replacement technologies, methods for extending pipe life, and other means of advancing the art while lowering the cost of infrastructure management.

Finally, the federal government should take other important steps to better access and leverage public and private capital. Congress should consider:

- Development of a national water infrastructure financing bond bank similar to Fannie Mae.
- Tax code and other reforms to increase the availability and use of private capital. This could include steps such as the removal of constraints on private activity bonds, development of subsidized bond insurance, provision of federal loan guarantees, and improved investment tax credit incentives.

CONCLUSION

Considering when pipes were laid down in many water systems and how long they can be expected to last, it is clear that a new age—the replacement era—has arrived for water utilities. Over the next 30 years, infrastructure replacement needs will compete with compliance needs for limited resources. Clearly, infrastructure needs and compliance with the Safe Drinking Water Act can't be approached as separate issues, but need to be addressed together.

Only in the true spirit of a new partnership, as outlined in this report, can we think most broadly about these issues. Only in this spirit can we achieve the goals to which we all aspire: the provision of safe and affordable water to all Americans.

Reinvesting in Drinking Water Infrastructure

Dawn of the Replacement Era

APPENDIX A

20 Sets of Nessie Curves

This appendix presents results of infrastructure expenditure needs analyses conducted for 20 water utilities across the United States. The "Nessie Curve" technique employed in this study produces a forecast of water main and other asset repair and replacement expenditure requirements based on how those assets "wear out" over the course of their economic life. While this study has focused on projecting economically efficient replacement and repair costs from wear-out, there are other reasons why assets might be replaced sooner, such as needs relating to urban redevelopment, system improvements, coordination with other city construction, and increasing pipe size. The curves also focus only on existing assets and take no account of new assets needed to support growth or compliance with new SDWA regulations in the coming decades.

For each utility, results are summarized in several Nessie Curves illustrating different perspectives. For each utility there is an estimate of the total replacement cost value of the utility's assets in today's dollars. There is also an indication of whether the utility was studied with respect to mains only, or whether it was studied with respect to a wider range of assets (including treatment plants). In viewing the charts, it is important to remember whether the utility is an "apple" (mains only) or an "orange" (all assets).

The charts presented cover the next 50 years, primarily to better illustrate the characteristic shapes of the replacement "echo" while also identifying differences in the timing of major replacement requirements between the participating utilities. All values are constant year 2000 dollars. The forecasts assume zero inflation.

The first chart is entitled. "Projected Per Household Expenditures Due to Wear-Out (\$/hh/yr)." In this graph, the total cost for replacement and repair due to aging is projected over the next 50 years at the household level.

The second chart, entitled "Projected Total Expenditures Due to Wear-Out" is similar to the first chart, showing the relative requirements for replacement expenditures and repair expenditures for the assets studied in each utility, expressed in total dollar outlays for the utility.

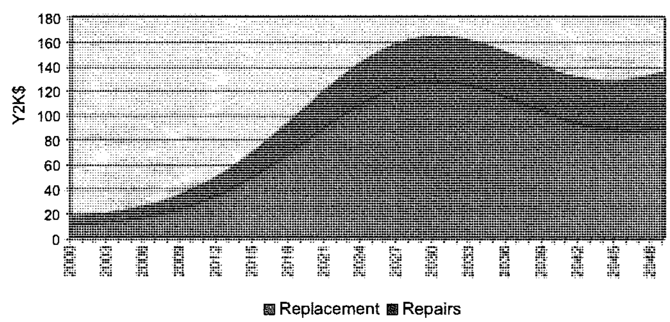
For the utilities that were studied with respect to all assets, there is a third chart on the page entitled, "Projected Total Replacement Expenditures Due to Wear-Out." This chart projects replacement investment only, showing the relative contributions to 50-year replacement needs of mains versus other assets (treatment, pumping, etc.). For utilities that were studied only with respect to mains, this third chart is omitted from the summary page for that utility.

Index of Nessie Curves

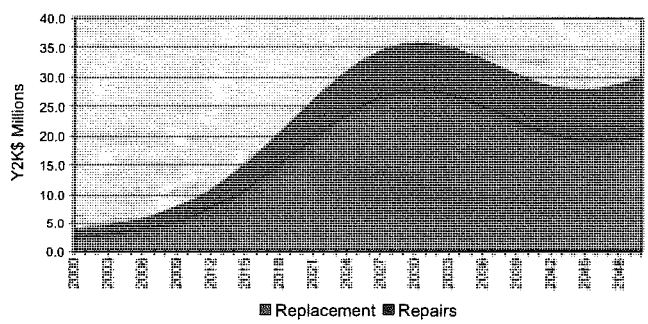
Austin, Texas

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $2,348 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



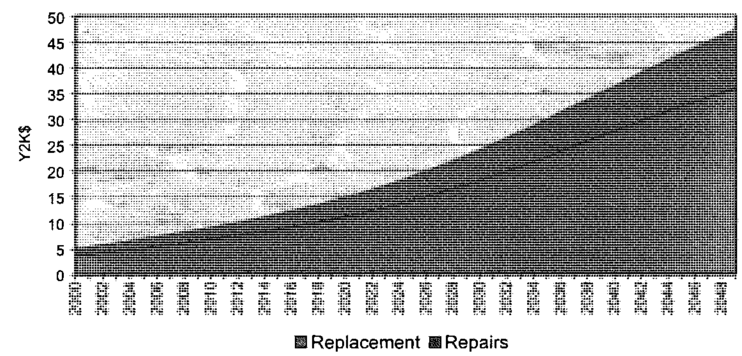
Projected Total Expenditures Due to Wear-Out



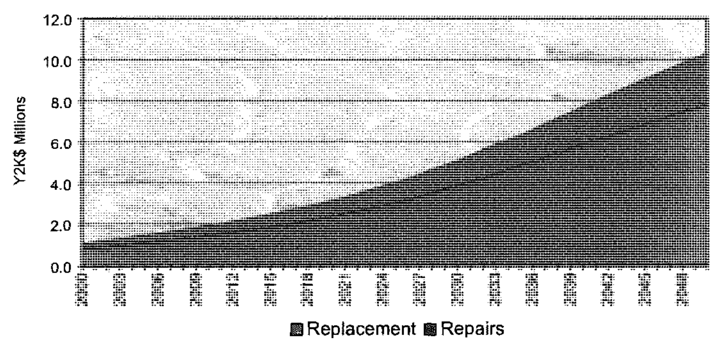
Boston, Massachusetts

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $694 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



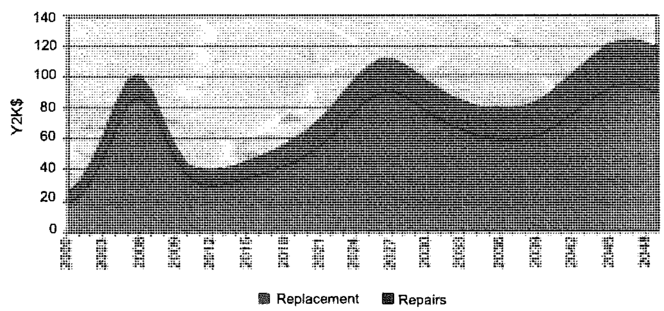
Projected Total Expenditures Due to Wear-Out



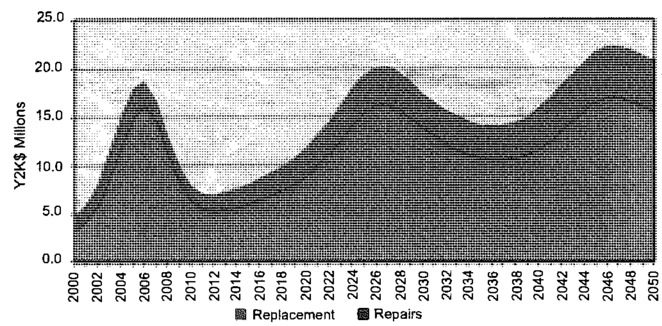
BHC, Bridgeport, Connecticut

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $1,663 M

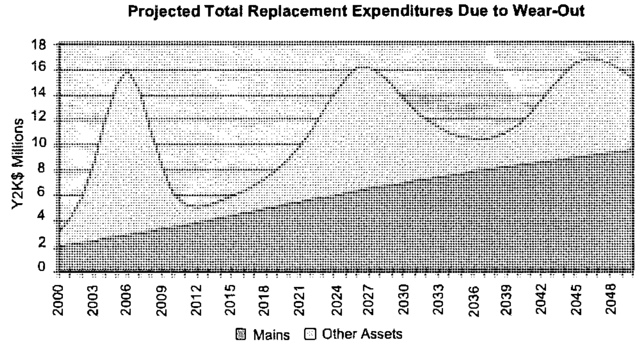
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



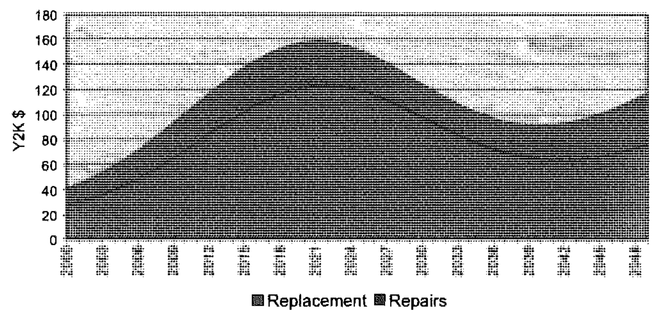
Projected Total Replacement Expenditures Due to Wear-Out



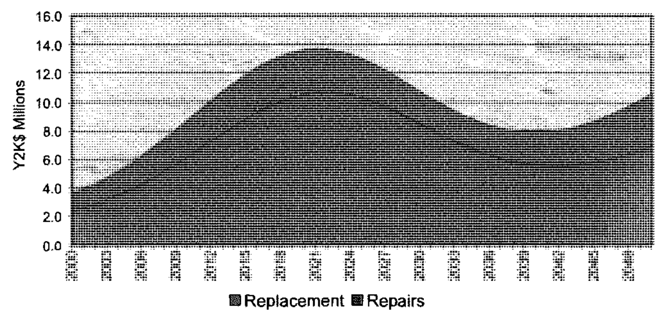
West Virginia American, Charleston, WV

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $650 M

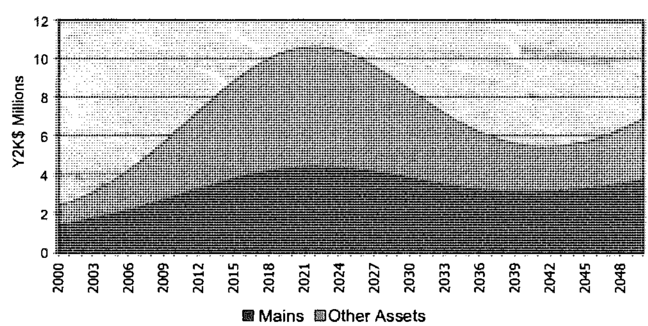
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



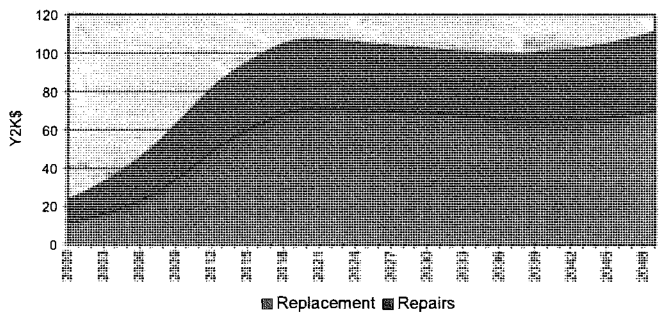
Projected Total Replacement Expenditures Due to Wear-Out



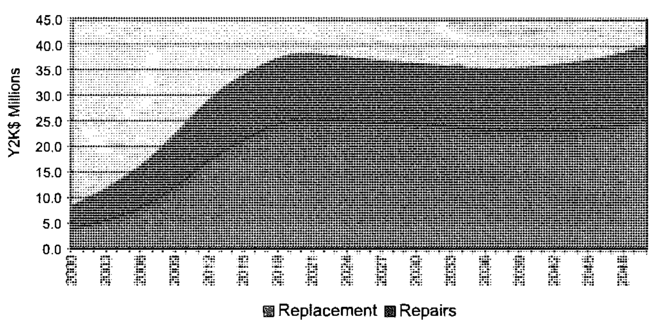
Cincinnati, Ohio

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $2,042 M

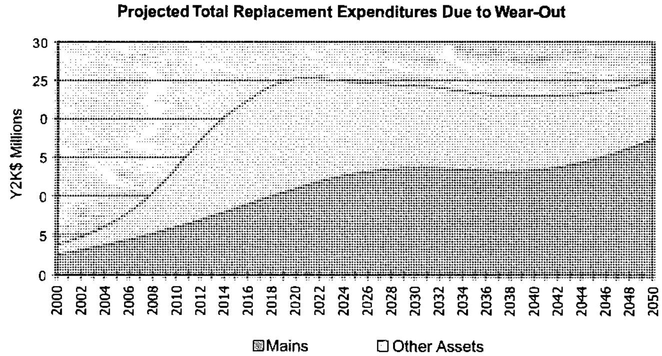
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



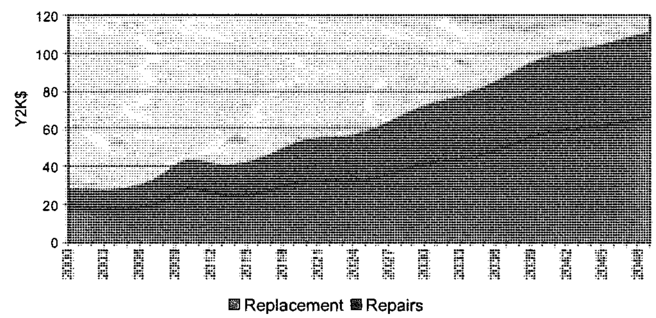
Projected Total Replacement Expenditures Due to Wear-Out



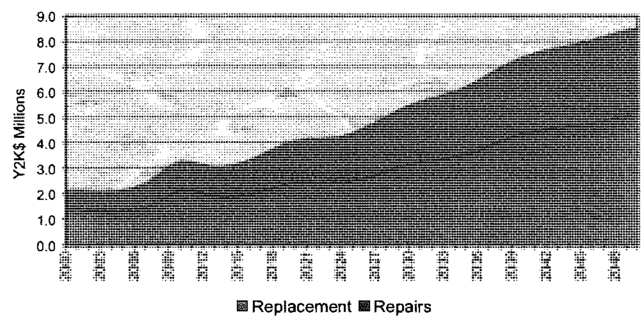
Columbus, Georgia

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $648 M

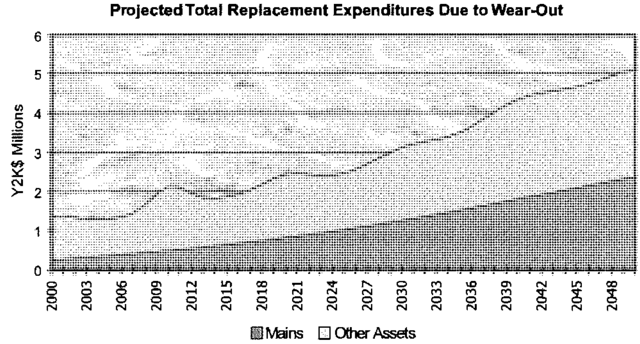
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



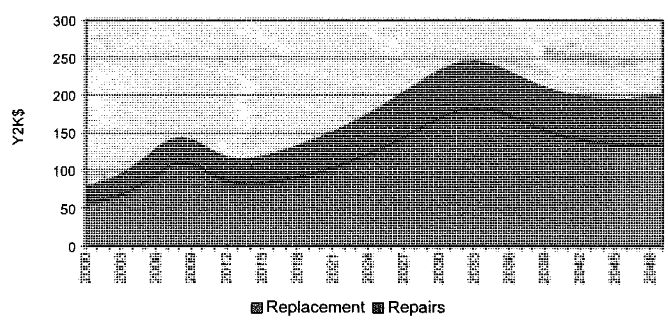
Projected Total Replacement Expenditures Due to Wear-Out



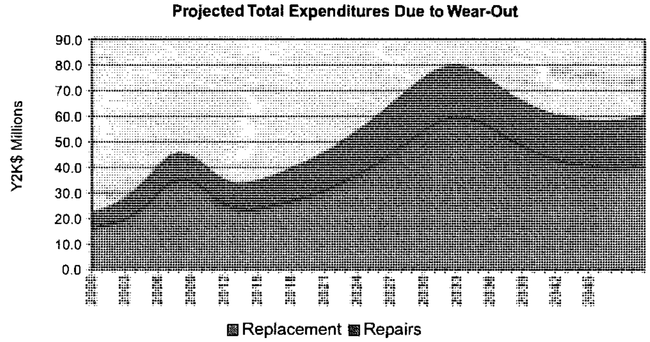
Denver, Colorado

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $5,583 M (Includes Major Dams)

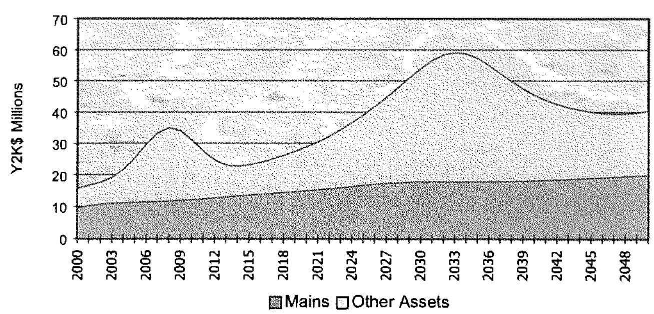
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out

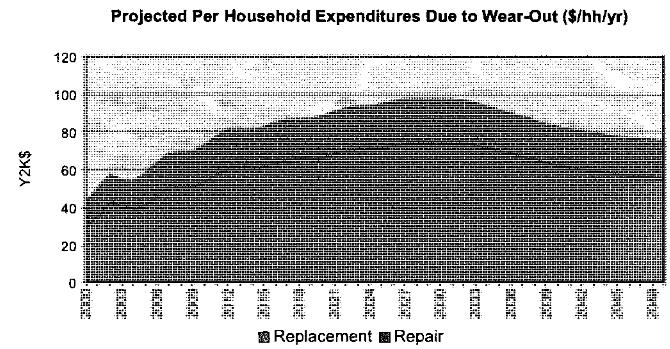


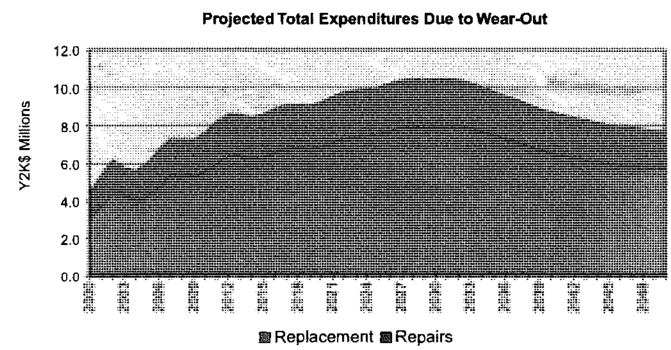
Projected Total Replacement Expenditures Due to Wear-Out

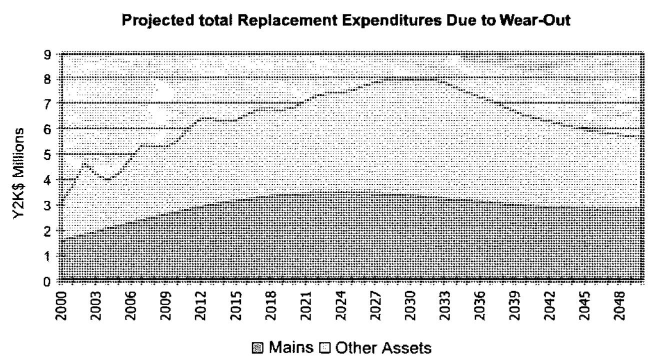


Des Moines, Iowa

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $524 M



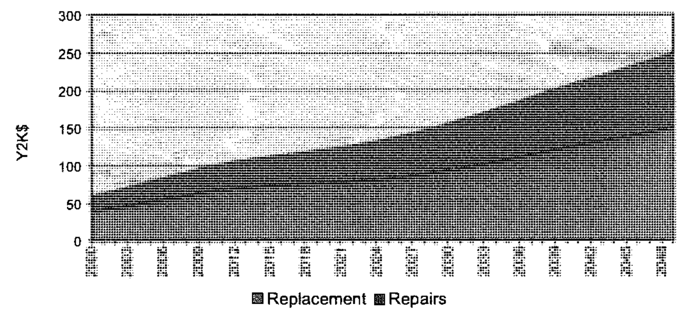




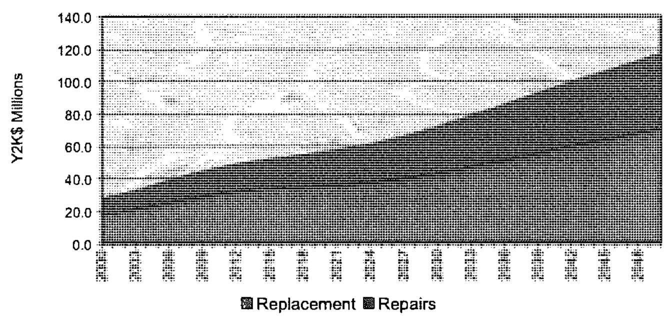
East Bay MUD, Oakland, California

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $8,110 M

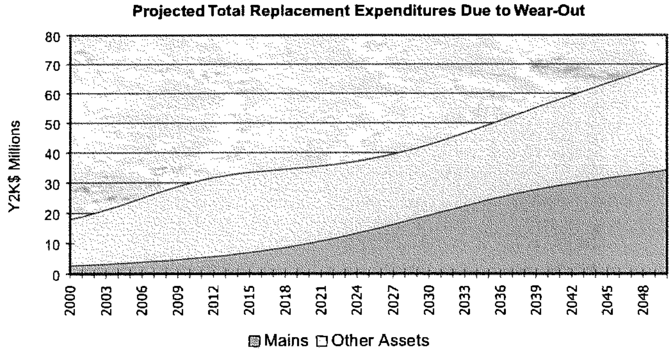
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



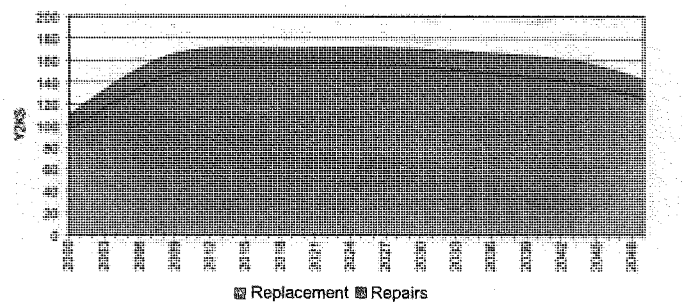
Projected Total Replacement Expenditures Due to Wear-Out



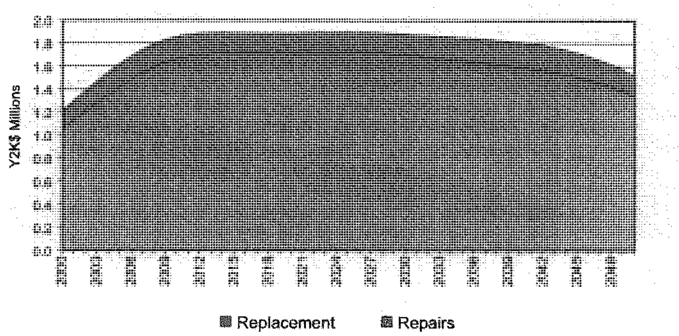
Gloucester, Massachusetts

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $116 M

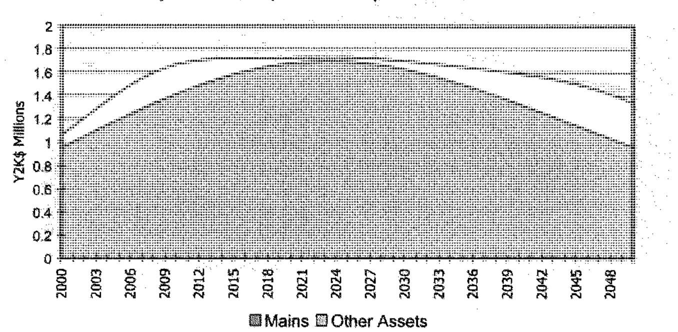
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out

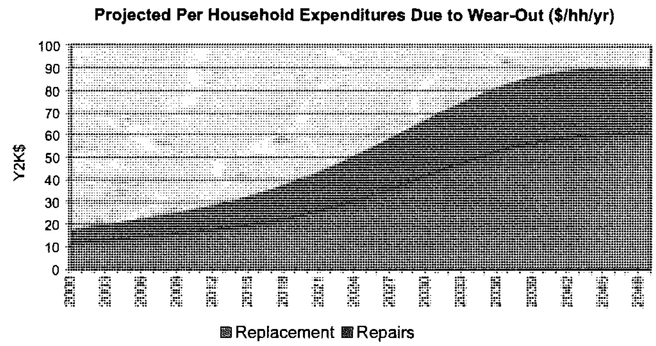


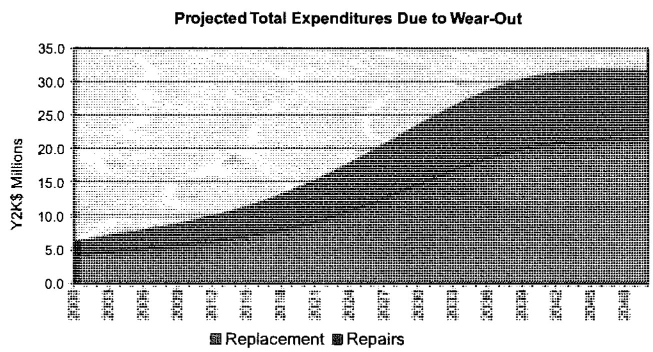
Projected Total Replacement Expenditures Due to Wear-Out

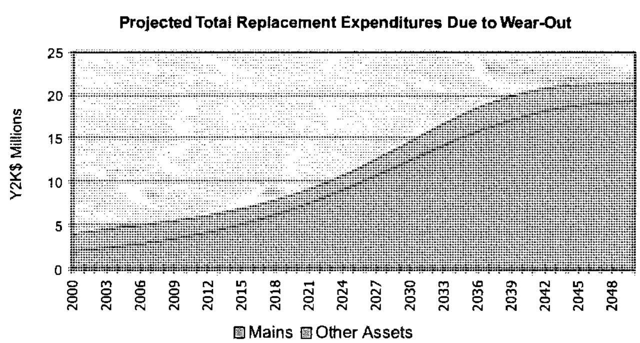


Honolulu, Hawaii

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $1,272 M



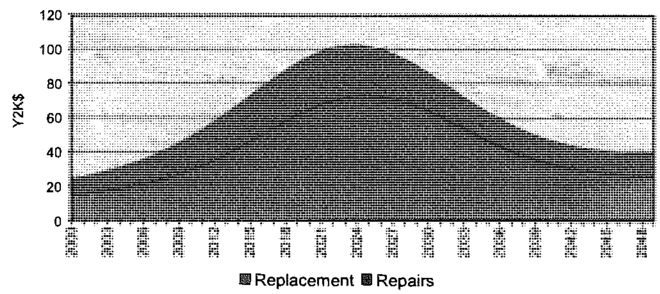




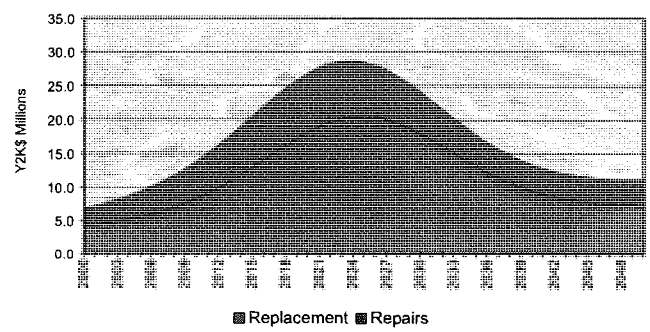
Louisville, Kentucky

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $1,343 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



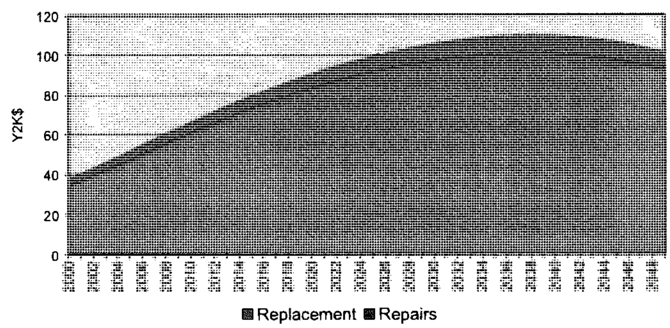
Projected Total Expenditures Due to Wear-Out



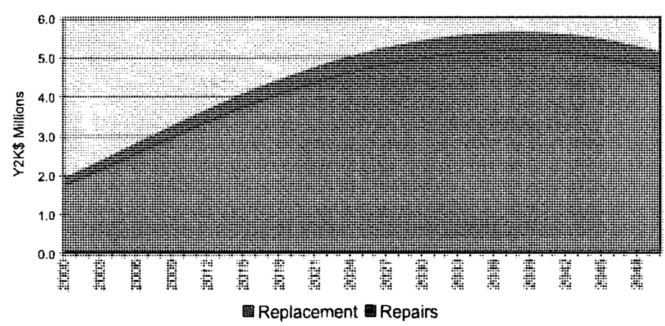
United Water, New Rochelle, New York

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $325 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



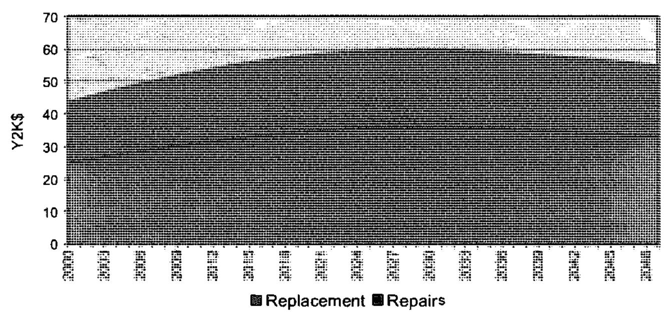
Projected Total Expenditures Due to Wear-Out



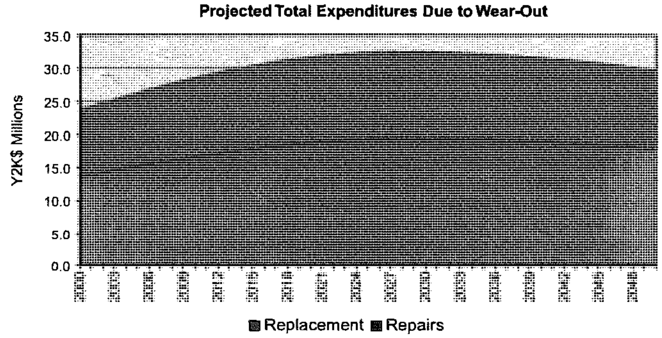
Philadelphia, Pennsylvania

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $2,438 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



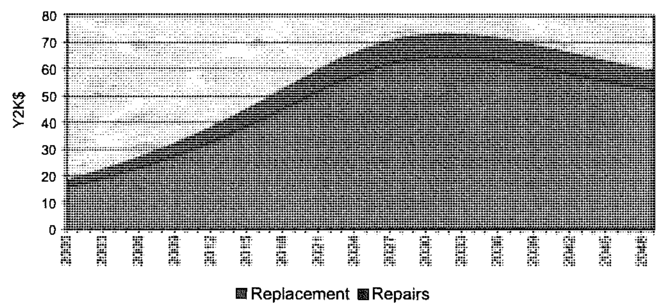
Projected Total Expenditures Due to Wear-Out



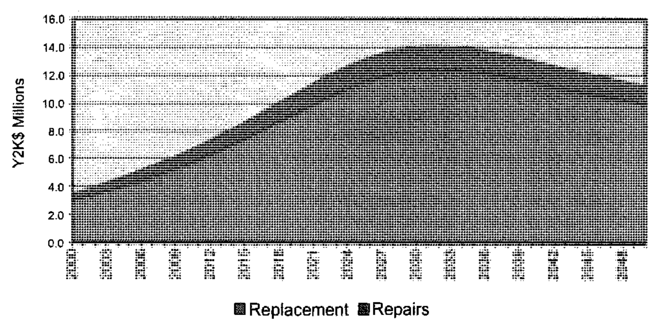
Portland, Oregon

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $1,257 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



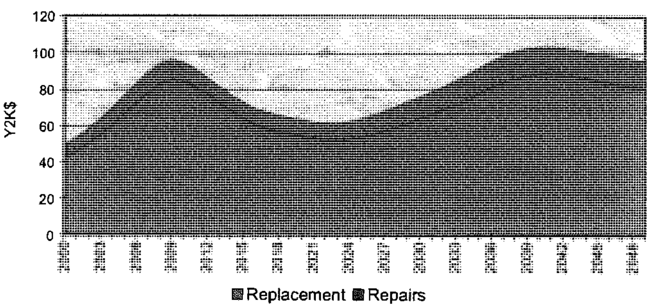
Projected Total Expenditures Due to Wear-Out



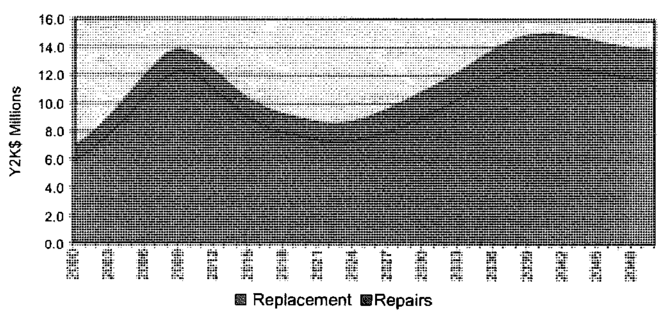
St. Paul, Minnesota

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $1,005 M

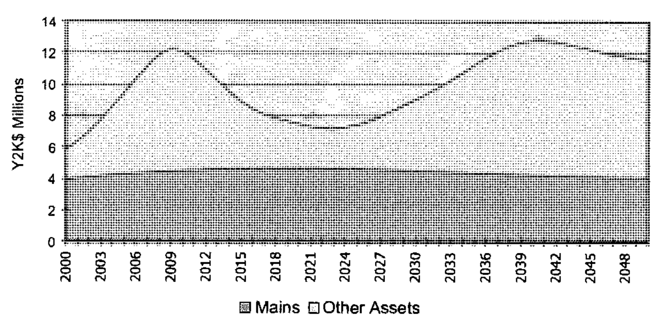
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



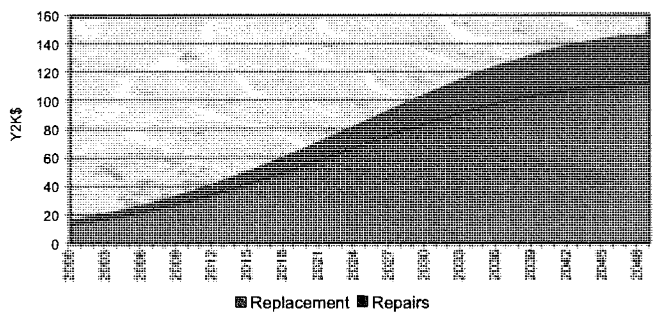
Projected Total Replacement Expenditures Due to Wear-Out



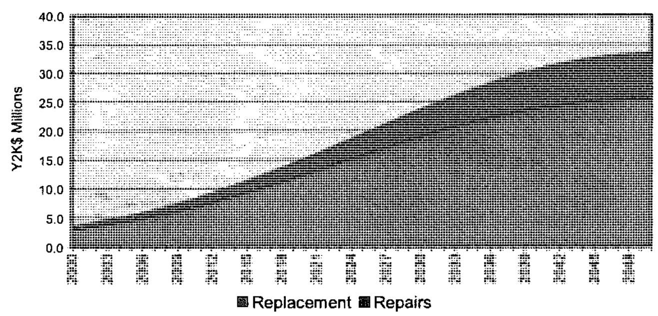
Seattle, Washington

Asset Sets Modeled: Water Mains —
Estimated Replacement Value $1,713 M

Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



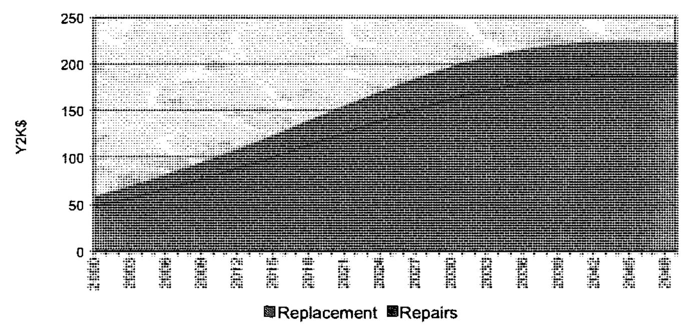
Projected Total Expenditures Due to Wear-Out



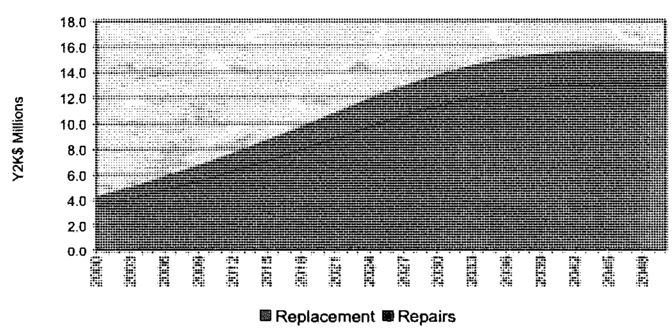
Tacoma, Washington

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $1,100 M

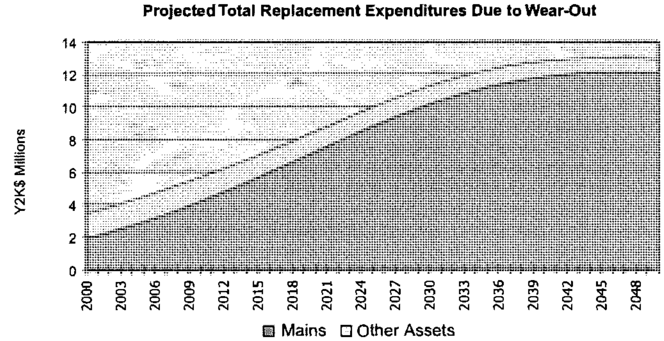
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



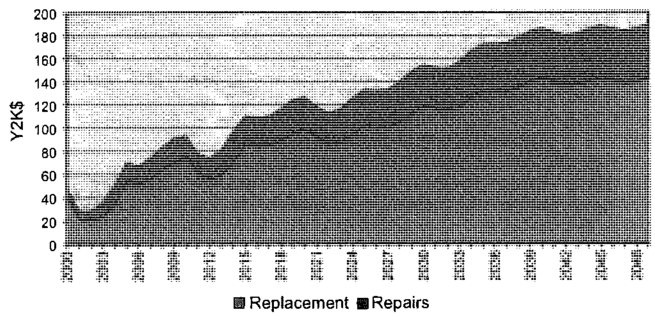
Projected Total Replacement Expenditures Due to Wear-Out



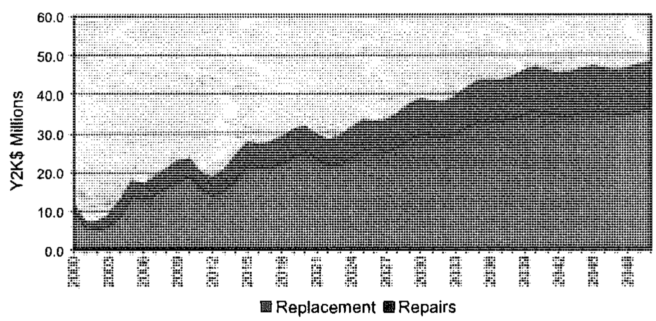
Tucson, Arizona

Asset Sets Modeled: Water Mains & Water Supply Plant —
Estimated Replacement Value $1,852 M

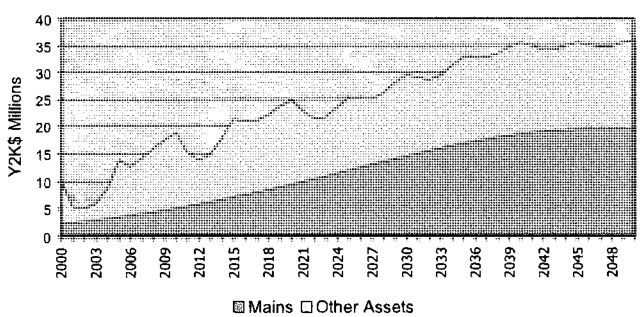
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



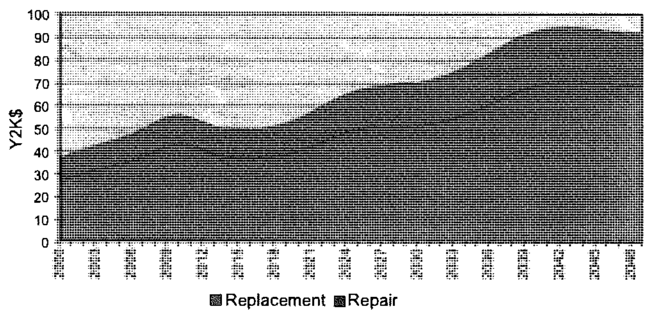
Projected Total Replacement Expenditures Due to Wear-Out



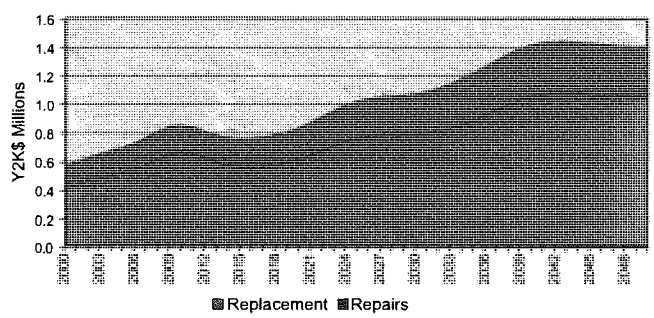
Wausau, Wisconsin

Asset Sets Modeled: Water Mains & Water Supply Plant — Estimated Replacement Value $84 M

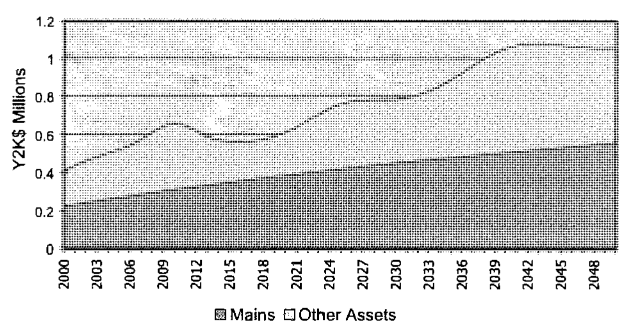
Projected Per Household Expenditures Due to Wear-Out ($/hh/yr)



Projected Total Expenditures Due to Wear-Out



Projected Total Replacement Expenditures Due to Wear-Out



Reinvesting in Drinking Water Infrastructure

Dawn of the Replacement Era

APPENDIX B

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A special thanks to the managers and staff of the following utilities for their time and effort in developing the Nessie Curves:

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West Virginia American
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Cincinnati Water Works
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Columbus Water Works
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Denver Water Board
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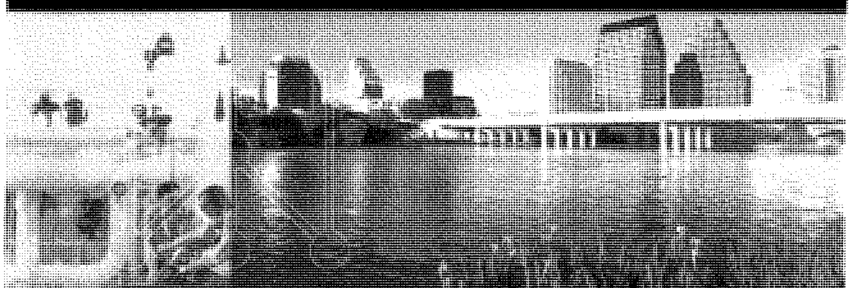
FUNDING

The research, analysis and production of this report was funded by the Water Industry Technical Action Fund (WITAF).

Water INFRASTRUCTURE NOW

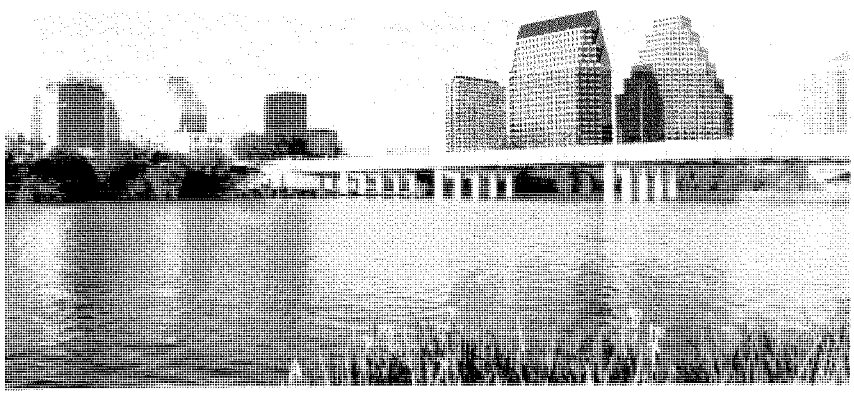


RECOMMENDATIONS FOR CLEAN AND SAFE WATER IN THE 21ST CENTURY

WATER INFRASTRUCTURE NETWORK

Water INFRASTRUCTURE NOW

RECOMMENDATIONS FOR CLEAN AND SAFE WATER IN THE 21ST CENTURY



WATER INFRASTRUCTURE NETWORK

WATER INFRASTRUCTURE NETWORK

The Water Infrastructure Network (WIN) is a broad-based coalition of local elected officials, drinking water and wastewater service providers, state environmental and health administrators, engineers and environmentalists dedicated to preserving and protecting the health, environmental and economic gains that America's drinking water and wastewater infrastructure provides.

Introduction

In April 2000, the Water Infrastructure Network (WIN) released its first report, *Clean & Safe Water for the 21st Century*. That report documented significant improvements in water quality and public health associated with America's investments in water and wastewater infrastructure. But, it also documented an unprecedented financial problem: over the next 20 years, America's water and wastewater systems will have to invest $23 billion a year more than current investments to meet the national environmental and public health priorities in the Clean Water Act and Safe Drinking Water Act and to replace aging and failing infrastructure. EPA's own data and analyses corroborate the WIN figures. In the words of the WIN coalition, which represents a broad spectrum of professional, technical, academic, environmental, labor, and government organizations involved in water infrastructure:

> "New solutions are needed to what amounts to nearly a trillion dollars in critical water and wastewater investments over the next two decades. Not meeting the investment needs of the next 20 years risks reversing the public health, environmental, and economic gains of the last three decades."

This second WIN report recommends a series of public and private actions that will be needed to meet the challenges for funding water and wastewater infrastructure over the coming decades. As part of this fiscal partnership, WIN recommends increasing the federal role where needs are great, public health or the environment is at risk, or local resources are inadequate. This enhanced federal role should provide for distribution of funds in fiscally responsible and flexible ways, including grants, loans, loan subsidies, and credit assistance.

Investment in Water and Wastewater Will Yield Substantial Returns

On this issue there is little disagreement – investments in water and wastewater systems pay substantial dividends to public health, the environment, and the economy. It is well documented that wastewater treatment plants prevent billions of tons of pollutants each year from reaching America's rivers, lakes, and coastlines. In so doing, they help prevent water-borne disease; make our waters safe for fishing and swimming; and preserve our natural treasures such as the Chesapeake Bay, the Great Lakes, and the Colorado River. Clean water supports a $50 billion a year water-based recreation industry, at least $300 billion a year in coastal tourism, a $45 billion annual commercial fishing and shell fishing industry, and hundreds of billions of dollars a year in basic manufacturing that relies on clean water. Clean rivers, lakes, and coastlines attract investment in local communities and increase land values on or near the water, which in turn, create jobs, add incremental tax base, and increase income and property tax revenue to local, state, and the federal government.

Some 54,000 community drinking water systems provide drinking water to more than 250 million Americans. By keeping water supplies free of contaminants that cause disease, our water systems reduce sickness and related health care costs and absenteeism in the workforce. By providing adequate supplies to industry that relies on pure water for processing, cooling, or product manufacturing, America's water systems create direct economic value across nearly every sector of the economy and every region of the country. By reducing illness and absenteeism, America's water systems contribute directly to the productivity of our workforce and continuous growth in Gross Domestic Product. Moreover, adequate water supply capacity to serve a growing industrial base enables expansion of the private economy.

Local, State, and Private Sources Form Part of the Funding Solution

Through water and sewer bills, local citizens and private businesses already pay about $60 billion a year or 90 percent of the total cost to build, operate, and maintain their water and wastewater systems. Increased local fees and taxes undoubtedly will help pay for a fair share of future system requirements, but local fees alone cannot solve all funding problems.

Efficiency gains also could pay some of the bill. Future increases in local water and sewer rates could well be reduced as competitive pressures drive utility managers to adopt more efficient organizational structures, work practices, and new technologies. Many publicly owned and operated utilities have demonstrated that operating costs can be reduced by 20–25 percent or more within a 3–5 year period.[1] But, WIN's estimate of the funding shortfall already deducts this "funding source" from its $23 billion total, so we can not count on operating efficiencies to meet more of our future needs.

Private firms in the water and wastewater business also can play a key role. Their pressure to keep markets competitive will result in reduced costs of services overall. In addition, these companies can help finance new investments. But in the end, whether financing comes from local governments or private firms, local citizens and businesses will still have to pay the bills.

The Federal Share in the 21st Century Will Be Critical

Local solutions, like increased water and wastewater rates or operating efficiencies, can address only a portion of this problem. Financing the full $23 billion a year need with utility rate increases would result in a doubling of rates, on average, across the nation. If this were to happen, at least a third of the population of the U.S. would face economic hardship using EPA's conventional criterion for affordability. In small, rural, low-income, or older shrinking urban communities, economic hardships would be significantly more acute than the average. Protecting the nation's waterways from pollution and our drinking water from contamination will grow increasingly unaffordable if local communities are asked to pay the entire bill.

In some locations, much of the shortfall in infrastructure finance is due to simple demographics. Over the next several decades, many cities will need to replace water and wastewater facilities and pipes that were installed in response to population growth and demographic shifts in the late 1800s and early 1900s. The next wave of infrastructure investment responded to post-war demographic changes in the 1920s and 1950s. Since the economic lives of materials shortened with each new investment cycle, many local utilities will face unprecedented funding hurdles as multiple generations of infrastructure wear out, more or less at the same time, over the next two decades.

1 See Association of Metropolitan Sewerage Agencies and Association of Metropolitan Water Agencies, *Thinking, Getting, and Staying Competitive: A Public Sector Handbook*, 1998.

The Case for Federal Investment

The case for federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone; and because waters are shared across local and state boundaries, the benefits of federal help will accrue to the entire nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, or a safe and efficient aviation system. These latter infrastructure programs enjoy sustainable, long-term federal grant programs; under current policy, water and wastewater infrastructure do not.

Equally compelling is the case for flexibility in the forms of federal investment including grants, loans, and other forms of assistance. Grants will be needed for many communities that simply cannot afford to meet public health, environmental, and/or service-level requirements. Loans and credit enhancements may be sufficient for other types of communities with greater economies of scale, wealthier populations, and/or fewer assets per capita to replace.

WIN Recommendations

The Water Infrastructure Network recommends that Congress pass and the President sign and budget for new legislation to finance clean and safe water for America that:

- Creates a long-term, sustainable, and reliable source of federal funding for clean and safe water;
- Authorizes capitalization of the next generation of state financing authorities to distribute funds in fiscally responsible and flexible ways, including grants, loans, loan subsidies, and credit assistance;
- Focuses on critical "core" water and wastewater infrastructure needs and non-point source pollution;
- Streamlines federal administration of the funding program and encourages continuous improvement in program administration at both the federal and state levels;
- Adequately finances strong state programs to implement the Clean Water Act and the Safe Drinking Water Act;
- Establishes a new program for clean and safe water technology and management innovation to reduce infrastructure costs, prolong the life of America's water and wastewater assets, and improve the productivity of utility enterprises; and
- Provides expanded, targeted technical assistance to communities most in need.

WIN recognizes that no single solution addresses the full range of water and wastewater infrastructure and related challenges. All levels of government and the private sector must share responsibility for effective, efficient, and fair solutions. Each of these provisions is discussed subsequently.

Long-Term, Sustainable, and Reliable Funding for Clean and Safe Water

The importance of water and wastewater infrastructure was highlighted in the 1960s as the nation watched the quality of its waters decline precipitously and chose in the 1972 Clean Water Act to spend significant federal tax dollars to reverse this trend. Despite growing threats to public health, despite increasing federal mandates for cleaner water and safer drinking water, despite shifts in population that strand water and wastewater assets in urban core cities with few ways to pay for needed improvements, and despite the nearly universal need to replace hundreds of billions of dollars in aging and failing water distribution and wastewater collection systems, the federal contribution to water and wastewater continues to decline.

Interestingly, this is not the case in other basic infrastructure systems such as highways, airports, transit systems, harbors, or waterways, for which Congress has continued to provide substantial federal funding. The rationale is simple: these basic infrastructure systems underpin the U.S. economy broadly and their benefits accrue widely to users without geographic limitations imposed by local political boundaries. Moreover, these infrastructure systems have network benefits that are felt only after all, or substantial portions, of the network is complete and functional, affording Americans anywhere in the country access to minimum levels of services. Water and wastewater infrastructure provide comparable economic and societal benefits.

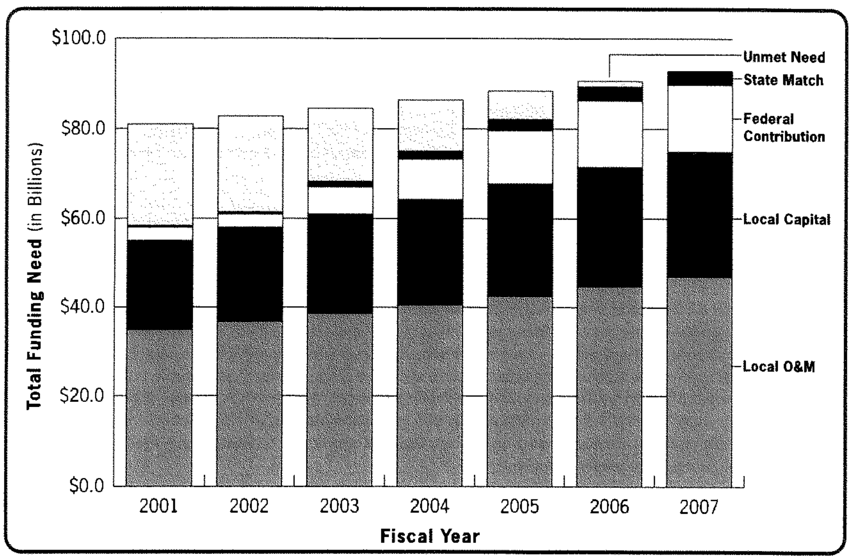
Accordingly, WIN recommends that Congress renew its commitment to America's water resources with $57 billion in new authorizations and funding to capitalize state-administered grant and loan programs through Water and Wastewater Infrastructure Financing Authorities (WWIFAs).[2] As depicted below, WIN recommends that appropriations ramp up over a five-year period to address, in a manageable fashion, the $23 billion annual shortfall in funding these critical infrastructure systems.

New Federal Funding to Capitalize State Water and Wastewater Infrastructure Financing Authorities for Core Infrastructure and Non-Point Source Investments (by Fiscal Year)[a]

	2003	2004	2005	2006	2007
Appropriations	$6 billion	$9 billion	$12 billion	$15 billion	$15 billion

[a] Current federal water and wastewater funding is about $3 billion a year, compared to WIN's estimate of $23 billion a year in needs.

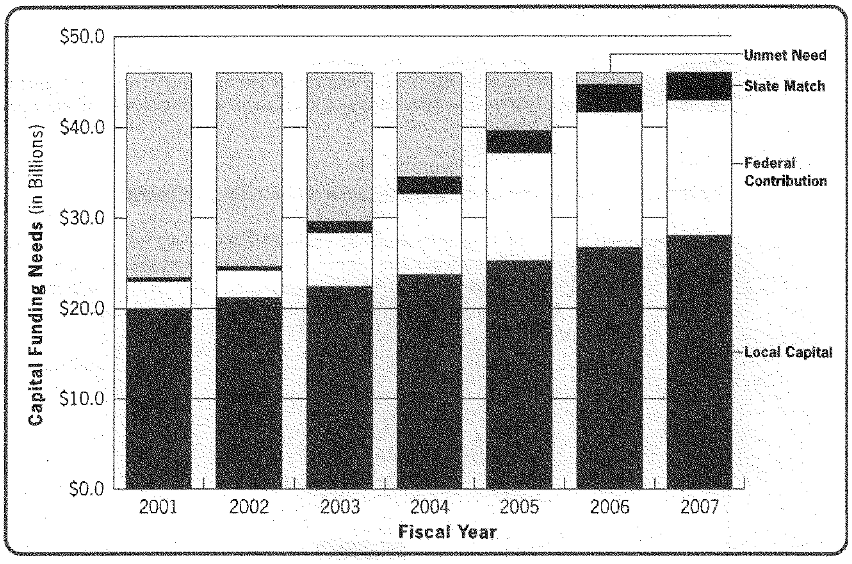
Over this five-year period, this level of funding is approximately half the capital funding shortfall.[3] In the chart below, WIN has identified how this new federal contribution could augment other sources to eliminate unmet needs by 2007.



2 Logically, these institutions are the next generation of today's water and wastewater State Revolving Funds. But under the WIN recommendations discussed subsequently, their charter would be expanded significantly and where not already so structured, administration of separate water and wastewater SRFs would be consolidated. WIN is recommending a change of name, therefore, to recognize these changes in scope, authority, and organization.

3 Note: Federal funding in 2006 and 2007 exceeds half the annualized shortfall to compensate for funds in the prior years falling short of half the annual needs.

Looking simply at the capital portion of this funding plan, the chart below depicts the relative shares of an estimated $46 billion a year in capital funding needs for which each partner will be responsible over the first five years:



The state match in these graphs is simply 20 percent of federal capitalization grants. While it is difficult to predict exactly, actual state contributions could be significantly higher than amounts shown here since many states contribute more than 20 percent through over-matching and leveraging federal capitalization grants in the bond market.

Consistent with the proportions of unmet needs identified in the April 2000 WIN Report, *Clean and Safe Water for the 21st Century*, WIN recommends that half the federal capitalization grant be reserved for investments in drinking water systems and half for wastewater systems.

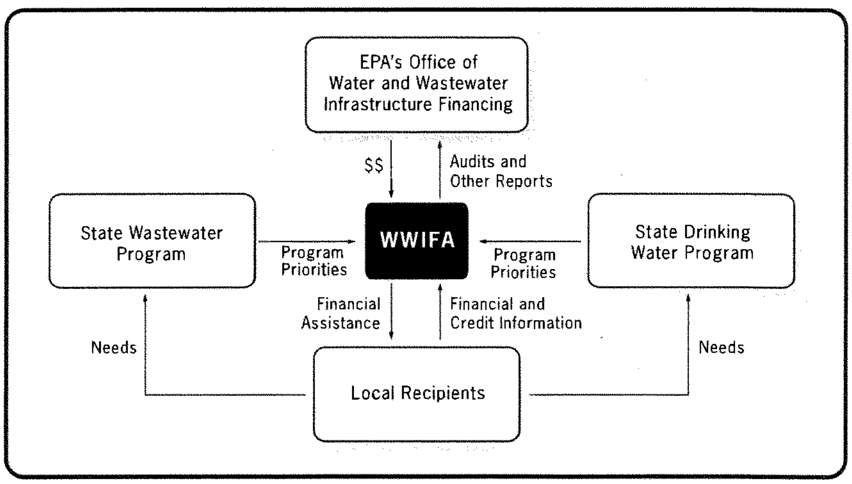
WIN recommends that states retain the flexibility to shift the use of their capitalization grant funds from water to wastewater or vice versa, with two conditions. First, neither water nor wastewater allocations in any year could drop below 35 percent of that state's annual capitalization grant as a result of such a transfer. Second, no funds could be transferred from water to wastewater (or vice versa) if such a transfer resulted in not funding a water project on the state priority list that was otherwise "ready to go," and vice versa.

WIN recommends further that Congress continue funding in years beyond 2007 to help meet the $23 billion annual shortfall identified in *Clean & Safe Water for the 21st Century*. In that regard, WIN notes that in July 2000 the U.S. Congressional Budget Office estimated that the federal budget would generate a surplus of $4.6 trillion between 2001 and 2010 and a $2.1 trillion surplus over the five-year period 2003–2007.[4]

In 2003, at the outset of WIN's recommended federal funding initiative, Congress should establish a formal process to evaluate alternatives for, and recommend the structure of, a longer-term and sustainable financing approach to meet America's water and wastewater infrastructure needs.

State Water and Wastewater Infrastructure Financing Authorities

WIN recommends that federal funding be administered through flexible statewide water and wastewater banking institutions. These water and wastewater infrastructure financing authorities, or WWIFAs, would have broad latitude to meet needs within their states using appropriate combinations of grants, loans, and other financial assistance instruments. In general, the relationship between WWIFAs and other relevant state, local, and federal institutions is depicted below.



WIN contemplates that WWIFAs would be the next generation of today's state revolving funds.[5] As such, they would have broad authorities to create affordable financial solutions to meet the investment needs of water and wastewater systems. They would handle the banking aspects of state water and wastewater infrastructure, working closely with state clean and drinking water programs

4 This includes both on- and off-budget surpluses. See: Congressional Budget Office, *The Budget and Economic Outlook: An Update*, (July 2000).

5 WIN contemplates a transition from SRFs to WWIFAs, the exact details of which must be worked out from state to state. Win does not contemplate creation of two parallel state funding institutions. WIN notes that some 30 states already operate WWIFA-like water and wastewater banking institutions, so transition issues, at least for these states, are likely to be minimal.

that would translate program priorities to meet the mandates of the Clean Water Act and Safe Drinking Water Act into sequenced WWIFA funding needs. Sequencing would help ensure that the most critical public health needs were addressed first. WWIFAs would have broad latitude to meet all funding needs with packages of grants, loans, and other forms of assistance (see below) that met sequencing requirements and resulted in local water and sewer fees that were affordable according to state financial hardship guidelines.

Just as EPA's water and wastewater program offices would interact on programmatic issues with their state counterparts, WWIFAs would interact on banking issues with EPA's new Office of Water and Wastewater Financing. This would effectively create separate, parallel funding and technical program delivery capabilities at both the federal and state levels.

WWIFAs should encourage water and wastewater utilities to use value-based procurement policies within an asset-management framework.

Grants

WIN recommends that Congress require state WWIFAs to provide 25–50 percent of each year's federal capitalization allotment as grants for up to 55 percent of the cost of eligible clean and safe water projects, except in hardship cases where grants could cover up to 75 percent of eligible project costs. In awarding grants, WWIFAs should take into account such factors as public health risk, environmental impairment, affordability, and service quality. Grants would be subject to reasonable terms and conditions.

These considerations would address the financial problems that many water and wastewater systems would face if they had to finance all of their needs through local rates. Acute public health risks, for example, should not endanger our communities nor should environmental threats degrade our unique water resources where cause and effect is unclear, leaving public and private concerns to debate who should pay to restore a watershed. Affordability should not stand as a barrier to clean, safe, and reliable water in any community in America.

Loans and Loan Subsidies

Many communities can afford to pay for loans and, in many cases, there is little debate over cost-effective solutions. Accordingly, WWIFAs should have flexibility in the types of loans and loan subsidies they offer, including interest rate discounts, zero interest rate loans, principal forgiveness, and negative interest rate loans. WIN recommends that Congress require WWIFAs to allocate 10–25 percent of each year's capitalization grant to loan subsidies. In addition, WIN strongly recommends loan terms of up to 30 years, provided such terms do not exceed the useful lives of investments.

Loan subsidies of any form should be designed to minimize administrative burdens and collateral requirements. Issues of potential concern include local accounting, reporting, and auditing requirements; requirements for public approvals; and cross-cutting federal requirements. Loan subsidies should be structured to be efficient and effective with no more requirements than those presently applicable to loan subsidies handled under the clean water and safe drinking water SRF programs.

Other Types of Financial Assistance to Meet Needs

WIN recognizes that other financial assistance mechanisms, including public-private partnerships, may address a portion of the problem. Congress, therefore, should authorize WWIFAs to use federal capitalization grants to:

- purchase or refinance outstanding debt obligations of water or wastewater service providers;
- guarantee, or purchase of insurance for, an obligation of a water or wastewater system;
- secure the payment or directly repay principal or interest on general obligation bonds issued by the state if proceeds of the bonds will be deposited into the SRF; and
- deposit into a capital reserve for a debt instrument of a water or wastewater system.

As part of the federal funding package designed to lower the cost of capital for WWIFAs that choose to leverage their federal capitalization grants and for individual issuers seeking to borrow in the public capital markets, Congress should exempt from state private activity bond volume caps state and local private activity bonds for water and wastewater infrastructure, where such bonds (1) are used to finance core water or wastewater infrastructure, as defined below, and (2) produce public health or environmental protection benefits that are generally available to the public.

This will greatly reduce the cost of financing water and wastewater infrastructure. As important, it will allow communities increased flexibility to more efficiently structure public-private partnerships that bring together the particular strengths of both the public sector and the private sector.[6]

Funding Core Infrastructure Needs

WWIFAs are broadly enabled banks for water and wastewater infrastructure and equivalent investments that yield clean and safe water. Accordingly, WIN believes that WWIFAs should focus on funding the following types of core investments, as identified in WIN's May 2000 report, *Clean & Safe Water for the 21st Century*:

- **Drinking water supply systems** – including water treatment facilities, finished water storage, finished water distribution systems, source water development, water supply management and inter-connection, source water protection, demand management, and rehabilitation of raw water conveyance and water storage infrastructure;
- **Domestic wastewater management systems** – including wastewater collection and pumping infrastructure, wastewater treatment plants, wastewater reclamation and reuse facilities, biosolids (sludge) management, and discharge infrastructure; and
- **Wet weather runoff control systems and management practices** – including pollution prevention and/or reduction practices as well as runoff collection, conveyance, and treatment facilities.

6 For a more complete discussion of these issues, see: Environmental Financial Advisory Board to the U.S. Environmental Protection Agency, *Incentives for Environmental Investment: Changing Behavior and Building Capital*, August 9, 1991.

Since needs will vary from one system or one watershed to the next, WIN recommends that states set the following broad priorities for project-level investments under their WWIFA programs to:

- Repair, rehabilitate, or replace treatment, collection, or distribution systems;
- Attain compliance with applicable federal or state regulatory requirements;
- Meet applicable local service levels;
- Address public health or environmental emergencies; and
- Address non-point source problems where such investments by local water or wastewater systems are cost effective relative to other core infrastructure solutions.

WIN recommends that water and wastewater systems making investments in core infrastructure remain eligible for WWIFA assistance regardless of whether they are publicly or privately owned and/or operated as long as they provide water or wastewater services that are generally available to the public.

Neither operations nor maintenance needs would be eligible for federal WWIFA funds. Using their own appropriated funds, states would be required to match 20 percent of federal capitalization grants. To avoid imposition of additional state fees, Congress should enable states to set aside sufficient portions of annual capitalization grants to administer these expanded programs.

While decisions on individual projects would not be subject to federal approval, they would be subject to public review and comment.

Streamlined Federal and State Administration

Currently, two different offices within the U.S. Environmental Protection Agency interact with state finance authorities – one handling water finance and the other handling wastewater finance. In addition, in about 20 states, separate water and wastewater agencies administer these financing programs.

WIN recommends, therefore, that EPA form a new Office of Water and Wastewater Infrastructure Financing to oversee implementation of this new funding legislation. This office would consolidate the administration of grants to state WWIFAs. The director of this office should report to the Assistant Administrator for Water. This arrangement would streamline program delivery and partially separate funding and financial performance activities from regulatory program development and enforcement activities.

Congress should authorize this new office to work with states, local borrowers, and other market participants through advisory panels to undertake a thorough analysis of, and recommend ways to streamline, inefficiencies in the administration of these funding programs. Recommendations should address the need to reduce federal and/or state paperwork requirements associated with federal funding assistance, simplify application processes, reduce oversight and reporting requirements where they no longer serve the federal or state interests, and provide flexibility in meeting requirements that do serve federal and state interests.

The State Role in Managing Clean and Safe Water Programs

Under both the Clean Water Act and Safe Drinking Water Act, EPA delegates primary responsibility to the states to administer and enforce the national programs for clean and safe water. Each year, Congress appropriates grants to states to help pay their costs of administering these programs.

Section 106 of the Clean Water Act authorizes EPA to provide Federal assistance to states (including territories, the District of Columbia, Indian Tribes) and interstate agencies to establish and implement ongoing water pollution control programs. Prevention and control measures supported by state water quality management programs include permitting, pollution control activities, surveillance, monitoring, and enforcement; advice and assistance to local agencies; and the provision of training and public information.

The Safe Drinking Water Act gives states and Indian Tribes primary enforcement responsibility for public water systems in their jurisdictions if they meet certain requirements. Congress also provides grants under Section 1443 to state drinking water agencies to manage these delegated programs. Activities undertaken by the states continue to expand and include conducting sanitary surveys; monitoring and enforcing drinking water standards; training and certifying operators; reviewing plans and specifications for water systems; implementing source water assessments and capacity development programs; and providing emergency response, risk communication, disease surveillance, and technical assistance to local communities.

Recent analyses have documented that federal grants to states have not kept pace with dramatic increases in costs of managing these federally delegated clean water and safe drinking water programs. While federal grants to support state drinking water programs may be used to provide up to 75 percent of a state program's costs, according to the Association of State Drinking Water Administrators, appropriations historically have covered only 35 percent. Accordingly, WIN recommends that Congress appropriate $400 million a year between 2003 and 2007 (in addition to the appropriations for WWIFA capitalization grants discussed earlier), or $200 million a year to help fund state implementation of the Clean Water Act and $200 million a year for state implementation of the Safe Drinking Water Act.

Federal Funding for State Implementation of the Clean Water Act and Safe Drinking Water Act (by Fiscal Year)

	2003	2004	2005	2006	2007
Appropriations	$400 million	$400 million	$400 million	$400 million	$400 million

A New Program for Clean and Safe Water Technology and Management Innovation

Technology and management innovation offer attractive solutions to high and rising costs of water and wastewater infrastructure. The rationale for technology research and development is simple: replacing existing and adding required new water and wastewater assets would cost more than $1 trillion, so improving the performance or longevity of only 1 percent of these assets would result in direct savings of $10 billion. Management innovation can continue to increase productivity at the nation's water and wastewater utilities, which in turn reduces operations and maintenance costs.

Recent innovations in the structure of organizations, the efficiency of reengineered work practices, and applications of technology have demonstrated O&M savings on the order of 15 percent to 40 percent.

The federal government currently supports technology research and development through a variety of programs at the federal level including:

- EPA programs administered by its Office of Research and Development and funded through grants to regional research organizations;
- Congressional appropriations to non-profit research foundations including the Water Environment Research Foundation (WERF) and the AWWA Research Foundation (AWWARF); and
- The Environmental Technology Verification Program.

Yet, none of these programs focuses specifically on infrastructure. The AWWRF program is impressive at some $15 million a year, but only $1–2 million a year is directed to infrastructure research. WERF's $10 million a year program similarly spreads resources across many subjects including infrastructure. The Association of Metropolitan Sewerage Agencies (AMSA), the Association of Metropolitan Water Agencies (AMWA), the Water Environment Federation (WEF), and the American Water Works Association (AWWA) independently and working together have advanced the concepts of competitiveness to improve water utility productivity and reduce operating costs. Currently, these groups are focused on new ways to manage water and wastewater utility assets. Much more work in these areas is needed.

Accordingly, WIN recommends that Congress authorize $250 million a year (in addition to authorization for WWIFA capitalization grants discussed earlier) to support an Institute of Technology and Management Excellence to promote the development and use of innovative technologies that would reduce the cost of meeting national clean and safe water requirements and replacing water and wastewater infrastructure. The Institute would offer 85 percent cooperation grants to water or wastewater systems and their private sector or university partners to develop new management techniques and technologies, demonstrate their performance and costs at the utility level, and disseminate results using an Institute-sponsored web learning center. The Institute would be charged with recommending to Congress and the states appropriate incentives to adopt new management approaches and/or technologies. The board of directors of the Institute would be comprised of public and private interests in clean and safe water.

Federal Funding to Support a New Institute of Technology and Management Excellence (by Fiscal Year)

	2003	2004	2005	2006	2007
Appropriations	$250 million	$250 million	$250 million	$250 million	$250 million

In addition, WIN recommends that Congress authorize and appropriate $150 million a year between 2003 and 2007 for research and development pilot projects on stormwater management. These funds would go directly to local governments who want to engage in research or to demonstrate innovative approaches to managing separate storm sewer discharges more effectively.

Federal Funding to Support Local Stormwater Management Pilot Projects (by Fiscal Year)

	2003	2004	2005	2006	2007
Appropriations	$150 million	$150 million	$150 million	$150 million	$150 million

Expand Technical Assistance for Communities Most in Need

Technical assistance and capacity building for communities in need is low-cost insurance that funds will be wisely invested in water and wastewater infrastructure and that these facilities will be properly maintained and managed. Since proper maintenance improves operating performance and prolongs system life, both current operating and future replacement costs will be reduced.

The federal government currently spends approximately $20 million a year on water and wastewater technical assistance to these communities through programs administered by the Environmental Protection Agency (EPA), the Department of Agriculture Rural Utilities Service (RUS), and various state programs. But, technical assistance needs are expected to grow with increases in funding for capital investment under the WIN recommendations. WIN therefore recommends that Congress authorize and fund an additional $25 million a year between 2003 and 2007 for technical assistance to communities in need. These funds would continue to be administered through existing programs.

Federal Funding to Increase Water and Wastewater Technical Assistance to Communities Most in Need (by Fiscal Year)

	2003	2004	2005	2006	2007
Appropriations	$25 million	$25 million	$25 million	$25 million	$25 million

Summary of Funding Recommendations

The Water Infrastructure Network has found compelling evidence of water and wastewater needs that substantially exceed current investment levels. If we do nothing, the nation can expect increased threats to public health, environmental degradation, and real economic losses. At times and in places, these threats will be small and barely noticeable, but over the next two decades, and even more quickly in some locations, losses will mount and solutions will be financially unmanageable.

The Water Infrastructure Network has recommended a series of actions, therefore, to strengthen the partnership among governments at the local, state, and federal levels and between public and private participants in the water and wastewater infrastructure community.

These actions will not be cost free. WIN is recommending that all levels of government and the private sector pay for needed investments in efficient, effective, and equitable ways. Despite the figures below that represent the federal share of this fiscal partnership, local government will still be paying 80 percent of the cost to build, operate, and maintain America's water and wastewater systems.

The Water Infrastructure Network, a broad based coalition of organizations representing local elected officials, drinking water and wastewater service providers, state environmental and health program administrators, engineers, labor, and environmentalists, agree: this partnership is essential to water in the 21st century.

The Federal Share of a Partnership for Clean and Safe Water for the 21st Century (in millions of current dollars)

	2003	**2004**	**2005**	**2006**	**2007**
Capitalize State Water and Wastewater Infrastructure Financing Authorities	$6,000	$9,000	$12,000	$15,000	$15,000
Support State Clean Water Act and Safe Drinking Water Act Programs	$400	$400	$400	$400	$400
Fund Technology and Management Innovation Cooperation Grants to Water and Wastewater Systems	$250	$250	$250	$250	$250
Fund Local Stormwater Management Pilot Projects	$150	$150	$150	$150	$150
Provide Technical Assistance to Communities Most in Need	$25	$25	$25	$25	$25
TOTAL	**$6,825**	**$9,825**	**$12,825**	**$15,825**	**$15,825**

[illegible]

American Coal Ash Association	ACAA
American Concrete Pipe Association	ACPA
American Concrete Pressure Pipe Association	ACPPA
American Consulting Engineers Council	ACEC
American Public Works Association	APWA
American Society of Civil Engineers	ASCE
American Water Works Association	AWWA
Associated General Contractors of America	AGC
Association of California Water Agencies	ACWA
Association of Metropolitan Sewerage Agencies	AMSA
Association of Metropolitan Water Agencies	AMWA
California Rebuild America Coalition	CalRAC
Clean Water Action	CWA
Environmental and Energy Study Institute	EESI
Environmental Business Action Coalition	EBAC
International Union of Operating Engineers, AFL-CIO	IUOE
Laborers' International Union of North America	LIUNA
National Association of Counties	NACo
National Association of Flood and Stormwater Management Agencies	NAFSMA
National Association of Towns and Townships	NATaT
National League of Cities	NLC
National Rural Water Association	NRWA
National Society of Professional Engineers	NSPE
National Urban Agriculture Council	NUAC
Prestressed/Precast Concrete Institute	PCI
Rural Community Assistance Program, Inc.	RCAP
Water Environment Federation	WEF
WateReuse Association	WateReuse
Western Coalition of Arid States	WESTCAS

The Sustainable Water Infrastructure Investment Act of 2011 Increasing the Availability of Private Activity Bonds for Water Projects

Myths and Facts

MYTH: *The Sustainable Water Infrastructure Investment Act of 2011 (SWIIA) Will Address the Entire Water Infrastructure Replacement Challenge Faced by Communities.*

FACT: No, but passing SWIIA and increasing the availability of Private Activity Bonds for water and wastewater projects will give communities an important tool they need to address the replacement challenge. There are many strategies that communities can and should employ to address the challenge. These range from the operational, to the managerial and the financial; SWIIA is but one.

The Environmental Protection Agency has estimated that expanding the availability of Private Activity Bonds for water and wastewater projects by removing the state volume cap as in SWIIA, could leverage as much as $5 billion annually to address the water infrastructure replacement challenge, yet only cost the Federal Government $354 million over the next decade – a bargain!

MYTH: *Private Activity Bonds Promote Corporate Welfare*

FACT: No, in virtually any utility ownership/management model, the benefits of SWIIA – low cost financing – would flow to utility customers in the form of lower utility rates, not to the private partner, its owners, directors or shareholders.

In the case of a privately owned utility, the State Public Utility Commissions which oversee and set rates would assure this, and are on record supporting SWIIA for this reason. In the case of public-private partnership between a municipal utility and a private firm, the municipal partner sets the rates and can assure the savings are passed on to customers.

MYTH: *Private Activity Bonds Benefit Investors, Not Consumers*

FACT: No, customers of water and wastewater utilities and other projects will benefit from infrastructure reinvestment that is done with the lowest cost financing available such as the type SWIIA will provide. First, the savings are passed

Under current law the total dollar amount of Private Activity Bonds that can be approved by a state or municipality is set annually; the PABs that are approved provide funding for one year, and on projects needing multi-year funding, new PABs must be approved each year, provided they are available. Therefore, the mere existence of an annual cap deters the undertaking of multi-year projects which water projects often are.

MYTH: *SWIIA Is Not Needed Because There Is No Shortage of Capital for Infrastructure Investments.*

FACT: While there are many financing alternatives available, there is a shortage of cheap, low-interest capital. The more financing choices available to utilities, the more likely customers will get the lowest rates that are feasible.

Furthermore, since Private Activity Bonds are issued by a private partner, not a municipality, virtually all of the financial risk is shifted to the private sector. This protects the public from fluctuations in the financial markets, and has no adverse affects on any other municipal financing or a municipality's bond rating.

Finally, other sources of low-interest capital like the loans offered by the State Revolving Funds (SRF) for water and wastewater bave been diminishing in availability over the last decade due to cuts in federal appropriations.

H.R.1802
Latest Title: Sustainable Water Infrastructure Investment Act of 2011
Sponsor: Rep Pascrell, Bill, Jr. [NJ-8] (introduced 5/10/2011) Cosponsors **(54)**
Related Bills: S.939
Latest Major Action: 5/10/2011 Referred to House committee.
Status: Referred to the House Committee on Ways and Means.

COSPONSORS (54), ALPHABETICAL

Rep Bachus, Spencer [AL-6] - 12/7/2011
Rep Berkley, Shelley [NV-1] - 7/6/2011
Rep Blumenauer, Earl [OR-3] - 6/14/2011
Rep Broun, Paul C. [GA-10] - 11/2/2011
Rep Brown, Corrine [FL-3] - 7/6/2011
Rep Carson, Andre [IN-7] - 6/14/2011
Rep Castor, Kathy [FL-11] - 6/2/2011
Rep Cicilline, David N. [RI-1] - 7/29/2011
Rep Coble, Howard [NC-6] - 7/15/2011
Rep Connolly, Gerald "Gerry" [VA-11] - 7/6/2011
Rep Costello, Jerry F. [IL-12] - 6/14/2011
Rep Critz, Mark S. [PA-12] - 8/1/2011
Rep Davis, Geoff [KY-4] - 5/10/2011
Rep DeFazio, Peter A. [OR-4] - 7/20/2011
Rep Duncan, John J., Jr. [TN-2] - 5/13/2011
Rep Filner, Bob [CA-51] - 7/6/2011
Rep Garamendi, John [CA-10] - 7/20/2011
Rep Gerlach, Jim [PA-6] - 7/13/2011
Rep Hanna, Richard L. [NY-24] - 9/29/2011
Rep Hastings, Alcee L. [FL-23] - 9/13/2011
Rep Higgins, Brian [NY-27] - 6/2/2011
Rep Holden, Tim [PA-17] - 5/13/2011
Rep Jackson, Jesse L., Jr. [IL-2] - 10/13/2011
Rep Johnson, Eddie Bernice [TX-30] - 7/6/2011
Rep Johnson, Henry "Hank," Jr. [GA-4] - 10/13/2011
Rep Kildee, Dale E. [MI-5] - 9/13/2011
Rep King, Peter T. [NY-3] - 12/7/2011
Rep Langevin, James R. [RI-2] - 9/29/2011
Rep Larsen, Rick [WA-2] - 6/14/2011
Rep Larson, John B. [CT-1] - 6/14/2011
Rep LaTourette, Steven C. [OH-14] - 12/7/2011
Rep Lewis, John [GA-5] - 5/24/2011
Rep LoBiondo, Frank A. [NJ-2] - 5/26/2011
Rep McDermott, Jim [WA-7] - 7/20/2011
Rep Meehan, Patrick [PA-7] - 9/13/2011
Rep Meeks, Gregory W. [NY-6] - 7/6/2011
Rep Moran, James P. [VA-8] - 7/6/2011
Rep Napolitano, Grace F. [CA-38] - 6/14/2011
Rep Neal, Richard E. [MA-2] - 7/13/2011
Rep Paul, Ron [TX-14] - 7/15/2011
Rep Rahall, Nick J., II [WV-3] - 6/14/2011
Rep Rangel, Charles B. [NY-15] - 7/20/2011
Rep Ross, Dennis [FL-12] - 6/2/2011
Rep Ross, Mike [AR-4] - 7/21/2011
Rep Rothman, Steven R. [NJ-9] - 7/21/2011
Rep Ryan, Tim [OH-17] - 7/13/2011
Rep Schwartz, Allyson Y. [PA-13] - 5/24/2011
Rep Shuster, Bill [PA-9] - 9/13/2011
Rep Sires, Albio [NJ-13] - 6/14/2011
Rep Sutton, Betty [OH-13] - 9/13/2011
Rep Tonko, Paul [NY-21] - 7/20/2011
Rep Turner, Michael R. [OH-3] - 7/6/2011
Rep Welch, Peter [VT] - 7/29/2011
Rep West, Allen B. [FL-22] - 7/6/2011

S.939
Latest Title: Sustainable Water Infrastructure Investment Act of 2011
Sponsor: Sen Menendez, Robert [NJ] (introduced 5/10/2011) Cosponsors (7)
Related Bills: H.R.1802
Latest Major Action: 5/10/2011 Referred to Senate committee. Status: Read twice and referred to the Committee on Finance.

COSPONSORS (7), ALPHABETICAL:

Sen Cardin, Benjamin L. [MD] - 10/11/2011
Sen Casey, Robert P., Jr. [PA] - 11/1/2011
Sen Crapo, Mike [ID] - 5/10/2011
Sen Gillibrand, Kirsten E. [NY] - 10/18/2011
Sen Inhofe, James M. [OK] - 11/28/2011
Sen Whitehouse, Sheldon [RI] - 6/7/2011
Sen Wicker, Roger F. [MS] - 5/12/2011

Supporters of Legislation to Remove Water Private Activity Bonds from State Volume Caps

American Council of Engineering Companies
American Iron and Steel Institute
American Public Works Association
American Road and Transportation Builders Assn.
American Society of Civil Engineers
American Water
American Water Works Association
Associated Equipment Distributors
Associated Equipment Manufacturers
Associated General Contractors of America
Associated General Contractors of Texas
Barclays
Bond Dealers of America
Bond Market Association
California Association of Sanitation Agencies
Carlyle Infrastructure Partners
Caterpillar
CDM
Coca Cola Company
Design Build Institute of America
Design Professionals Coalition
Dow Chemical Company
Ductile Iron Pipe Research Association
General Electric
Gulf Coast Waste Disposal Authority
HDR Engineering
HD Water Supply
Infrastructure Management Group
International Private Water Association
International Union of Operating Engineers
ITT Industries
Jacobs Engineering
John Deere
Laborers-Employers Coop and Education Trust
Laborers International Union of North America
McWane, Inc.
Mueller Water
Nat'l. Assn. of Regulatory Utility Commissioners
National Association of Towns and Townships
National Association of Water Companies
National Council for Public-Private Partnerships
National League of Cities
National Stone, Sand & Gravel Association
National Utility Contractors Association
Parsons Brinckerhoff, Inc.
Plastics Pipe Institute
Portland Cement Association
Poseidon Resources Corporation
San Antonio Water System
Siemens
Texas Rural Water Association
Texas Water Development Board
Unibel/PVC Pipe Association
United Brotherhood of Carpenters and Joiners
United Rentals, Inc.
United Water
US Chamber of Commerce
US Conference of Mayors – Mayors Water Council
Valve Manufacturers Association
Veolia Water
Vermeer
Vinyl Institute
Water and Sewer Distributors of America
Water and Wastewater Equipment Manufacturers Association
Water Environment Federation
WaterReuse Association
Watts Water Technologies

CHAMBER OF COMMERCE
OF THE
UNITED STATES OF AMERICA

R. BRUCE JOSTEN
EXECUTIVE VICE PRESIDENT
GOVERNMENT AFFAIRS

1615 H STREET, N.W.
WASHINGTON, D.C. 20062-2000
202/463-5310

June 29, 2011

The Honorable Bill Pascrell, Jr.
U.S. House of Representatives
Washington, DC 20515

Dear Representative Pascrell:

The U.S. Chamber of Commerce, the world's largest business federation representing the interests of more than three million businesses and organizations of every size, sector, and region, believes H.R. 1802, the "Sustainable Water Infrastructure Investment Act," is an important step to enhance the ability of local governments to finance water and wastewater infrastructure projects and create jobs by encouraging private investment.

Private investment in infrastructure frees government dollars for allocation to other troubled areas of the economy and transfers risk away from the public partner to the private entity. Recent studies indicate that every $1 billion invested in water infrastructure generates up to $3.46 billion of total national output, $82.4 million in state and local tax revenue, and supports 28,500 jobs.

Few businesses can survive without sustainable water and wastewater infrastructure. Now more than ever, the United States needs significant capital investment in water infrastructure.

The Chamber applauds your introduction of this important legislation and looks forward to continuing to work with Congress and the Administration, and interested stakeholders on this important issue.

Sincerely,

R. Bruce Josten

cc: The Members of the United States House of Representatives

NCA II

Raymond J. Poupore
Executive Vice President

UNITED BROTHERHOOD of CARPENTERS & JOINERS of AMERICA

Douglas J. McCarron
General President

INTERNATIONAL UNION of OPERATING ENGINEERS

Vincent J. Giblin
General President

NATIONAL CONSTRUCTION ALLIANCE II

HEADQUARTERS: 1634 Eye Street NW, Suite 805 • Washington, DC 20006 • 202-239-4779

July 13, 2011

The Honorable Bill Pascrell
United States House of Representatives
2370 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Pascrell:

The National Construction Alliance II supports your legislation, H.R. 1802, the Sustainable Water Infrastructure Act of 2011. The National Construction Alliance II a partnership between the International Union of Operating Engineers and the United Brotherhood of Carpenters and Joiners represents nearly 1-million workers, many of whom build the nation's water and wastewater infrastructure.

Your legislation, which will bring water projects out from underneath the Private Activity Bond (PAB) volume cap, will make PABs a key form of federal financing to replace and upgrade the nation's drinking and wastewater systems. H.R. 1802 will help lower the cost of project financing, which will assist in controlling rates for customers, and it will facilitate more multi-year water projects. This access to new private capital will help utilities that are struggling to finance water and wastewater upgrades, which are in dire need. In their annual report on the nation's infrastructure, the American Society of Civil Engineers gives both drinking water and wastewater infrastructure a D-, just barely above failing. They estimate that $11-billion is needed annually for drinking water upgrades alone.

Most important to the Carpenters and Operating Engineers, H.R. 1802 will create jobs in the hard-hit construction sector. The unemployment rate in construction is currently 15.6%, and it reached over 27% in February 2010. Our industry is in desperate need of legislation that will help put the tens of thousands of unemployed construction workers back on the job. Your legislation will help achieve this objective by creating an estimated 1.4 million jobs, roughly half of those in the construction sector. Passage of H.R. 1802 will deliver the type of boost that the construction sector needs right now.

PABs have already proven to be an important mechanism for local governments to finance projects such as airports, high-speed intercity rail, and solid waste sites. With greater access to this innovative financing, public-private partnerships can be expected to bring more water and wastewater projects to market, creating jobs and reducing the nation's infrastructure deficit.

The National Construction Alliance endorses the Sustainable Water Infrastructure Investment Act of 2011, H.R.1802, and we look forward to working with you to enact it into law this Congress.

Thank you for your leadership on creating American jobs. We sincerely appreciate it.

Sincerely,

Raymond J. Poupore
Executive Vice President

REGIONAL OFFICE: 100 East Corson Street, Suite 230 • Pasadena, CA 91103 • 626-229-9975

United States Senate

WASHINGTON, DC 20510

August 22, 2011

Dear Colleague:

We are writing to ask you to cosponsor S. 939, the Sustainable Water Infrastructure Investment Act of 2011. This bill would allow local communities to leverage private capital markets in combination with other financial mechanisms to finance water and wastewater infrastructure projects by removing private activity bonds for water and wastewater projects from the annual private activity bond (PAB) volume caps. Removing these projects would make the PAB program far more effective in stimulating the critically needed financing of water and wastewater projects across the nation.

Private activity bonds are a form of tax-exempt financing for a governmental entity such as a municipality or state that wants to partner with a private party to meet a public need. Congress controls the total volume of tax-exempt bonds by limiting issuance in each state with an annual cap. Including water and wastewater projects in the annual per state volume cap on private activity bonds hinders financing for these projects. In particular, since they are mostly multi-year projects they often lose out to single year projects which are a better fit in the annual volume cap structure of the PAB program. There is precedent for removing this cap – under current law there is no cap on PABs to build airports, housing, ports, high-speed rail and solid waste disposal sites.

By at least one estimate, our legislation will generate $50 billion in private capital investment, create or support over 1.4 million jobs and generate billions in tax revenue at the federal state and local level.

The Environmental Protection Agency and the Government Accountability Office estimate the investment gap for infrastructure upgrades over the next 20 years to be more than $500 billion to ensure safe drinking water and wastewater treatment. Despite this well-publicized critical national need to upgrade our water and wastewater infrastructure, only 1.3 percent of all PABs issued in 2007 were for water and wastewater projects.

Given the importance of quality water and sewage infrastructure and the incompatibility of the current PAB structure with the financing of these types of projects, we believe it is critical to remove water and sewage projects from the annual volume caps. If you have any questions or would like to cosponsor, please contact Justin Field with Senator Menendez's staff at 4-4727, or Luke Tomanelli with Senator Crapo's staff at 4-6142.

Sincerely,

Robert Menendez

ROBERT MENENDEZ
United States Senator

Mike Crapo

MICHAEL CRAPO
United States Senator

Testimony of Stephen E. Howard

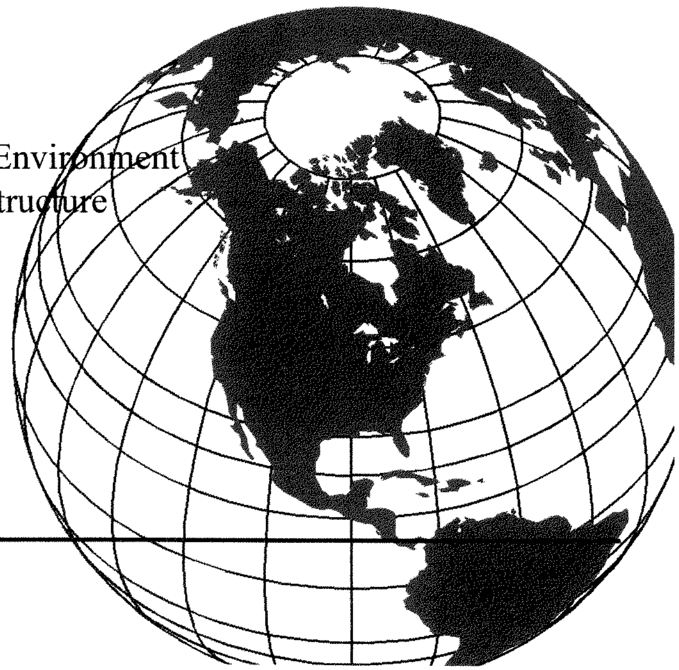
Senior Vice President
[redacted]

Before the:

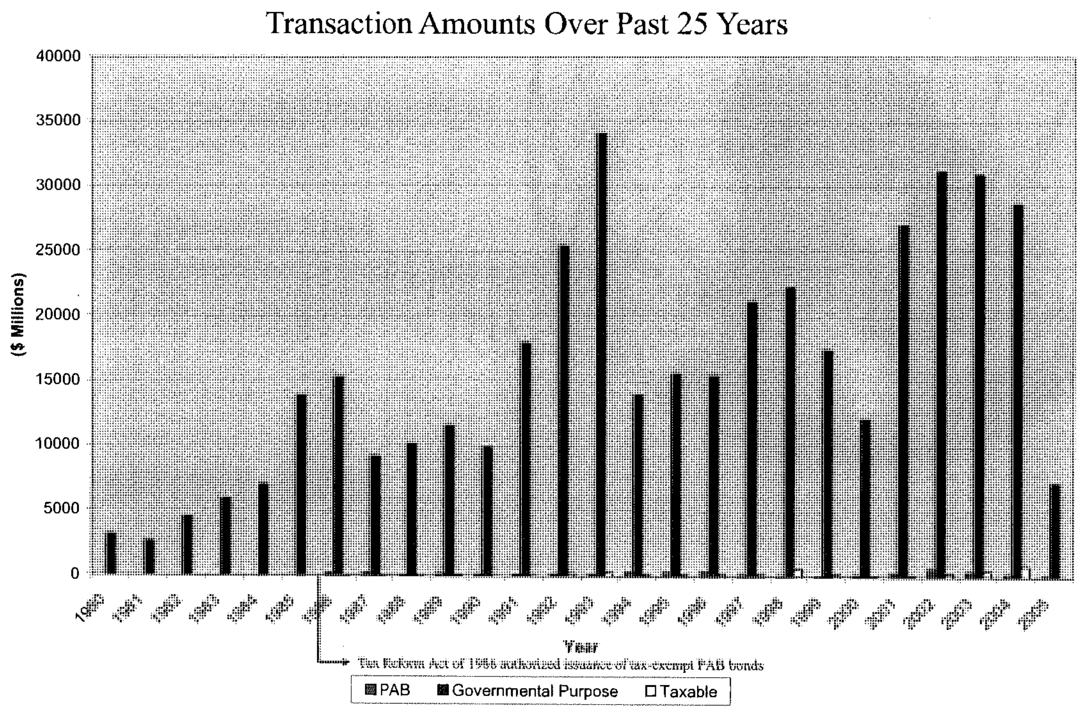
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives

Financing Water Infrastructure Projects

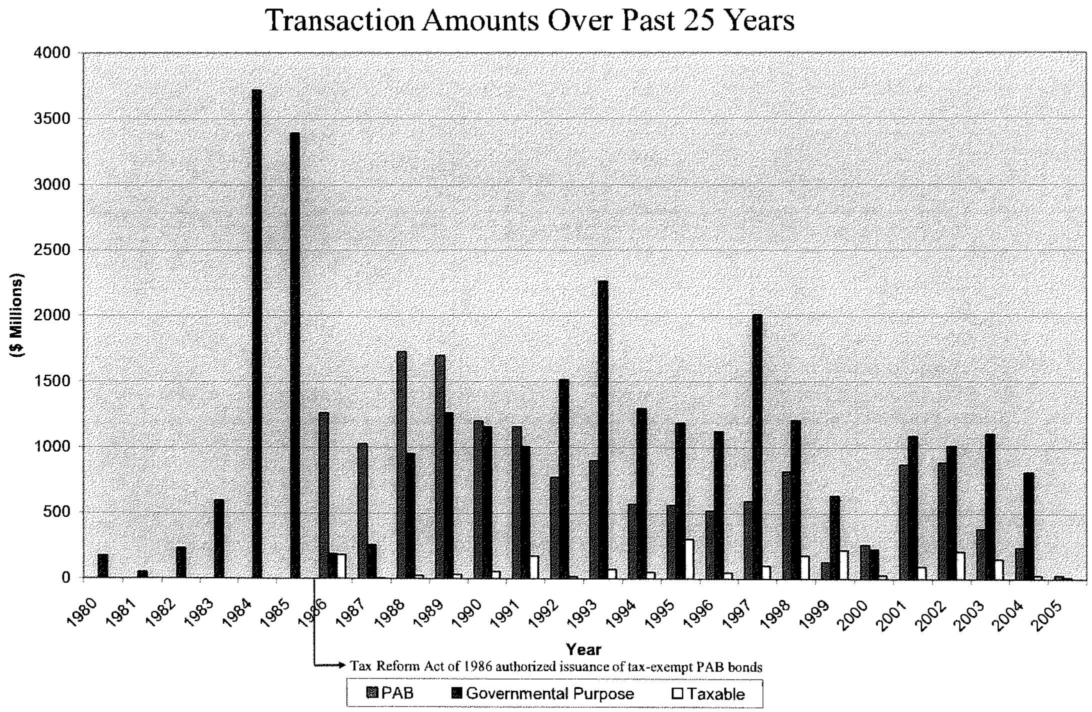
June 14, 2005



Water/Wastewater Historical Data



Solid Waste Historical Data



Economic Impact of Water and Wastewater Infrastructure Investment

Main Street small business and job creation estimates of a bill to remove federal funding restrictions on tax-exempt bonds for water and wastewater projects

Creating/Supporting Jobs

While the nation continues to suffer through a recession, the construction industry is experiencing depression-like conditions. According to virtually every economic measure, construction businesses and their employees have been disproportionately affected by the economic downturn.

✓ According to the U.S. Bureau of Labor Statistics, **the construction industry's unemployment rate currently hovers at 25 percent**, more than double the overall national jobless rate.

✓ While construction jobs account for five percent of the nation's workforce, **20 percent of the jobs lost since 2007, over two million, have been in construction**.

✓ Multiple independent studies conducted by The U.S. Conference of Mayors, the Associated General Contractors of America (AGC) and the Clean Water Council estimate that **$1 billion in water infrastructure investment can support 28,500 jobs.**

- According to the US Conference of Mayors, every $1 million invested in water infrastructure directly creates 8.7 jobs, and each of these jobs leads to an additional 3.68 jobs elsewhere in the national economy. (8.7 x 1000 x 3.68 = 28,500 jobs per $1 billion)
- According to the AGC "Blueprint for Economic Growth", every billion dollars invested in nonresidential construction activity adds $3.4 billion to the gross domestic product, increases personal earnings by $1.1 billion and creates or sustains 28,500 jobs. **Almost 19,000 of those jobs would be in areas outside the immediate construction sector, including equipment manufacturing, materials supply, food service, health care and retail.**
- According to a recent study conducted by the Clean Water Council, every $1 billion invested in water and wastewater infrastructure also results in total national output (i.e., demand for products and services in all industries) of up to $3.46 billion, **and approximately $82.4 million in state and local tax revenue.** Additionally, the CWC study also estimates that a $1 billion investment generates measurable national employment in 325 other standard industry classifications.

Employing Small Businesses Throughout the Country

✓ The complex process of water provision requires; engineers, equipment manufacturers, distributors and wholesalers, retail and customer service, general and heavy construction workers, operators, and consultants throughout the supply chain. Many of these businesses employed in a water project are small and local.

- 70 percent of the nation's **engineering firms** are defined as "small businesses."
- 90 percent of the nation's **general and heavy construction** firms are small; employing fewer than 20 workers. Though according to the Small Business Administration, businesses with fewer than 20 employees account for 25% of all jobs but generated 40% of job growth in the last recovery.

- ✓ **75 percent of other businesses employed throughout the process of a water project are small at the following levels:**
  - 500 employees for most manufacturing industries
  - 100 employees for all wholesale trade industries
  - $6.5 million annual revenue for most retail and service industries
  - $13 million annual revenue for all special trade contractors

<u>$5 Billion for Water and Wastewater (or more) annually</u>

- ✓ Based on the EPA's estimate of *up to $5* billion annually or $50 billion worth of private water investment over ten years, **1,425,000 jobs could be supported by creating a private activity bond volume cap exception for water and wastewater projects.** As the market matures in the years to follow estimates show that volume could increase to $5 billion annually, supporting up to 142,500 jobs.

- ✓ Recent estimates show that about **$190 billion** in new money for infrastructure investment is available. More of this capital can be **deployed towards water investment** when a PAB volume cap exception is created.

- ✓ In addition to companies that invest in infrastructure, there are over 30 infrastructure funds ready to invest in the U.S. market with a levered purchasing power of ~$475 billion.

<u>Ready to Go</u>

- ✓ Private Activity Bond issuance is one of the **surest and swiftest** forms of federal assistance to water projects. A PAB issuance only requires a willing issuer – **no time consuming applications.** The entire process; approval to sale would take approximately 90-120 days for a ready-to-go project.

<u>Low Cost to the Federal Government</u>

- ✓ This is a relatively **inexpensive job creation proposal**. The cost to the Federal Government of supporting **1,425,000 jobs** through a PAB volume cap exception is a mere **$354 million over 10 years**.

<u>Spurring Market Activity</u>

- ✓ With credit markets in turmoil, providing broader access to the tax-exempt market will allow for more market activity from municipalities and infrastructure providers who might have otherwise deferred investment.

ESTIMATED BUDGET EFFECTS OF THE REVENUE PROVISIONS CONTAINED IN H.R. 4213, THE "AMERICAN JOBS AND CLOSING TAX LOOPHOLES ACT OF 2010," SCHEDULED FOR CONSIDERATION BY THE HOUSE OF REPRESENTATIVES

Fiscal Years 2010 - 2020

[Millions of Dollars]

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
I. Infrastructure Incentives														
A. Extend Build America Bonds with Direct-Pay Subsidy Rate Decreasing to 32% for Governmental Capital Project Financing Bonds Issued During 2011, and 30% for Such Bonds During 2012 [1].......	DOE	---	-89	-343	-451	-451	-451	-451	-451	-451	-451	-451	-1,786	-4,042
B. Exempt-Facility Bonds for Sewage and Water Supply Facilities														
1. Provide that the volume cap for private activity bonds shall not apply to bonds for facilities for the furnishing of water and for sewage facilities..........	oia DOE	-1	-3	-7	-14	-23	-31	-39	-47	-55	-63	-71	-79	-354
2. Permit Indian tribes to issue tax-exempt private activity bonds for facilities for the furnishing of water and for sewage facilities............	oia DOE	[2]	[2]	-1	-1	-1	-2	-2	-2	-3	-3	-3	-5	-18
C. Extension of Exemption from AMT Tax Treatment for Certain Tax-Exempt Bonds (sunset 12/31/11).....	oia 12/31/10	---	-13	-25	-25	-25	-25	-24	-24	-22	-21	-20	-113	-224
D. Extension and Additional Allocations of Recovery Zone Bond Authority [1]..........................	DOE	-10	-104	-242	-266	-259	-256	-249	-249	-249	-249	-249	-1,137	-2,385
E. Allow New Markets Tax Credit Against the AMT [3]..	[4]	-1	-6	-21	-43	-61	-73	-77	-74	-61	-28	---	-205	-445
F. Extension of Tax-Exempt Eligibility for Loans Guaranteed by Federal Home Loan Banks (sunset 12/31/11)..	DOE	---	-13	-15	-15	-15	-15	-15	-15	-15	-15	-15	-73	-148
G. Extension of Temporary Small Issuer Rules to Tax-Exempt Interest Allocation Rules for Financial Institutions (sunset 12/31/11)..................................	bia 12/31/10	---	-7	-21	-29	-29	-29	-29	-28	-28	-27	-27	-115	-254
Total of Infrastructure Incentives..		**-12**	**-235**	**-675**	**-844**	**-864**	**-882**	**-886**	**-890**	**-884**	**-857**	**-836**	**-3,513**	**-7,870**

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
II. Extension of Expiring Provisions														
A. Energy														
1. Alternative motor vehicle credit for new qualified hybrid motor vehicles other than passenger automobiles and light trucks (sunset 12/31/10).........	ppa 12/31/09	-3	-3	-1	-1	[2]	[5]	[5]	---	---	---	---	-8	-8
2. Excise tax credits and outlay payments for biodiesel and renewable diesel:														
a. Biodiesel (sunset 12/31/10)................................	fsoua 12/31/09	-624	-231	---	---	---	---	---	---	---	---	---	-854	-854
b. Renewable diesel (sunset 12/31/10)......................	fsoua 12/31/09	-10	-4	---	---	---	---	---	---	---	---	---	-14	-14
3. Extend and modify credit for electricity produced at open-loop biomass facilities placed-in-service before 10/22/04 (sunset 12/31/10)............................	epasa 12/31/09	-43	-29	-6	-3	-2	-1	---	---	---	---	---	-84	-84
4. Extend and modify credit for steel industry fuel (sunset 12/31/10)..	DOE & fpa 10/1/08	-13	-15	-16	---	---	---	---	---	---	---	---	-44	-44
5. Placed-in-service date for eligibility for tax credit for the production of coke or coke gas (sunset 12/31/10)...	fpisa 12/31/09	-3	-5	-5	-5	-3	---	---	---	---	---	---	-21	-21
6. Credit for construction of energy efficient new homes (sunset 12/31/10)...	haa 12/31/09	-23	-17	-6	-6	-5	-4	-4	-1	---	---	---	-61	-66
7. Incentives for alternative fuel and alternative fuel mixtures (excluding liquefied hydrogen, coal to liquids, and P-series fuels) (sunset 12/31/10)...........	fsoua 12/31/09	-73	-23	---	---	---	---	---	---	---	---	---	-96	-96
8. Special rule for sales or dispositions to implement FERC or State electric restructuring policy for qualified electric utilities (sunset 12/31/10)..............	ta 12/31/09	-221	-88	49	49	49	49	49	49	17	---	---	-113	---
9. Suspension of 100 percent-of-net- income limitation on percentage depletion for oil and natural gas from marginal properties (sunset 12/31/10)...	tyba 12/31/09	-67	-36	---	---	---	---	---	---	---	---	---	-103	-103
10. Direct payment of energy-efficient appliance tax credit [1]..	api 2009 & 2010	-68	-2	---	---	---	---	---	---	---	---	---	-69	-69
11. Modify the requirements for exterior windows, doors, and skylights to be eligible for the credit for nonbusiness energy property (sunset 12/31/10).........	ppisa DOE	---	-145	---	---	---	---	---	---	---	---	---	-145	-145
B. Individual Tax Relief														
1. Deduction for certain expenses of elementary and secondary school teachers (sunset 12/31/10)............	tyba 12/31/09	-43	-172	---	---	---	---	---	---	---	---	---	-215	-215
2. Additional standard deduction for State and local real property taxes (sunset 12/31/10)................	tyba 12/31/09	-233	-1,318	---	---	---	---	---	---	---	---	---	-1,551	-1,551
3. Deduction of State and local general sales taxes (sunset 12/31/10)..	tyba 12/31/09	-218	-1,288	-294	---	---	---	---	---	---	---	---	-1,800	-1,800

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
4. Contributions of capital gain real property made for qualified conservation purposes (sunset 12/31/10)	cmi tyba 12/31/09	-23	-60	-22	-17	-14	-12	-10	-8	-8	-8	-8	-148	-190
5. Deduction for qualified tuition and related expenses (sunset 12/31/10)	tyba 12/31/09	-35	-658	---	---	---	---	---	---	---	---	---	-693	-693
6. Tax-free distributions from IRAs to certain public charities from age 70 1/2 or older, not to exceed $100,000 per taxpayer per year (sunset 12/31/10)	Dmi tyba 12/31/09	-175	-187	-24	-25	-26	-28	-29	-31	-33	-34	-35	-465	-627
7. Look-thru of certain regulated investment company ("RIC") stock in determining gross estate of nonresidents (sunset 12/31/10)	dda 12/31/09	*No Revenue Effect*												
8. Election for direct payment of low-income housing credit for 2010 [1]	DOE	-3,072	-1,232	281	435	504	521	523	523	523	523	482	-2,563	11
C. Business Tax Relief														
1. Tax credit for research and experimentation expenses (sunset 12/31/10)	apoia 12/31/09	-2,195	-1,522	-483	-425	-374	-329	-291	-274	-265	-256	-236	-5,328	-6,650
2. Indian employment tax credit (sunset 12/31/10)	tyba 12/31/09	-6	-34	-7	-1	---	---	---	---	---	---	---	-49	-49
3. New markets tax credit (sunset 12/31/10)	cyba 12/31/09	---	-7	-33	-101	-156	-169	-191	-208	-205	-176	-100	-467	-1,347
4. 50% tax credit for certain expenditures for maintaining railroad tracks (sunset 12/31/10)	epoid tyba 12/31/09	-66	-99	[2]	[2]	---	---	---	---	---	---	---	-165	-165
5. Mine rescue training credit:														
a. Mine rescue team training credit (sunset 12/31/10)	tyba 12/31/09	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	-1	-1
b. Allow mine rescue team training credit against the AMT (sunset 12/31/10)	tyba 12/31/09	-1	-1	-1	-1	[2]	[2]	[2]	---	---	---	---	-6	-6
6. Employer wage credit for activated military reservists (sunset 12/31/10)	pma 12/31/09	-1	-2	-1	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	-4	-4
7. 5-year depreciation for certain farming business machinery and equipment (sunset 12/31/10)	ppisa 12/31/09	-113	-228	-164	-156	-178	41	377	334	87	---	---	-798	---
8. 15-year straight-line cost recovery for qualified leasehold, restaurant and retail improvements (sunset 12/31/10)	ppisa 12/31/09	-145	-410	-528	-522	-513	-489	-475	-479	-466	-443	-380	-2,608	-4,851
9. 7-year recovery period for certain motorsports entertainment complexes (sunset 12/31/10)	ppisa 12/31/09	-11	-18	-11	-6	-3	-4	-4	1	6	6	6	-52	-38
10. Accelerated depreciation for business property on Indian reservations (sunset 12/31/10)	ppisa 12/31/09	-107	-186	-69	15	51	80	65	35	4	-7	-4	-216	-123
11. Enhanced charitable deduction for contributions of food inventory (sunset 12/31/10)	cma 12/31/09	-43	-35	---	---	---	---	---	---	---	---	---	-78	-78
12. Enhanced charitable deduction for contributions of book inventory (sunset 12/31/10)	cma 12/31/09	-17	-14	---	---	---	---	---	---	---	---	---	-31	-31

429

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
13. Enhanced charitable deduction for qualified compnter contributions (sunset 12/31/10)	cmi tyba 12/31/09	-107	-88	---	---	---	---	---	---	---	---	---	-195	-195
14. Election to expense mine safety equipment (sunset 12/31/10)	ppisa 12/31/09	-8	-2	3	2	2	1	1	1	[5]	---	---	-3	---
15. Special expensing rules for qualified film and television productions (sunset 12/31/10)	qfatpca 12/31/09	-54	-108	12	26	18	15	13	11	9	7	5	-91	-46
16. Expensing of Brownfields environmental remediation costs (sunset 12/31/10)	epoia 12/31/09	-201	-124	19	22	25	23	20	18	15	13	12	-236	-158
17. Deduction allowable with respect to income attributable to domestic production activities in Puerto Rico (sunset 12/31/10)	tyba 12/31/09	-84	-101	---	---	---	---	---	---	---	---	---	-185	-185
18. Modify tax treatment of certain payments under existing arrangements to controlling exempt organizations (sunset 12/31/10)	proaa 12/31/09	-17	-3	---	---	---	---	---	---	---	---	---	-20	-20
19. Exclusion of gain or loss on sale or exchange of certain Brownfield sites from unrelated business taxable income (sunset 12/31/10)	paa 12/31/09	1	1	-1	-17	-18	-3	-3	-3	-3	-3	-3	-37	-54
20. REIT timber provisions including mineral royalties treated as qualified REIT income of timber REITs; treatment of REIT timber gain; and prohibited transactions safe harbor rules (sunset 12/31/10)	tyea 5/22/09	-1	-1	-1	-1	-1	-1	-1	-1	---	---	---	-5	-7
21. Treatment of certain dividends of regulated investment companies ("RICs") (sunset 12/31/10)	[6]	-12	-72	---	---	---	---	---	---	---	---	---	-84	-84
22. Extend the treatment of RICs as "qualified investment entities" under section 897 ("FIRPTA") (sunset 12/31/10)	1/1/10	-5	-5	---	---	---	---	---	---	---	---	---	-10	-10
23. Exception under Subpart F for active financing income (sunset 12/31/10)	tyba 12/31/09	-945	-2,978	---	---	---	---	---	---	---	---	---	-3,923	-3,923
24. Look-thru treatment of payments between related controlled foreign corporations under foreign personal holding company income rules (sunset 12/31/10)	tyba 2009	-135	-439	---	---	---	---	---	---	---	---	---	-574	-574
25. Basis adjustment to stock of S corporations making charitable contributions of property (sunset 12/31/10)	cmi tyba 12/31/09	-11	-11	-1	-2	-2	-2	-2	-2	-2	-2	-2	-29	-39
26. Empowerment zone tax incentives (sunset 12/31/10)	tyba 12/31/09	-203	-103	8	2	1	---	-2	-1	-2	-2	-2	-295	-304
27. Tax incentives for investment in the District of Columbia (sunset 12/31/10)	tyba 12/31/09	-55	-11	-3	-1	-1	-2	-4	-2	-2	-2	-2	-73	-85

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
28. Renewal community tax incentives (sunset 12/31/10)	tyba 12/31/09	-239	-252	-80	-42	-3	-3	-2	-1	1	---	---	-615	-621
29. Increase in limit on cover over of rum excise tax revenues (from $10.50 to $13.25 per proof gallon) to Puerto Rico and the Virgin Islands; (sunset 12/31/10) [1] [7]	abiUSa 12/31/09	-104	-27	---	---	---	---	---	---	---	---	---	-131	-131
30. Payment to American Samoa in lieu of extension of economic development credit [1] [7]	---	-18	---	---	---	---	---	---	---	---	---	---	-18	-18
31. Election to temporarily utilize unused AMT credits determined by domestic investment [8]	tyba 12/31/09	-160	-3,032	167	142	120	102	87	74	63	53	45	-2,660	-2,337
32. Study of expiring tax provisions	DOE	*No Revenue Effect*												
D. Temporary Disaster Relief Provisions														
1. National disaster relief														
a. Waive certain mortgage revenue bond requirements following Federally declared disasters (sunset 12/31/10) [9]	bia 12/31/09	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-11	-21
b. Individual casualty losses attributable to Federally declared disasters deductible without regard to AGI; $500 floor applicable to all casualty losses (sunset 12/31/10)	tyba 12/31/09	-273	-455	---	---	---	---	---	---	---	---	---	-728	-728
c. Special depreciation allowance for qualified disaster property (sunset 12/31/10)	eoao doa 12/31/09	-335	-625	-469	-183	-76	-69	-18	97	83	72	65	-1,757	-1,457
d. 5-year carryback of net operating losses attributable to Federally declared disasters (sunset 12/31/10)	doa 12/31/09	-21	-380	53	57	49	37	28	21	15	12	9	-205	-120
e. Expensing of qualified disaster expenses (sunset 12/31/10)	eoao doa 12/31/09	-20	-17	1	1	1	1	1	1	---	---	---	-33	-31
2. New York Liberty Zone:														
a. Special depreciation allowance for nonresidential and residential real property (sunset 12/31/10)	ppisa 12/31/09	-33	-10	1	1	1	1	1	1	1	1	1	-39	-34
b. Tax-exempt bond financing (sunset 12/31/10)	bia 12/31/09	-2	-8	-12	-12	-12	-12	-12	-12	-12	-12	-12	-58	-118
3. GO Zone:														
a. Extend the higher credit rate for GO Zone rehabilitation (sunset 12/31/10)	apoia 12/31/09	-23	-29	-6	2	2	2	2	2	2	2	2	-52	-43
b. Work opportunity tax credit with respect to certain individuals affected by Hurricane Katrina for employees inside disaster areas (sunset 8/27/10)	iha 8/27/09	-6	-1	[2]	[2]	[2]	[2]	---	---	---	---	---	-7	-7

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
c. Extend the placed-in-service deadline for GO Zone low-income housing credits (sunset 12/31/12)	ppisa 12/31/10	---	-8	-29	-40	-40	-40	-40	-40	-40	-40	-40	-157	-357
Extension of Expiring Provisions		**-10,724**	**-16,960**	**-1,681**	**-815**	**-606**	**-297**	**77**	**103**	**-214**	**-298**	**-199**	**-31,081**	**-31,619**
III. Pension Provisions														
A. Pension Funding Relief														
1. Single-employer plans [10]	various	110	777	1,595	1,524	859	468	239	-134	-1,006	-1,743	-1,380	5,333	1,309
2. Rollover of amounts received in airline carrier bankruptcy	DOE	-25	-91	25	-4	-4	-4	-4	-4	-3	-3	-3	-102	-119
3. Multiemployer plans [10]	various	9	34	56	79	99	117	134	132	99	40	-2	394	797
B. Defined Contribution Plan Fee Disclosure	pyba 12/31/11	*Negligible Revenue Effect*												
Total of Pension Provisions		**94**	**720**	**1,676**	**1,599**	**954**	**581**	**369**	**-6**	**-910**	**-1,706**	**-1,385**	**5,625**	**1,987**
IV. Revenue Offsets														
A. Foreign Provisions														
1. Rules to prevent splitting foreign tax credits from the income to which they relate	generally fitpoaa doi	75	850	800	750	700	650	600	550	500	450	400	3,825	6,325
2. Denial of foreign tax credit with respect to foreign income not subject to United States taxation by reason of covered asset acquisitions	generally caaa DOE	25	400	400	400	400	400	400	400	400	400	400	2,025	4,025
3. Separate application of foreign tax credit limitation, etc., to items resourced under treaties	tyba DOE	3	25	25	25	25	25	25	25	25	25	25	128	253
4. Limitation on the amount of foreign taxes deemed paid with respect to section 956 inclusions	[11]	10	100	100	100	100	100	100	100	100	100	100	510	1,010
5. Special rule with respect to certain redemptions by foreign subsidiaries	aa doi	5	25	25	25	25	25	25	25	25	25	25	130	255
6. Modification of affiliation rules for purposes of rules allocating interest expense	tyba DOE	15	225	150	10	5	[5]	[5]	[5]	[5]	[5]	[5]	405	405
7. Termination of special rules for interest and dividends received from persons meeting the 80-percent foreign business requirements	generally tyba 12/31/10	---	1	2	6	9	12	15	21	25	29	33	30	153
8. Source rules for income on guarantees	gia DOE	25	200	200	200	200	200	200	200	200	200	200	1,025	2,025
9. Modification of statute of limitations for failure to disclose certain foreign transactions	[12]	*No Revenue Effect*												
B. Personal Service Income Earned in Pass-Thru Entities														
1. Partnership interests transferred in connection with performance of services	iipta DOE	*Estimate Included in Item IV.B.2.*												

432

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
2. Income of partners for performing investment management services treated as ordinary income received for performance of services [13]	tyea DOE	---	2,026	1,580	1,707	1,661	1,463	1,551	1,977	2,267	2,268	2,185	8,437	18,685
3. Employment and self-employment tax treatment of professional service businesses [10]	tyba 12/31/10	---	502	863	942	1,051	1,138	1,205	1,274	1,348	1,425	1,501	4,496	11,249
C. Corporate Provisions														
1. Treatment of securities of a controlled corporation exchanged for assets in certain reorganizations	gea DOE	5	25	25	25	25	25	25	25	25	25	25	130	255
2. Taxation of boot received in reorganizations	gea DOE	10	50	50	50	50	50	50	50	50	50	50	260	510
D. Other Provisions														
1. Increase Oil Spill Liability Trust Fund tax to 34 cents per barrel (sunset 12/31/20) and remove single-incident expenditure caps for the Oil Spill Liability Trust Fund [14]	fqb 60da DOE & ema DOE	---	1,185	1,197	1,200	1,199	1,195	1,195	1,161	1,149	1,151	1,153	5,975	11,785
2. Increase by 36 percentage points the required corporate estimated tax payments factor for corporations with assets of at least $1 billion for payments due in July, August, and September 2015	DOE	---	---	---	---	---	21,234	-21,234	---	---	---	---	21,234	---
Total of Revenue Offsets		**173**	**5,614**	**5,417**	**5,440**	**5,450**	**26,517**	**-15,843**	**5,808**	**6,114**	**6,148**	**6,097**	**48,610**	**56,935**
Total of Titles I - IV		**-10,469**	**-10,861**	**4,737**	**5,380**	**4,934**	**25,919**	**-16,283**	**5,015**	**4,106**	**3,287**	**3,677**	**19,641**	**19,433**
V. Unemployment Health, and Other Assistance														
1. Extension of premium assistance for COBRA benefits for involuntary terminations through 11/30/10 [1] [15]	[16]	-2,620	-3,318	-982	38	31	19	12	4	1	---	---	-6,832	-6,815
2. Establish a CMS-IRS data match to identify tax-delinquent providers [1] [7]	DOE	---	---	38	38	50	50	50	50	50	50	50	175	425
Total of Unemployment Health, and Other Assistance		**-2,620**	**-3,318**	**-944**	**76**	**81**	**69**	**62**	**54**	**51**	**50**	**50**	**-6,657**	**-6,390**
VI. Other Provisions														
1. Exclude from gross income amounts received by Indians pursuant to Cobell settlement	DOE	*No Revenue Effect*												
2. Provide that tax refunds or credits are not income in the year received for purposes of the administration of Federal programs and federally assisted programs (sunset 12/31/10) [1] [7]	ara 12/31/09	-2	---	---	---	---	---	---	---	---	---	---	-2	-2

Provision	Effective	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
3. Extensions of duty suspensions on certain cotton shirting fabrics (sunset 12/31/13) [7]........................	DOE	---	[17]	[17]	[17]	[17]	---	---	---	---	---	---	[17]	[17]
Total of Other Provisions..		**-2**	**[17]**	**[17]**	**[17]**	**[17]**	**---**	**---**	**---**	**---**	**---**	**---**	**-2**	**-2**
NET TOTAL		**-13,091**	**-14,179**	**3,793**	**5,456**	**5,015**	**25,988**	**-16,221**	**5,069**	**4,157**	**3,337**	**3,727**	**12,982**	**13,041**

Joint Committee on Taxation

NOTE: Details may not add to totals due to rounding. The date of enactment is assumed to be July 1, 2010.

Legend for "Effective" column:

aa = acquisitions after
abiUSa = articles brought into the United States after
api = appliances produced in
apoia = amounts paid or incurred after
ara = amounts received after
bia = bonds issued after
caaa = covered asset acquisitions after
cma = contributions made after
cmi = contributions made in
cyba = calendar years beginning after
dda = decedents dying after
Dmi - distributions made in
doa = disasters occurring after
DOE = date of enactment

ema = expenditures made after
eoao = expenditures on account of
epasa = electricity produced and sold after
epoia = expenses paid or incurred after
epoid = expenses paid or incurred during
fitpoaa = foreign income taxes paid or accrued after
fpa = fuel produced after
fpisa = facilities placed in service after
fqb = first quarter beginning
fsoua = fuel sold or used after
gea = generally exchanges after
gia = guarantees issued after
haa = homes acquired after
iha = individuals hired after

iipta = interests in partnerships transferred after
oia = obligations issued after
paa = property acquired after
Paa = penalties assessed after
pma = payments made after
ppa = property purchased after
ppisa = property placed in service after
proaa = payments received or accrued after
pyba = plan years beginning after
qfatpca = qualified film and television productions commencing after
tyba = taxable years beginning after
tyea = taxable years ending after
60da = 60 days after

[1] Estimate includes the following outlay effects:	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
Build America Bonds..	---	484	1,949	2,730	2,730	2,730	2,730	2,730	2,730	2,730	2,730	10,622	24,270
Recovery Zone Bonds..	14	70	141	141	141	141	141	141	141	141	141	648	1,353
Direct payment of energy-efficient appliance tax credit..........................	68	2	---	---	---	---	---	---	---	---	---	69	69
Election for refundable low-income housing credit for 2010.....................	3,112	1,334	---	---	---	---	---	---	---	---	---	4,446	4,446
Rum cover over [7]..	104	27	---	---	---	---	---	---	---	---	---	131	131
Payment to American Samoa [7]..	18	---	---	---	---	---	---	---	---	---	---	18	18
COBRA..	277	289	508	---	---	---	---	---	---	---	---	1,075	1,075
CMS-IRS data match to identify tax-delinquent providers [7]...................	---	---	-38	-38	-50	-50	-50	-50	-50	-50	-50	-175	-425
Tax refunds or credits not income in the year received [7].......................	2	---	---	---	---	---	---	---	---	---	---	2	2

[2] Loss of less than $500,000.

[3] Estimate includes interaction with item II.C.3.

[4] Effective for qualified equity investments initially made after March 15, 2010, and before January 1, 2012.

[Footnotes for Table #10-1 058 R10 are continued on the following page]

Footnotes for Table #10-1 058 R10 continued:

[5] Gain of less than $500,000.

[6] Effective for dividends with respect to taxable years of regulated investment companies beginning after December 31, 2009.

[7] Estimate provided by the Congressional Budget Office.

[8] Provision does not apply for taxable years beginning after December 31, 2010.

[9] Extends provisions in Internal Revenue Code sections 143(k)(11) and 143(k)(13).

[10] Estimate includes the following off-budget effects:

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
Pension Funding Relief for Single-Employer Plans	---	144	342	349	202	104	45	-60	-331	-561	-450	1,141	-215
Pension Funding Relief for Multiemployer Plans	---	5	12	20	25	30	36	37	29	11	-1	92	203
Employment and self-employment tax treatment of professional service businesses	---	316	553	547	568	615	652	692	733	777	823	2,598	6,276

[11] Effective for acquisitions of U.S. property determined under section 956 after the date of introduction.

[12] Effective for returns filed after March 18, 2010, as well as other returns for which the limitations period under section 6501 had not yet expired as of that date.

[13] For taxable years beginning before January 1, 2013, 50 percent of income and other items to which the provision applies is treated as ordinary; 75 percent thereafter. These percentages also apply to self-employment and Medicare unearned income tax. Estimated tax penalties are waived in 2010 for any increase in liability owing to the provision.

[14] Estimate does not include the following outlay effects,

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2010-15	2010-20
which are provided by the Congressional Budget Office	---	500	400	100	---	---	---	---	---	---	---	1,000	1,000

[15] Estimate includes interaction with the unemployment insurance program, provided by the Congressional Budget Office.

[16] Generally effective as if included in the "American Recovery and Reinvestment Act of 2009."

[17] Negligible revenue effect.

The United States Conference of Mayors
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For Immediate Release
March 15, 2010

Contact: Carlos Vogel (cvogel@usmayors.org) 202-861-6708

AVERAGE AMERICAN HOUSEHOLD WATER AND SEWER RATES ARE EXPECTED TO INCREASE 2 TO 4 TIMES BY 2028

Nation's Mayors Report on Past and Projected Cost of Public Water and Wastewater Services and Infrastructure

Washington, D.C. – A report released today by the U.S. Conference of Mayors says that water and sewer rates for American households will double to quadruple over the next 20 years. The report forecasts future spending for public water and wastewater systems will range between $2.5 and $4.8 trillion over the next 20 year period 2009 to 2028. Over the last 53 years, local governments have invested $1.6 trillion.

The report shows that cities provide the overwhelming majority of public water and wastewater infrastructure investment—accounting for more than 95% of total expenditures for these public services. In 2008 local government spent $93 billion on water and sewer services and infrastructure, while Congress provided only $2 billion in grants to states who then disbursed the money in the form of loans to local governments which have to be paid back with interest.

"We need a new partnership with the federal government to achieve the clean water goals: providing safe, adequate and affordable water quality for the 21st Century while protecting the environment", said U.S. Conference Mayors President Burnsville (MN) Mayor Elizabeth Kautz. "Right now the federal government is imposing many more mandates than the money needed to meet them." she said. "Many of these mandates impose costs on cities to clean up the pollution caused by mining and agricultural activities. "But it is our citizens, whose family budgets are already strained by the economy, who will have to pay the skyrocketing water and sewer rates."

The report finds that current federal financial assistance programs are fragmented and not targeted to metro-urban areas that the nation depends on for employment, economic growth, and environmental stewardship. Currently the nation's preeminent federal water program--the State Revolving Fund Loan Program—is inadequate in its current form and needs to be revitalized to meet 21st Century needs. The report shows that the SRF program has received flat funding while the federal government has dramatically increased mandates on local governments.

In addition to the wave of unfunded mandates, the report also finds that the increased costs are related to population growth, urbanization, and aging infrastructure. The combination of mandates and these other factors are forcing loeal government onto a spending treadmill where ever-growing annual investments may not be sufficient to guarantee safe, affordable and adequate supplies and services or meet state and federal requirements.

KEY FINDINGS

- The cost of providing public water and wastewater services and infrastructure from 1956 to 2008 was $1.6 trillion in nominal dollars and $3.2 trillion in inflation adjusted 2008 dollars.
- Local government spending doubled five times over this period, while GDP doubled four times over the same period. Today, sixty cents on every dollar spent is for Operations and Maintenance; and 40 cents goes to capital investment, reversing an historical trend of a majority of expenditures on capital investments.
- Local government devotes six tenths of one percent of GDP to this function each year, while the intended preeminent federal aid program – the State Revolving Fund (SRF) loan programs - provides a mere 2 thousandths of one percent of GDP annually. The SRF program fails to provide adequate financial assistance to cities.

- Cities are spending more dollars on water and wastewater each year, but the investment needs far outweigh local government's ability to keep up with an aging infrastructure- Americans will likely face increased service disruptions, increased water main breaks, and greater impacts on local economies and threats to public health.

"The bottom line is that our federal water and wastewater programs must be reformed and directly fund our cities to meet these challenges," said U.S. Conference of Mayors CEO and Executive Director Tom Cochran, "Otherwise, families will be hit with unrealistic bills they cannot afford." "The nation's mayors call on Congress and the Administration to work with cities to establish a National Action Agenda that will renew and strengthen the intergovernmental commitment to water and wastewater infrastructure," he said.

A copy of the Report: "TRENDS IN LOCAL GOVERNMENT EXPENDITURES ON PUBLIC WATER AND WASTEWATER SERVICES AND INFRASTRUCTURE: PAST, PRESENT AND FUTURE", can be found at www.usmayors.org/publications

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The U.S. Conference of Mayors is the official nonpartisan organization of cities with populations of 30,000 or more. There are 1,139 such cities in the country today, each represented in the Conference by its chief elected official, the Mayor.

II

AUTHENTICATED U.S. GOVERNMENT INFORMATION GPO

112TH CONGRESS
1ST SESSION

S. 939

To amend the Internal Revenue Code of 1986 to provide that the volume cap for private activity bonds shall not apply to bonds for facilities for the furnishing of water and sewage facilities.

IN THE SENATE OF THE UNITED STATES

MAY 10, 2011

Mr. MENENDEZ (for himself and Mr. CRAPO) introduced the following bill; which was read twice and referred to the Committee on Finance

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A BILL

To amend the Internal Revenue Code of 1986 to provide that the volume cap for private activity bonds shall not apply to bonds for facilities for the furnishing of water and sewage facilities.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Sustainable Water Infrastructure Investment Act of 2011".

SEC. 2. FINDINGS AND PURPOSE.

(a) FINDINGS.—Congress finds the following:

(1) Our Nation's water and wastewater systems are among the best in the world, providing safe drinking water and sanitation to our citizens.

(2) In addition to protecting the health of our citizens, community water systems are essential to our local economies, enabling industries to achieve growth and productivity that make America strong and prosperous.

(3) Regulated under title XIV of the Public Health Service Act (42 U.S.C. 300f et seq.; commonly known as the "Safe Drinking Water Act") and the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), community drinking water systems and wastewater collection and treatment facilities are critical elements in the Nation's infrastructure.

(4) Water and wastewater infrastructure is comprised of a mixture of old and new technology. In many local communities across the Nation, the old infrastructure has deteriorated to critical conditions and is very costly to replace. Recent government studies have estimated costs of $500,000,000,000 to $800,000,000,000 over the next 20 years for maintaining and improving the ex-

isting inventory, building new infrastructure, and meeting new water quality standards.

(5) The historical approach of funding infrastructure is insufficient to meet the investment needs of the future.

(6) The Federal partnership with State and local communities has played a pivotal role in improving the Nation's water quality and drinking water supplies. Federal assistance under this partnership has been the linchpin of these improvements.

(7) In light of constrained Federal budgets, the availability of exempt-facility financing represents an important financing tool to help close the gap between funds currently being invested and water infrastructure needs, preserving the Federal partnership.

(8) Providing alternative financing solutions, such as tax-exempt securities, encourages investment in water and wastewater infrastructure that in turn creates local jobs and protects the health of our citizens.

(9) Federally mandated State volume cap restrictions in conjunction with other priorities have limited the use of tax-exempt securities on water and wastewater infrastructure investment.

(10) Removal of State volume caps for water and wastewater infrastructure will accelerate and increase overall investment in the Nation's critical water infrastructure; facilitate increased use of innovative infrastructure delivery methods supporting sustainable water systems through public-private partnerships that optimize design, financing, construction, and long-term management, maintenance and viability; and provide for more effective risk management of complex water infrastructure projects by municipal utility and private sector partners.

(b) PURPOSE.—The purpose of this Act is to provide alternative financing for long-term infrastructure capital investment programs, and to restore the Nation's safe drinking water and wastewater infrastructure capability and protect the health of our citizens.

SEC. 3. EXEMPT-FACILITY BONDS FOR SEWAGE AND WATER SUPPLY FACILITIES.

(a) BONDS FOR WATER AND SEWAGE FACILITIES EXEMPT FROM VOLUME CAP ON PRIVATE ACTIVITY BONDS.—Paragraph (3) of section 146(g) of the Internal Revenue Code of 1986 is amended by inserting "(4), (5)," after "(2),".

(b) CONFORMING CHANGE.—Paragraphs (2) and (3)(B) of section 146(k) of the Internal Revenue Code of 1986 are both amended by striking "(4), (5), (6)," and inserting "(6)".

(c) EFFECTIVE DATE.—The amendments made by this section shall apply to obligations issued after the date of the enactment of this Act.

○

For Immediate Release
May 10, 2011

For Information Contact
Paul Brubaker (973) 523-5152

REPS. PASCRELL, GEOFF DAVIS; SENS. MENENDEZ, CRAPO INTRODUCE BIPARTISAN LEGISLATION TO HELP CREATE JOBS BY ENCOURAGING PRIVATE INVESTMENT IN WATER INFRASTRUCTURE UPGRADES

Lawmakers agree: Lifting the cap on private activity bonds for water infrastructure will make needed infrastructure updates more affordable.

WASHINGTON – Citing the nation's undeniable needs for jobs creation and updated water systems, U.S. Reps. Bill Pascrell, Jr. (D-NJ-8) and Rep. Geoff Davis (R-KY-4) and U.S. Sens. Robert Menendez (D-NJ) and Mike Crapo (R-ID) introduced legislation today aimed at creating jobs by encouraging private investment in water infrastructure upgrade projects.

"Our nation's job deficit and deteriorating water systems have gotten to the point that if you randomly pick up a newspaper in any American city, there's a good chance you find a story about a company's job cuts or a community's water main break – maybe both," said Pascrell, a member of the House Ways and Means and Budget Committees. "Taxpayers cannot be expected to foot the entire bill for all of the repairs and updates that our water infrastructure needs. That is why this legislation will encourage this is a public- private partnership that will unlock upwards of 50 billion dollars of private capital for the public good. More people will be put back to work and more reliable water services will be provided in communities across the nation."

"This bill is an important step forward in incentivizing public-private partnerships to bring in needed private capital to ensure that water infrastructure is safe and reliable," Rep. Geoff Davis (R-KY) said. "I am pleased to have worked with Representative Pascrell on this important legislation that will make the financing of water infrastructure projects more affordable."

"We're all too familiar with the increasing frequency of water main breaks that unexpectedly flood random areas, disrupting businesses, transportation, and the daily lives of so many on any given day," said Senator Menendez. "This legislation could create over a million jobs leveraging a modest investment by the federal government into billions of dollars of critical private economic investment to upgrade and rebuild aging water infrastructure in communities across the nation. Creating private sector jobs to ensure American families have reliable access to clean water is a win for our workers, taxpayers, and the communities we live in."

"Small communities need, and deserve, federal support to comply with federal water and wastewater guidelines," Sen. Crapo said. "This bill would allow local communities to leverage private capital markets in combination with other financial mechanisms to finance water and wastewater infrastructure projects. It makes financial sense for communities and will improve public health and water quality."

The Water Infrastructure Investment Act of 2011 provides for the removal of state volume caps on private activity bonds (PABs) for water and wastewater financing. Congress has already exempted airports, intercity high-speed rail, and solid waste disposal sites from these bond caps.

The legislation would allow water systems easier access to capital throughout the nation.

PAB issuance would be one of the fastest forms of federal assistance when applied to water and wastewater projects, with only 90-120 days needed to complete the process – from approval to sale – and get Americans to work. In the first year of implementation alone the legislation is expected to create 28,500 new jobs.

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THE UNITED STATES CONFERENCE OF MAYORS

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May 20, 2011

The Honorable Robert Menendez
U. S. Senate
528 Hart Senate Office Building
Washington, DC 20510

Dear Senator Menendez:

On behalf of the nation's Principal Cities represented by The United States Conference of Mayors (USCM), I am writing to express strong support for the Sustainable Water Infrastructure Investment Act of 2011 (S. 939). The purpose of the legislation, as you so well state, is to modify the tax code to help local government finance much needed water and wastewater infrastructure and create jobs by encouraging private investment. The USCM has supported similar legislative proposals for over a decade, and we wish to express our thanks to you for continuing to fight for this important legislation. We agree with you that water and wastewater infrastructure is critical to the well being of public health and the nation's economy.

Our Member Cities, in 2005, identified their most pressing water resources management issue is the rehabilitation of an aging infrastructure. Subsequently, our research clearly indicates that local government efforts, in 2008, involved a $100.2 billion expenditure on water and wastewater infrastructure and services. Yet, Congress and the Administration have contributed less than 2 percent to local government to support this effort. At the same time, the U.S. Environmental Protection Agency has promulgated several very costly unfunded federal mandates. The EPA has announced plans to develop more regulations that will become a cost-burden on the nation's cities. Our mayors are expected to rebuild their existing systems to maintain basic services, but also comply with new and costly regulatory programs. Local government allocation of financial resources to comply with federal water policy is rapidly and significantly diverting resources away from other equally important public needs. Congress set no cap on what cities are expected to spend to satisfy the water laws. The EPA has proven to be insensitive to the cost impacts of unfunded mandates. The nation's mayors recognize that this is both ill-advised and unsustainable.

Your legislation would provide some much-needed relief by encouraging local government to work with private capital to deliver a critical public service. A study we published in 2008 indicates that local government investment in water and wastewater infrastructure adds value to the national (and local) economy. That study suggests that every local dollar spent for this purpose generates $9 in direct and indirect income. Every local job created in water and sewer creates 3.68 jobs in the national economy to support that job. Your understanding of the relationship between infrastructure investment and job creation is a welcome sign of leadership in the right direction.

Thank you for sponsoring the Sustainable Water Infrastructure Investment Act of 2011. This minor modification of the tax code will provide an expansion of the tool-box of local government to provide safe, affordable and adequate water and wastewater services and infrastructure for the nation's principal cities in the 21st Century. If the Conference of Mayors can be of any service to your efforts, please contact Judy Sheahan or Rich Anderson of my staff at 202-293-7330.

Sincerely,

Tom Cochran

Tom Cochran
CEO and Executive Director
The United States Conference of Mayors

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I

112TH CONGRESS
1ST SESSION

H. R. 1802

To amend the Internal Revenue Code of 1986 to provide that the volume cap for private activity bonds shall not apply to bonds for facilities for the furnishing of water and sewage facilities.

IN THE HOUSE OF REPRESENTATIVES

MAY 10, 2011

Mr. PASCRELL (for himself and Mr. DAVIS of Kentucky) introduced the following bill; which was referred to the Committee on Ways and Means

---

A BILL

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(c) EFFECTIVE DATE.—The amendments made by this section shall apply to obligations issued after the date of the enactment of this Act.

○

TESTIMONY OF
STEPHEN L. JOHNSON
ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE SENATE APPROPRIATIONS COMMITTEE
ON MARCH 4, 2008

Madam Chairman and Members of the Committee, I appreciate the opportunity to discuss our proposed Fiscal Year (FY) 2009 Budget request for the Environmental Protection Agency (EPA) budget.

The President requests $7.14 billion for FY 2009 to support EPA's mission to protect human health and the environment both directly and through EPA's state, local and tribal partners nationwide. Since its founding, EPA has laid a strong foundation of environmental progress. Our air, water and land are cleaner today than they were just a generation ago. This budget continues this progress, supports the environmental commitments that the President and I have made and institutionalizes EPA's major management and performance improvements.

In particular, the budget meets the major priorities that I've set for my final year of service:

- Advancing clean, affordable and safe energy,
- Safeguarding our nation through stronger homeland security,
- Encouraging stakeholder collaboration to address energy and climate change issues,
- Improving our water infrastructure and programs,
- Continuing Superfund remediation of the most highly contaminated hazardous waste sites,
- Encouraging economic development through revitalization with our successful Brownfields program,
- Ensuring full compliance with the nation's environmental laws,
- Building a stronger EPA for my successor – including strengthening our protection of human health and the environment through best available science, and
- Demonstrating fiscal responsibility for all our successors.

Advancing Clean, Affordable and Safe Energy

We all know that our nation faces multiple challenges to assure a future of clean, affordable and safe energy. With both demand and costs on the rise, innovators are moving forward to propose cleaner power solutions that are good for our environment and good for our energy security. Industry is searching for many new domestic alternatives to help reduce our dependence on foreign energy. We estimate that over the next several years industry will propose drilling thousands of new oil and gas wells on Federal, state, and Tribal lands, apply to renew up to 100 nuclear plant licenses, consider building dozens of new liquefied natural gas terminals, and propose many other projects. This budget recognizes that industry's increased efforts will mean a larger workload in our existing air and water permitting programs as well as our enforcement programs – especially out West.

This budget includes an additional $14 million to help ensure environmentally sound decision-making – with proper permitting and review and in full compliance with the law. The

$14 million will support our state and tribal partners' efforts to increase their capacity to review and assess all the proposed energy projects and pay for the additional technical experts the Agency needs to meet permitting, technical review, and NEPA requirements.

One related clean energy initiative that I'm glad that we and the appropriating committees agreed upon is the Diesel Emission Reduction Act (DERA) program grants. In FY 2009, $49 million will fund 250-300 diesel retrofit grant programs that target older diesel engines which are not subject to the new regulations. A combination of strategies including engine retrofits, rebuilds or replacements, switching to cleaner fuels, and idling reduction strategies can reduce particulate matter emissions by 95 percent, smog forming hydrocarbon and nitrogen oxide emissions by up to 90 percent and greenhouse gases by up to 20 percent. These strategies will allow us to make continued progress in five sectors: freight, construction, school buses, agriculture and ports.

Homeland Security

Homeland Security continues to be one of EPA's top priorities. EPA has responded to five major disasters and catastrophic incidents in recent years, including response actions to the 9/11 terrorist attacks, the anthrax terrorist incidents, the Columbia Shuttle disaster and recovery efforts, the Ricin incident on Capitol Hill, and the Gulf Coast hurricanes. Our experience from these responses, coupled with EPA's externally driven mandates such as Homeland Security Presidential Directives and Emergency Support Function mission assignments, lead me to propose that EPA heighten its preparedness.

This budget ensures that we can meet these commitments by proposing an additional $32 million over last year's enacted budget for a total of $170 million to advance the EPA's capabilities to respond to multiple incidents, strengthen bio-defense research, and continue to support the Water Security Initiative.

As a part of this request, we remain committed to funding five Water Security Initiative pilots to secure a broad range of data so water utilities across the country will have the necessary information to install and enhance contamination warning systems. With the FY 2009 request we will have initiated all five pilots and expect to complete them by 2012. EPA is also advancing its preparedness to respond to multiple, large-scale, catastrophic incidents, and in particular, potential chemical, biological and/or radiological agent terror attacks.

Climate Change

For FY 2009, EPA requests a total of $114.7 million to continue to achieve real reductions of carbon dioxide, methane, per fluorinated compounds (PFCs) and other greenhouse gases, and continue research to better understand climate change and its ramifications.

EPA will continue to achieve real reductions in greenhouse gases by promoting energy efficiency through partnerships with consumers, businesses and other organizations. We will continue to see real results in the home, building, industrial and transportation sectors by spurring our partners' investments in energy efficient and greenhouse gas saving technologies, policies and practices. Based on a historical analysis, we estimate that for every dollar spent by EPA on its climate change programs, greenhouse gas emissions are reduced by up to the equivalent of one metric ton of carbon.

One cornerstone of our partnerships is the ENERGY STAR program, which has helped speed new lighting technologies to market, fostered development of more energy efficient computers, and increased Americans' understanding of how they can help the environment by purchasing cleaner and more efficient machines. To give one example, ENERGY STAR qualified light bulbs use 75 percent less electricity and last up to 10 times longer than traditional bulbs. If every American household switched just one traditional bulb to a high-efficiency ENERGY STAR bulb, America would save enough power to light more than three million homes ... save $600 million in energy costs ... and prevent greenhouse gas emission equal to more than 800,000 cars annually.

A Washington Post article two weeks ago on how pollution can be blown to the U.S. from overseas reminded me that our international programs are essential to realizing American ecological goals. If we don't help China, India and other developing countries build energy efficient technologies into their infrastructure, their increases in greenhouse gas emissions will far out-weigh any reduction that we achieve here. That is why it remains essential that we move forward with the Asia Pacific Partnership, Methane to Markets and other international programs.

In climate change research, EPA will invest $16.4 million to continue to better understand climate change and its ramifications. EPA will investigate how climate change affects air and water quality to protect the gains in public health made by the Agency. We will explore opportunities to anticipate the impacts and incorporate climate change considerations into regulatory processes. We will use research findings to support the development of a proposed rule on the geological sequestration of carbon dioxide to ensure that underground sources of drinking water are protected. We will continue to reach out to all our potential 300 million "green" partners by making available free, online decision support tools to enable resource managers to incorporate climate change considerations into their day-to-day operations.

Cooperative Programs

Our cooperative programs also provide an outstanding example of how we can find "win-win" solutions that make sense both environmentally and economically. They allow us to work with businesses and individuals to achieve environmental results while improving the bottom line. They allow EPA to start addressing environmental challenges as soon as we recognize them and give us the opportunity to test innovative approaches to meet today's challenging environmental problems. To date, our conservative estimate is that over 20,000 businesses and other groups across America have participated in cooperative programs. We are proud of the record of success of these programs and want to encourage our talented employees to continue to use their creativity in finding innovative ways to improve environmental results.

Working with Federal Partners

Cooperation with Federal partners is also crucial for EPA to meet its mission. In the FY 2009 budget, I want to highlight our efforts to work with Federal partners to better understand the environmental impact of the almost $2 trillion worth of imported goods coming into the U.S. annually. To meet this challenge, the President directed agencies with import/ export responsibilities to work together to create an International Trade Data System (ITDS) within an expanded Automated Commercial Environment (ACE). EPA's $3.1 million investment in FY 2009 will help build the linkage with ITDS to identify, track and confirm vital environmental details about imported goods in 6 areas: 1) vehicles and engines, 2) ozone depleting substances, 3) fuels, 4) pesticides, 5) toxic substances, and 6) hazardous waste.

This is not a pie-in-the-sky dream. It builds on a successful pilot test by our Office of Enforcement, which showed that accessing useable records lead to timely action. One pilot test identified imported engines in several planned shipments that did not meet US specifications and allowed us to block their entrance. One bad engine can make a big difference in emissions of particulate matter. Another pilot test proved that even child's play can be harmful to the environment. Detailed records highlight many batches of innocent-looking "silly-string" which contained banned chlorofluorocarbons (CFCs). These tests make clear that prompt data retrieval translates into prompt protection.

This is also an example of how our long term planning has paid off. EPA can efficiently link to ITDS because of the Agency developed a Central Data Exchange, a standard set of IT systems and protocols for sharing information among multiple partners.

Water Infrastructure and Programs

This President's budget meets our commitments to finance state revolving funds, proposes new financing options, continues WaterSense and other collaborative water-efficiency projects, strengthens our wetlands and watershed protection, and furthers our successful geographic initiatives.

We propose $842 million for Drinking Water State Revolving Fund (DWSRF) grants, an increase of $13 million. This funding will help achieve the target of 445 additional infrastructure improvement projects to public water systems – and help reach a long term target $1.2 Billion revolving level. The DWSRF program supports states by providing low-interest loans and other assistance to water systems to help provide safe, reliable water service on a sustainable basis, protect public health and achieve or maintain compliance with the Safe Drinking Water Act (SDWA).

For Clean Water State Revolving Funds (CWSRFs), we propose a FY 2009 investment of $555 million to help meet the program's long term revolving target of $3.4 Billion. This program is able to meet EPA's $6.8 billion total capitalization goal for FYs 2004-2011 with a reduced budget request due to higher than anticipated funding levels in previous years. The CWSRF program provides funds to capitalize state revolving loan funds that finance infrastructure improvements through low interest loans for public wastewater systems and other water quality projects.

The President's FY 2009 budget continues to support the Water Enterprise Bond Initiative that proposes financing wastewater and drinking water infrastructure projects using Private Activity Bonds (PABs) that are exempt from unified state PAB volume caps. We estimate this initiative will increase capital investment in the nation's water infrastructure by up to $5 billion per year over time through public-private partnerships. These bonds will complement local efforts to move towards full-cost pricing for wastewater and drinking water services, help localities become self-financing and minimize the need for future Federal expenditures.

These financing proposals work together with our continuing efforts to increase efficiency, protect our wetlands and watersheds, accurately monitor the condition of our waters and wetlands and target vital geographic areas.

For example, in June 2006 EPA launched the WaterSense program to reduce water use across the country by creating an easy-to-identify label for water-efficient products. The WaterSense label certified that products had been independently tested to meet strict efficiency and performance criteria. In less than two years, WaterSense has become a national symbol for water efficiency among utilities, plumbing manufacturers, and consumers. More than 125 different models of high-efficiency toilets and 10 bathroom faucets have earned the label and more than 600 manufacturers, retailers, utilities and professionals have joined the program as partners. In FY 2009 EPA will continue supporting development of new products and working with utilities, retailers, distributors, and the media to educate consumers on the benefits of switching to water-efficient products.

EPA's Wetlands Program supports the Administration's goals to achieve "no net loss" of wetlands in the Sec. 404 regulatory program and an overall increase in wetland quantity and quality. Wetlands provide numerous ecological and economic services: they help to improve water quality; recharge water supplies; reduce flood risks; provide fish and wildlife habitat; offer sites for research and education; and support valuable fishing and shellfish industries. In FY 2009, EPA will work with its state and Tribal partners to promote up-to-date wetlands mapping tied with GIS (Geographic Information Systems) analysis, strengthen monitoring and assessment programs to report on wetlands condition, and improve data to better manage wetlands within a watershed context. Two key activities will be implementing the 2006 Supreme Court decision in the Rapanos case, and working with our federal agency partners to accelerate the completion of the digital Wetlands Data Layer within the National Spatial Data Infrastructure (NSDI).

Watershed protection runs through our budget and strategic plan as one of the overarching principles for clean and healthy communities. Our strategic plan, our daily activities and our proposed FY 2009 budget all reflect the importance of core regulatory and stewardship programs prevent water pollution and protect source waters. With our partners we launched a Green Infrastructure Strategy on January 17, 2008 to reduce sewer overflows and storm-water runoff. We also continue to urge Congress to enact targeted, bipartisan clean water legislation to encourage "Good Samaritan" cleanup of abandoned hard rock mines. This simple step will remove legal and bureaucratic obstacles, keep environmental safeguards in place, save tax payer dollars and help clean up watersheds.

We continue to place a high priority on improving the states' ability to accurately characterize the condition of their waters. In FY 2009, we will continue our water quality monitoring initiative by providing grant funding totaling over $18.5 million to states and tribes that participate in collecting statistically valid water monitoring data and implement enhancements in their water monitoring programs.

The FY 2009 budget continues funding for geographic initiatives, including:

- In the Great Lakes, EPA's $35 million investment in the Great Lakes Legacy Act will give priority to working with states and local communities to achieve improvements in water quality and reducing the number of toxic "Areas of Concern". "Areas of Concern" include areas with damaged fish and wildlife populations, contaminated bottom sediments and past or continuing loadings of toxic and bacterial pollutants.
- In the Chesapeake Bay, the $29 million investment will be committed to substantially accelerating the restoration of the Bay's aquatic habitat and achieving the pollution reduction targets for 2010.
- For the Gulf of Mexico, EPA's $4.6 million investment will continue to support efforts to reduce nutrient loadings to watersheds. We will identify the top 100 nutrient-contributing watersheds in the Mississippi River Basin and use a computer model determine the location of major sources of nitrogen and phosphorus and where to target hypoxia- reduction efforts.

Superfund remediation of highly contaminated hazardous waste sites

The President's budget requests a $10 million increase for a total of $1.264 Billion for the Superfund program to continue our progress cleaning up contaminated sites and strengthening our emergency preparedness and response capabilities. The vital goals of the Superfund program remain assuring the health and safety of neighboring citizens during cleanups and protecting human health and the environment in the long-term. Within this budget request, funding for Superfund clean-up remains at essentially the same level as enacted in FY 2008.

EPA takes seriously its responsibility to take actions to protect human health by controlling exposure to hazardous substances during clean ups. Before or during long-term remedial action, the Superfund program often completes removal actions to mitigate immediate health threats prior to completing investigations and starting long-term cleanup construction. For example, to date, EPA has provided more than two million people living near contaminated sites with alternative sources of drinking water, has completed more than 9,400 removals at hazardous waste sites to reduce the immediate threat to human health and the environment, and has conducted 351 emergency response and removal cleanup actions in FY 2007 alone.

Developed more than a decade ago, EPA's construction completion measure continues to show substantial progress in the Superfund program. As of the end of FY 2007, cleanup construction had been completed at 1,030 of the National Priorities List (NPL) sites – 66 percent of the sites listed on the NPL. EPA plans to complete clean up construction at 30 sites in FY

2008, and 35 sites in 2009. This will keep EPA on track to complete construction at 165 sites during the FY 2007 to FY 2011 time period - EPA's goal in the current Strategic Plan.

To better measure long-term progress, the program added a Site-Wide Ready for Anticipated Use measure in 2007. This measure tracks the number of NPL sites where the remedy is constructed (construction complete) and all of the controls are in place to ensure that the land is protected for reasonably anticipated uses over the long term. EPA expects to make at least 30 sites ready for anticipated use in 2009, building upon its 2007 achievement of doubling the original goal of 30 by making 64 Superfund sites ready for anticipated use.

Brownfields and Land Revitalization

The President's FY 2009 budget request provides $165.8 million for the Brownfields program, including $93.6 million to fund program assessment, cleanup, revolving loan fund, and job training grants. This will fund 129 assessment grants, 96 cleanup grants, 7 revolving loan fund grants, and 12 job training grants. Through this work, we project that Brownfields grantees will assess 1,000 properties, clean up 60 properties, leverage 5,000 cleanup and redevelopment jobs, and leverage $900 million in cleanup and redevelopment funding.

Experience has taught us that one of the best ways to clean up contaminated sites and to address blighted properties in communities is to expressly consider the future uses of this land. The country has accepted the economic and ecological importance of recycling various consumer products – and our understanding of sound resource management must now also embrace the recycling of contaminated properties. In addition, by incorporating "green" and sustainable approaches into Brownfields redevelopment, we can further increase the environmental benefits from land revitalization. We remain committed to the goal of restoring our nation's contaminated land resources and enabling America's communities to safely return these properties to beneficial economic, ecological, and societal uses.

Enforcement

Experience has also shown that we cannot always rely on collaboration to attain all our goals. This budget doesn't neglect that lesson. Once again I request the largest enforcement budget in history, $563 million - an increase of $9 million - to maintain our vigorous and successful enforcement program.

These dollars will prove to be a wise investment. Last year, EPA's enforcement programs succeeded in:

- Having defendants agree to $10.6 billion in investments to reduce pollution;
- Achieving private party reimbursements of $252 million for Superfund; and,
- Reducing water pollution by 178 million pounds and air pollution by 427 million pounds.

This all-time record budget request includes a $2.4 million increase to a total budget of $52.2 million for criminal enforcement. These dollars are vital to help us increase the number of criminal investigators.

Stronger EPA – Sound Science

As a 27-year Agency veteran, one of my most solemn duties is to leave behind an EPA that is stronger than when I came in. As both a scientist and a long time manager – I am convinced that the only way that a technical, regulatory agency can meet its mission is by doing a lot of hard thinking to ensure that we keep our technical, legal and scientific base strong – and that we hone our management goals and measures to guide our efforts. This budget builds on the progress we've made by strengthening our workforce, sharpening our management and performance measurement and increasing our scientific knowledge.

First, as a scientist, I want to continue to provide strong support for research addressing our nation's and our world's critical and increasingly complex environmental issues. In FY 2009, I propose that EPA invest extra resources to understand two critical, growing areas: nanotechnology and computational toxicology.

For nanotechnology, I ask for an additional $4.5 million, for a total budget of $14.9 million to strengthen understanding of health and ecological implications arising from new routes of exposure and/or toxicities associated with exposure to these novel materials. We must identify and develop risk assessment methodologies for use by risk assessors, and evaluate the adequacy of current exposure assessment approaches. We will coordinate this research closely with the President's National Nanotechnology Initiative (NNI), which emphasizes the need for the government to understand which processes govern the environmental fate of nano-materials and what data are available or are needed for accurate nano-material risk assessment. This includes determining the release potential of nano-materials in the environment, researching the state of science for sampling and measuring nano-materials in environmental media. We must also study effects on human and ecological receptors and determine which technologies and practices minimize risk.

I also remain strongly committed to improving our computational toxicology work and ask for a $2.7 million increase - for a total budget of $14.9 million for this vital area. In FY 2009, we want to improve EPA's ability to more efficiently understand chemicals' toxicity through advanced modeling. One aspect of this work that is particularly important is that it can reduce the need to use animals for toxicity testing.

To help further these initiatives and ensure EPA's ability to attract and retain the highest caliber scientists, the budget proposes expanded special authority that will allow EPA to hire up to 40 scientists quickly and competitively.

Stronger EPA – Performance and Management

As a manager, I want to make sure that we focus on something we can all take pride in – delivering results. And I'm proud to tell you about what we've accomplished to date in the planning and management fields. EPA:

- Scored "green" in the President's Management Agenda on all initiatives in the first quarter of FY 2008 – one of only a few agencies to reach that goal, and
- Improved outcome measures to more directly link the results of our work and resources to environmental, on-the-ground, results.

We've addressed specific challenges as well. For the first time in ten years we've succeeded in removing grants management as a "management challenge" or "material weakness". We've fixed problems identified by the Government Accountability Office (GAO) and the Office of Inspector General (OIG) and built a system of internal controls fully integrated into the grants management process that includes:

- Improved mandatory training,
- Heightened grants performance standards,
- Quarterly management close-out reviews,
- New post-award monitoring orders, and
- EPA's new grants management system.

Finally, as I conclude my tenure at EPA, I want to fulfill my responsibility to cultivate the next generation of EPA leaders. This budget includes funding for a Leadership and Professional Development rotation program to ensure that our talented GS-13, 14 and 15 employees can expand knowledge and expertise, develop leadership skills and enhance professional growth through short term rotational assignments. For more senior leadership, we propose to continue our SES mobility program to make sure that we populate the highest levels of the agency with proven managers.

Conclusion

Madam Chairman, when I look at the candidates who are getting the opportunity to broaden their skills in these programs, I am heartened that I'll be leaving the agency in good hands. I look forward to working with you to enact this budget.

I am confident that this budget gives them an excellent basis on which to build. I hope that together we can see prompt action on these budget proposals so that we can implement your funding decisions.

Thank you. I will be happy to respond to any questions you may have.

General Explanations of the Administration's Fiscal Year 2009 Revenue Proposals

Department of the Treasury
February 2008

ELIMINATE THE VOLUME CAP FOR PRIVATE ACTIVITY BONDS FOR WATER INFRASTRUCTURE

Current Law

In general, the interest on bonds issued by State or local governments is excludable from gross income if the bonds meet certain eligibility requirements. State or local governments issue tax-exempt bonds to finance a wide range of public infrastructure projects. There are two basic kinds of tax-exempt bonds: governmental bonds and qualified private activity bonds. Bonds generally are treated as governmental bonds if the proceeds are used to carry out governmental purposes or the bonds are repaid with governmental funds. Bonds are classified as governmental bonds under a definition that limits private business use and private business sources of payment and also limits private loans. Governmental bonds are subject to various general restrictions, including arbitrage investment restrictions, registration and reporting requirements, Federal guarantee restrictions, advance refunding limitations, spending period limitations, and pooled bond limitations. Governmental bonds, however, are not subject to specific volume limitations.

Bonds that have excessive private business involvement or private loans are classified as "private activity bonds." In particular, bonds are classified as "private activity bonds" if more than 10 percent (reduced to 5 percent in the case of certain unrelated or disproportionate private business use) of the bond proceeds are both: (1) used for private business use; and (2) payable or secured from private sources. Bonds also are treated as private activity bonds if more than the lesser of $5 million or 5 percent of the bond proceeds are used to finance private loans, including business and consumer loans.

Private activity bonds may be issued on a tax-exempt basis only if they meet the general requirements for governmental bonds and the additional requirements necessary for "qualified private activity bonds." Qualified private activity bonds include exempt facility bonds, qualified mortgage bonds for single-family housing, qualified veterans' mortgage bonds, qualified small issue bonds, qualified student loan bonds, qualified redevelopment bonds, and qualified 501(c)(3) bonds. Eligible facilities for which exempt facility bonds may be issued include facilities for the furnishing of water and sewage facilities. Most qualified private activity bonds are subject to an annual unified State volume cap.

Reasons for Change

The nation's water and wastewater infrastructure facilities serve important national public policy interests in ensuring clean and safe drinking water and sanitation. There is a significant need for capital funding to upgrade the nation's water and wastewater infrastructure facilities. Removing the volume cap on tax-exempt qualified private activity bonds for water and wastewater infrastructure facilities would encourage additional needed private investment and public-private partnerships in these needed water infrastructure facilities.

Proposal

The proposal would provide an exception to the unified annual State volume cap on tax-exempt qualified private activity bonds for exempt facilities for the "furnishing of water" or "sewage facilities." The proposal would be effective for bonds issued after December 31, 2008, to finance water or sewer facilities. These bonds are intended to complement local efforts to move towards full cost pricing for wastewater and drinking water services, helping municipalities become self-financing and minimizing the need for future Federal expenditures.

Revenue Estimate

Fiscal Years							
2008	2009	2010	2011	2012	2013	2009-2013	2009-2018
($ in millions)							
0	0	-3	-6	-10	-15	-34	-214

<u>Tax-exempt Private Activity Bonds – Legislative history, 111th Congress</u>
Legislation to remove from state volume caps, tax –exempt bonds for water and wastewater projects

<u>U.S. House of Representatives</u>
H.R. 537, *Sustainable Water Infrastructure Investment Act of 2009*
Introduced January 14, 2009 by Rep. Bill Pascrell (D-NJ) – <u>55 Cosponsors</u>

Included in larger tax legislation:

H.R. 4213, American Jobs and Closing Tax Loopholes Act
Sec. 102. Exempt-facility bonds for sewage and water supply facilities.
PASSED House of Representatives: December 9, 2009

H.R. 4849, Small Business and Infrastructure Jobs Tax Act of 2010
Sec. 202. Exempt-facility bonds for sewage and water supply facilities.
PASSED House of Representatives: March 24, 2010

H.R. 5893, Investing in American Jobs and Closing Tax Loopholes Act of 2010
Sec. 102. Exempt-facility bonds for sewage and water supply facilities.
INTRODUCED: July 28, 2010

<u>U.S. Senate</u>
S. 3262, *Sustainable Water Infrastructure Investment Act of 2010*
Introduced April 27, 2010 by Senators Robert Menendez (D-NJ) and Michael Crapo (R-ID) – <u>10 Cosponsors</u>

Included in larger tax legislation:

Baucus Substitute Amendment to H.R. 4213, *American Jobs and Closing Tax Loopholes Act*
Sec. 102. Exempt-facility bonds for sewage and water supply facilities.
Baucus (Finance Comm.) Substitute Amendment
Introduced May 21, 2010
Amended June 8, 2010
Amended June 16, 2010

Thune Amendment to H.R. 4213 (Republican Alternative)
Sec. 101. Exempt-facility bonds for sewage and water supply facilities.

H.R. 4849 *Small Business and Infrastructure Jobs Tax Act of 2010*
Senator Baucus asked Unanimous Consent that the modified House bill be read three times and passed as substitute amendment to H.R. 5297.
Amendment Offered: September 16, 2010

S. 3793, *Jobs Creation and Tax Cuts Act of 2010.*
Sec. 102. Exempt-facility bonds for sewage and water supply facilities.
INTRODUCED: September 16, 2010

Senate Amendment 4727 (Baucus) to H.R. 4853 entitled "An Act to amend the Internal 3 Revenue Code of 1986 to extend the funding and expenditure authority of the Airport and Airway Trust Fund"
INTRODUCED: December 2, 2010

TECHNICAL EXPLANATION OF THE REVENUE PROVISIONS CONTAINED IN THE "AMERICAN JOBS AND CLOSING TAX LOOPHOLES ACT OF 2010," FOR CONSIDERATION ON THE FLOOR OF THE HOUSE OF REPRESENTATIVES

Prepared by the Staff
of the
JOINT COMMITTEE ON TAXATION

May 28, 2010
JCX-29-10

B. Exempt-Facility Bonds for Sewage and Water Supply Facilities (sec. 102 of the bill and sec. 146 of the Code)

Present Law

In general

Interest on bonds issued by State and local governments generally is excluded from gross income for Federal income tax purposes if the proceeds of the bonds are used to finance direct activities of these governmental units or if the bonds are repaid with revenues of the governmental units. Interest on State or local bonds issued to finance activities of private persons is taxable unless issued for certain purposes permitted by the Code ("qualified private activity bonds"). [21]

The definition of a qualified private activity bond includes exempt facility bonds, qualified mortgage, veterans' mortgage, small issue, redevelopment, 501(c)(3), and student loan bonds.[22] The definition of an exempt facility bond includes bonds issued to finance certain transportation facilities (airports, ports, mass commuting, and high-speed intercity rail facilities); low-income residential rental property; privately owned and/or operated utility facilities (sewage, water, solid waste disposal, and local district heating and cooling facilities, certain private electric and gas facilities, and hydroelectric dam enhancements); public/private educational facilities; qualified green building/sustainable design projects, qualified hazardous wast facilities, and qualifed highway or surface freight transfer facilities.[23] A facility for the furnishing of water will qualify as an exempt facility if: the water is or will be made available to members of the general public (including electric, industrial, agricultural, or commercial users); and either the facilities are (1) operated by a governmental unit or (2) the rates for the furnishing or sale of the water have been established or approved by a State or political subdivision thereof, by an agency or instrumentality of the United States, or by a public service or public utility commission or other similar body of any State or political subdivision thereof.[24]

Issuance of most qualified private activity bonds is subject (in whole or in part) to annual State volume limitations ("State volume cap").[25] For calendar year 2010, the State volume cap, which is indexed for inflation, equals $90 per resident of the State, or $273,775,000, if greater.[26]

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[21] Sec. 103(b)(1).

[22] Sec. 141(e).

[23] Sec. 142(a).

[24] Sec. 142(e).

[25] Sec. 146.

[26] Rev. Proc. 2009-50, 2009-45 I.R.B. 617 (Novermber 9, 2009).

Exceptions from the State volume cap are provided for bonds issued for certain government-owned facilities (airports, ports, certain high-speed intercity rail, and solid waste disposal) and bonds which are subject to separate local, State, or national volume limits (public/private educational facilities, enterprise zone facility bonds, qualified green building/sustainable design projects, and qualified highway or surface freight transfer facility bonds).

If an issuing authority's State volume cap for a calendar year exceeds the aggregate amount of tax-exempt private activity bonds issued during the year, the authority generally may elect to treat all (or any portion) of the excess as a carryforward for one or more specified "carryforward purposes." The issuing authority is required to identify the purpose for which the carryforward is elected and specify the portion of the carryforward which is to be used for that purpose. The Code defines "carryforward purpose" to mean one of four purposes: issuing exempt facility bonds; issuing qualified mortgage bonds or mortgage credit certificates; issuing qualified student loan bonds; and issuing qualified redevelopment bonds.[27] A carryforward of unused State volume cap is valid for three years.

Many States have State revolving fund programs ("SRFs") to finance wastewater and drinking water projects. SRFs are pools of capital dedicated to financing public infrastructure formed through Federal and state contributions. SRFs use Federal grants to make loans to local governments to finance the construction of water facilities and to establish debt service reserve funds for bonds the proceeds of which are so be used to make such loans. Although present law generally prohibits the Federal guarantee of tax-exempt bonds,[28] the IRS has ruled that States may use Federal grants to fund debt service reserve funds for tax-exempt bonds issued to finance SRF loans without affecting the tax-exempt status of such bonds.[29]

Indian tribal governments

Under present law, gross income does not include interest on State or local bonds.[30] State and local bonds are classified generally as either governmental bonds or private activity bonds. Governmental bonds are bonds the proceeds of which are primarily used to finance governmental facilities or that are repaid with governmental funds. Private activity bonds are bonds in which the State or local government serves as a conduit providing financing to nongovernmental persons. For these purposes, the term "nongovernmental person" includes the Federal government and all other individuals and entities other than States or local

[27] Sec. 146(f)(5).

[28] Sec. 149(b).

[29] Notice 88-54, 1988-1 C.B. 539.

[30] Sec. 103.

governments.[31] Interest on private activity bonds is taxable, unless the bonds are issued for certain purposes permitted by the Code and other requirements are met.[32]

Although not States or subdivisions of States, Indian tribal governments are provided with a tax status similar to State and local governments for specified purposes under the Code.[33] Among the purposes for which a tribal government is treated as a State is the issuance of tax-exempt bonds. Under section 7871(c), tribal governments are authorized to issue tax-exempt bonds only if substantially all of the proceeds are used for essential governmental functions.[34] The term essential governmental function does not include any function that is not customarily performed by State and local governments with general taxing powers. Section 7871(c) further prohibits Indian tribal governments from issuing tax-exempt private activity bonds (as defined in section 141(a) of the Code) with the exception of certain bonds for manufacturing facilities.

Explanation of Provision

The provision provides that tax-exempt bonds issued to finance privately used or operated facilities for the furnishing of water or sewage facilities are not subject to the State volume caps.[35]

Also, the provision allows Indian tribal governments to issue tax-exempt private activity bonds for two additional types of facilities. These new facilities are facilities for the furnishing of water[36] and sewerage facilities.[37] These bonds are not subject to the private activity bond volume limitation, nor the essential government function test.

Effective Date

The provision is effective for bonds issued after the date of enactment.

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[31] Sec. 141(b)(6); Treas. Reg. sec. 1.141-1(b).

[32] Secs. 103(b)(1) and 141.

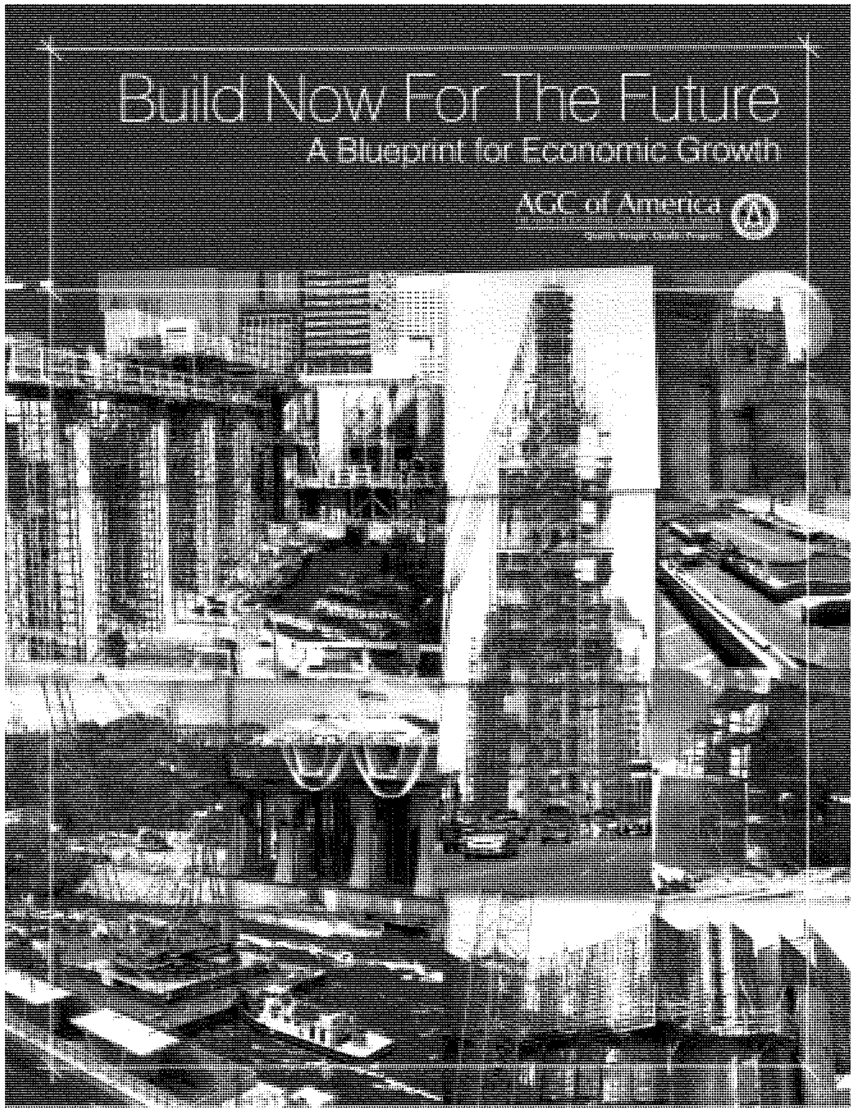
[33] Sec. 7871.

[34] Sec. 7871(c).

[35] To the extent an issuer previously designated facilities for the furnishing of water or sewerage facilities when the issuer elected to carry-forward unused volume cap, the issuer shall be allowed to designate another carry-forward purpose in a time and manner provided under guidance from the Secretary of the Treasury.

[36] Sec. 142(a)(4).

[37] Sec. 142(a)(5).


Build Now For The Future
A Blueprint for Economic Growth
AGC of America

Contents

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THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
Quality People. Quality Projects.

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The Need

■ Why Construction is Essential to Our Economy

While the nation continues to suffer through a recession, the construction industry is experiencing depression-like conditions. According to virtually every economic measure, construction businesses and their employees have been disproportionately affected by the economic downturn. The industry's unemployment rate is currently 16.5 percent, nearly double the overall national jobless rate. While construction jobs account for five percent of the nation's workforce, 20 percent of the jobs lost since 2007 have been in construction. In August 2009 alone, nearly one out of every three jobs lost was in construction.

While $1.072 trillion was invested in construction in 2008, that amount is projected to shrink by as much as $193 billion in 2009, an 18 percent drop. The stimulus program enacted early in 2009, which included approximately $135 billion for infrastructure and construction projects, will help. However, the money will be invested over several years and much of it will be used to offset declining state and local investments. In other words, the stimulus is not enough to turn around a trillion dollar industry.

Few communities have avoided the job losses and declining construction activity currently devastating the industry. As of August 2009, construction employment had declined in 48 states and improved in only two from a year earlier. All but 13 of the nation's largest 336 metropolitan areas saw declines in construction employment over the past year, with four communities seeing declines in their construction workforce in excess of 30 percent.

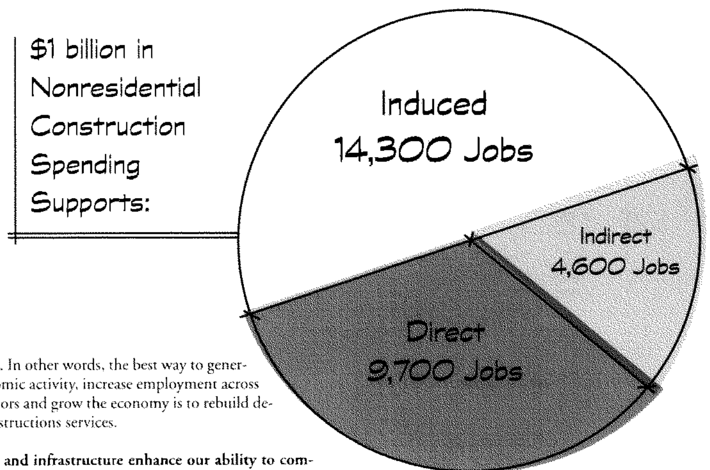
This nationwide construction crisis is not only devastating to people working directly in construction. It is serving as a drag on U.S. economic growth. That is because the construction industry accounts for more than eight percent of U.S. gross domestic product and is responsible for one out of every 10 U.S. manufacturing shipments and one out of every 12 machinery shipments. Given that the vast majority of construction firms are small, local businesses, the strength of the sector has a disproportionate impact on countless communities.

Addressing the construction industry crisis is essential to rebuilding, expanding and sustaining the broader U.S. economy for a number of reasons, including:

- **Rebuilding the construction industry will boost job creation** The best way to ensure that the economic recovery includes significant new job growth is to revitalize the U.S. construction industry. Given the significant share of total jobs lost that has come from the sector, any construction turnaround will create a disproportionate surge in new hires while laying a foundation for long-term economic growth. These will be high-paying jobs too, since the average annual pay for construction workers is $49,000, eight percent more than the average for all private-sector employees.

- **Restoring construction activity will boost economic growth through 2010.** Economic outlooks show little chance the construction sector will significantly improve before 2011 at the earliest, given growing office, retail and manufacturing vacancies, declining state and local tax revenue and little demand for large, multi-family housing construction. A prolonged economic crisis in the construction sector will serve as a drag on broader economic growth. Restoring immediate demand for construction activity, however, will provide a significant boost for the nascent economic recovery.

- **Boosting the construction sector will generate broader economic activity.** Every billion dollars invested in nonresidential construction activity adds $3.4 billion to the gross domestic product, increases personal earnings by $1.1 billion and creates or sustains 28,500 jobs. Almost 19,000 of those jobs would be in areas outside the immediate construction sector, including equipment manufacturing, materials supply, food service, health



care and retail. In other words, the best way to generate new economic activity, increase employment across economic sectors and grow the economy is to rebuild demand for constructions services.

- **Construction and infrastructure enhance our ability to compete globally.** In a global economy, the difference between success and failure is often based on the ability to distribute goods, services and information quickly and efficiently. Reliable highways, efficient freight facilities, modern communications networks, cutting edge educational facilities, and modern office and manufacturing facilities are all essential to our continued global economic success. Finding ways to invest in these facilities now will help lay a strong foundation for continued economic growth that will last decades.

- **Enhancing construction will improve public health and protect the environment.** Enhancing the construction industry will help deliver new, more environmentally friendly office buildings, power facilities and factories. At the same time, investing in new public infrastructure will ease pollution-causing traffic congestion and ensure the safe and healthy supplies of drinking water for decades to come. You can't wish for a greener, healthier future – you have to build it.

Because the health of the construction industry is vital to our economic strength, environmental quality and public health, the association has prepared the following national plan for reinvigorating the nation's construction industry. It is a plan predicated on the understanding that the work of improving the construction industry outlook must start with the private sector. The plan outlines a series of commonsense incentives, tax credits, trade policy changes and regulatory revisions designed to stimulate new private sector demand for construction. Taken together, these changes will allow sound private-sector construction projects easier access to credit and financing, encourage greater efficiency upgrades in our buildings and facilities and keep construction costs competitive.

The plan also calls for pragmatic new public and private investments in infrastructure that will boost construction now while enhancing our economic capacity for decades to come. And it identifies regulatory and policy changes that, when made, will allow these public investments to flow more rapidly while increasing government purchasing power.

The plan is broad in its scope and ambitious in its purpose, yet it is calibrated to meet a significant challenge. That is why everything in it should be implemented by the end of 2009 to deliver the broadest possible benefits to the industry. Given the critical role the construction industry plays in our broader economy and the number of unemployed workers that stand to benefit, this plan should receive broad, bipartisan support. All that is needed is the kind of sustained focus and resolve that many in Congress and the Administration already have shown in boosting the banking, automotive, housing and insurance sectors. The only difference is that the measures outlined in this plan will cost dramatically less while providing taxpayers with a better return on their investment.

The Plan

■ Rebuild Private Construction Markets

Any effort to reinvigorate the construction industry must successfully jump-start new privately-funded construction. Accounting for $766 billion in 2008, over 70 percent of the total construction market, the strength of the private sector market is the single largest determining factor in the health of construction activity. As a result, the Associated General Contractors of America proposes the following measures designed to stimulate new, and in most cases immediate, privately-funded construction activity:

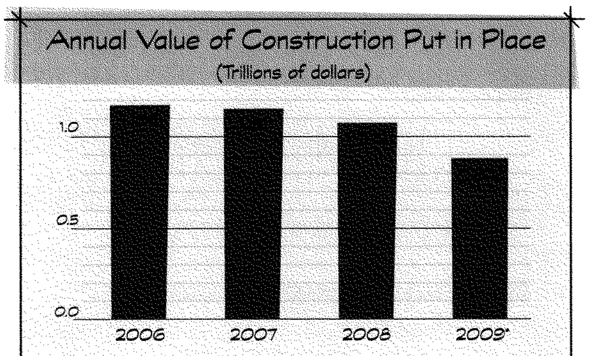
- **Increase Commercial Building Energy Efficiency Tax Deductions.** Current law allows owners to deduct the cost of installing energy efficient systems, like new heating and cooling units, in commercial buildings. The amount of the deduction is up to $1.80 per square foot that will see at least a 50 percent efficiency improvement. Given the limited impact this deduction has had on boosting energy-efficient installations, Congress should raise the deduction amount to $3.00 per square foot, saving energy and energy costs.

- **Convert Commercial Building Energy Efficiency Tax Deductions into Tax Credits.** In addition to boosting the deduction amount for efficiency upgrades to commercial buildings, Congress should convert the tax benefit into a tax credit. In an environment where many commercial building owners are likely to experience losses in 2009 and 2010, tax deductions will have limited to no impact. Converting deductions into credits will provide a significant financial incentive for property owners to improve the efficiency of commercial buildings.

- **Make Permanent Shortened Cost Recovery Period for Retail & Restaurant Improvements.** Tax provisions shortening the cost recovery period of certain leasehold, retail and restaurant improvements from 39 to 15 years are set to expire at the end of 2009. Making those provisions permanent will provide an important incentive for retail and restaurant operations to make capital improvements to their leasehold space.

- **Repeal the Alternative Minimum Tax.** Since the vast majority of America's businesses are taxed as individuals instead of as corporations, the alternative minimum tax would undercut potential earnings that otherwise will be reinvested as retained earnings each year. These retained earnings provide the capital needed for businesses to invest in real estate, renovations and new manufacturing equipment, all of which is essential to the private construction market. Congress should repeal the alternative minimum tax before it saps more capital out of the economy and undermines future construction projects.

- **Make Permanent Certain Expiring Tax Cuts from 2001 & 2003.** A broad range of tax cuts enacted in 2001 and 2003 are set to expire on December 31, 2010. The majority of small businesses are organized as subchapter S corporations where the owner pays taxes as an individual instead of a corporation. Imposing significantly higher tax levels at the end of next year will prompt many firms to limit capital expenditures, including investments in real estate and facilities upgrades, and cut hiring this year and next as a way to conserve cash. As a result, Congress should make permanent the reductions in individual income, bonus depreciation, small business expensing and capital gains tax rates from earlier this decade. Congress also should maintain the 10 percent tax bracket and current eligibility limits for joint filers at the 15 percent bracket to help rehired workers use more of their earning to build new fiscal security. Taken together, making these cuts permanent will strengthen capital markets and make it easier for businesses (construction and other) to grow, expand and build new facilities.



• **Eliminate Disincentives on Global Investments in U.S. Commercial Real Estate.** Congress can encourage new investments in commercial real estate by amending the Foreign Investment in Real Property Tax Act to eliminate provisions that punish global investments in U.S. commercial real estate compared to the tax treatment of other forms of international investments in the U.S.

• **Extend the Term Asset Backed Securities Loan Facility (TALF) through 2010.** Extending the TALF, which is scheduled to expire at the end of 2009, for at least one additional year will help boost commercial real estate activity by providing the time needed for commercial mortgage backed securities to assemble TALF-eligible transactions. That is because the TALF provides the kind of attractive financing to investors needed to bring them back to the commercial real estate market.

• **Allow Public Private Investment Programs to Finance Sound Construction Projects.** While the Public Private Investment Program is currently being used to buy-up troubled existing loans, Congress should expand the program's authority to allow for the funding of new commercial real estate loans. This would allow construction to begin on countless sound, solidly underwritten projects affected by the significant decline in construction financing since September 2008.

• **Extend Depreciation Bonus & Capital Expenditures Write-Off Levels.** As part of the Recovery Act, businesses are able to immediately write-off 50 percent of the cost of new tangible depreciable property (like construction equipment) placed in service in 2009. The act also allows small business taxpayers to write-off up to $250,000 of capital expenditures made this year and in 2010. Congress should extend the 50 percent "bonus depreciation" to include purchases made in 2010 and make the higher small-business limit permanent to lower construction costs and encourage construction firms to modernize their equipment, with newer, more efficient machinery that will emit less greenhouse gasses than their predecessors.

• **Extend and Expand the Five-Year Carryback of Net Operating Losses for Small Businesses.** The Recovery Act allowed businesses with gross receipts of $15 million or less that experienced net operating losses in 2008 to carry those losses back over the preceeding five years. The provision allows small businesses with deductions exceeding their income to get a refund for taxes paid in previous years. This provision had little impact on construction companies, few of whom experienced losses in 2008. Expanding the provision to cover net operating losses incurred in 2009 and 2010 for all businesses regardless of size will allow cash-strapped construction firms to convert future tax benefits into cash today that can be used to expand payrolls, retain workers and invest in equipment.

• **Extend the First –Time Home Buyer Credit.** The current $8,000 first-time home buyer credit, which is set to expire November 2009, is helping to encourage new housing construction, including multi-family housing units, while boosting home sales that provided needed state and local tax revenue. Extending the credit for an additional 12 months will encourage additional residential construction that also would stimulate nearby retail development and boost tax revenue. New home construction boosts demand for public infrastructure and private-construction projects such as shops, restaurants and places of worship.

• **Restore "Fast Track" Trade Promotion Authority.** Allowing the President the freedom and flexibility to negotiate bilateral free trade agreements that can be presented to Congress for an 'up-or-down' amendment-free vote would restore confidence on the part of potential new trade partners and accelerate completion of new pro-growth trade agreements. Streamlining trade negotiating authority will make it easier to open new markets for

U.S. exports, while boosting demand for the construction of manufacturing and shipping facilities nationwide.

- **Remove Trade Barriers that Inflate Construction Costs.** Reducing the trade barriers for critical construction components like steel, cement and softwood lumber will help keep construction costs competitive, thereby helping encourage new construction activity.

■ Boost Investments in Infrastructure

While stimulating new private-sector construction activity is the best way to rebuild the construction industry and boost job creation, publicly- and privately-funded infrastructure and construction projects also are crucial. These projects provide additional stability and employment for hard-hit construction firms. More important, these investments reduce the significant economic costs of traffic-clogged transportation networks, inefficient public buildings, unreliable or insufficient levees and failing water and wastewater facilities. That is why we are recommending the following measures designed to boost investments in the nation's public infrastructure and facilities:

- **Double Investment Levels in Federal Highway, Transit, Aviation, Freight and Rail Programs.** Multiple independent, bipartisan commissions have addressed the need to significantly boost investments in the nation's transportation network. By setting federal transportation spending to approximately $120 billion a year – the low end of most recommendations – we can improve safety and help ease chronic traffic congestion that wastes fuel, saps business productivity and undermines quality of life. Addressing our infrastructure investment gap also will put contractors to work now building road, rail, airport and transit projects that will boost economic productivity for decades to come.

- **Begin Transition to Vehicle Miles Tax, Right-Size the Federal Gas Tax.** There is little debate that the federal gas tax, which charges drivers $0.184 per gallon of fuel purchased, is becoming increasingly outdated thanks to improvements in fuel efficiency, changes in commuting habits and the growth of hybrid and alternative fuel vehicles. The ultimate solution is to transition to a vehicle miles traveled method of collecting the highway user fees to finance vital road, bridge and transit projects. Given that such a transition will take at least several years, Congress should revise the current gas tax to restore its purchasing power to levels last seen in 1993 by setting the excise at $0.36 per gallon and indexing for future inflation. This would allow the federal government to keep pace with aging infrastructure and projected growth in both the amount of drivers and distance they travel while simultaneously adjusting to a more appropriate user fee.

- **Address Maintenance and Modernization Backlog for Federal Buildings.** Congress and the Administration can provide immediate new opportunities for unemployed construction workers by addressing unmet maintenance and modernization needs in its building inventory. The Government Accountability Office has identified $4 billion worth of needs in over 900 federal buildings. Aging federal facilities undermine government productivity and waste significant amounts of energy. For approximately half of one percent of its stimulus program, the federal government can boost construction employment, increase federal productivity and reduce energy consumption.

- **Boost Investments in Vital Navigation and Flood Control Projects.** Congress and the Administration should begin to address unmet navigation and flood control needs by increasing funding for the U.S. Army Corps of Engineers' Civil Works program to a minimum of $7 billion in 2010. In addition, the Harbor Maintenance Trust Fund must be used for its intended purpose. This will not only boost public construction activity, but will help protect communities across the country from costly flood damage and allow for more efficient and environmentally-friendly freight movement along our waterways.

- **Invest in Clean Water.** Congress should increase funding for the Clean Water State Revolving Loan fund and Safe Drinking Water State Loan Fund to a combined $6 billion annually. In addition, the Administration and Congress should work together to establish a Water Trust Fund that will allow for future

Fact:

- Construction workers earned an average of $49,000 in 2008, 8% more than private sector employees
- 91% of the 811,500 construction firms in 2007 were small, local businesses

Data source: Ken Simonson, Chief Economist, AGC of America, simonsonk@agc.org, from Prof. Stephen Fuller, George Mason University, and U.S. Government sources investments to come from dedicated and sustainable long-term funding sources, instead of depending on unreliable and unpredictable annual appropriations out of the General Fund.

- **Establish a National Infrastructure Bank.** Establishing a national infrastructure bank would allow state and local governments facing declining local revenue to finance local infrastructure and construction projects. The independent bank would evaluate and finance "capacity building" infrastructure projects including mass-transit systems, public housing, roads & bridges, drinking water and sewage treatment systems.

- **Encourage Public Private Partnerships.** While current economic conditions have certainly impacted the amount of private-sector capital that could be invested in public infrastructure projects, these partnerships still hold significant potential for augmenting public investments in highway, bridge, airport, water treatment, public building and other revenue generating infrastructure projects. Congress and the Administration should eliminate barriers to public private partnerships by giving states greater flexibility to allow for tolling, allowing municipalities to privatize airports and accept private investments in transit, and expanding eligibility for private investments in public buildings.

- **Expand and Make Permanent Build America Bonds Program.** The Recovery Act created the Build America Bonds program as a new financing tool to allow state and local governments to obtain much-needed funding, at lower borrowing costs, for projects such as construction of schools, hospitals, transportation infrastructure and water & sewer upgrades. Since the program was launched in April, 34 states have issued 178 different Build America Bonds totaling $17.4 billion. Instead of allowing this successful program to expire in 2010, Congress should make it permanent and expand eligibility to cover certain private activities with national benefits, such as energy infrastructure and efficiency upgrades at commercial, manufacturing and health care buildings.

- **Exempt Construction from Private Activity Bond Cap.** Private Activity Bonds are a form of financing that allows private entities to partner with state or municipal governments to receive tax-exempt financing for private- or publicly-owned projects in the public's interest. However, the rules governing these bonds limit the total dollar amount that can be issued based on a state's population. Eliminating these caps would qualify significantly more water, sewer and mass transit projects, among others, for this kind of financing.

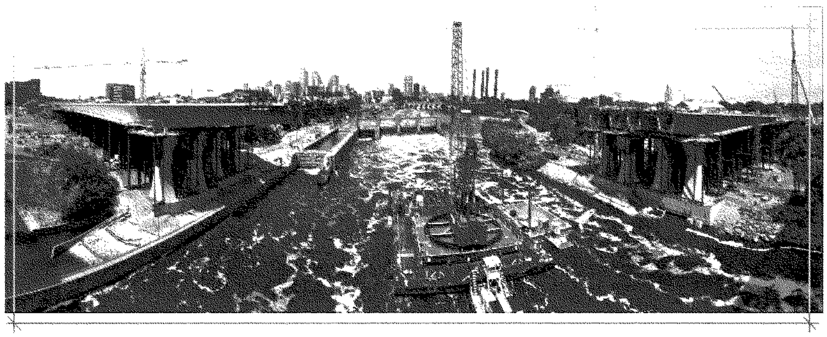
- **Expedite Distribution of Stimulus Construction Funds.** Congress and the administration were wise to include an estimated $135 billion in funds for a range of infrastructure and construction investments as part of the stimulus package. The infrastructure funding in the stimulus has preserved many construction jobs but has yet to live up to its full promise. For example, outside of the transportation program, the distribution of those funds has been slowed by a range of challenges, including coping with new regulatory requirements. Federal, state and local governments should make every possible effort to expedite investment of these vital construction funds so they can have the desired impact boosting construction activity and employment, including prioritizing environmental reviews and expediting Buy American waiver requests.

Revise Restrictive Policies & Regulations

As important as boosting private-sector construction activity and closing our public infrastructure gap is, those efforts will only be completely effective if we make long-needed revisions to dated government policies and regulations that delay projects, inflate construction costs and divert resources. Nobody questions the need to ask tough questions and demand good answers about construction's impact on the environment, the quality of work and whether the government is getting a good value for its investment. But it shouldn't take years of effort, dozens of staff and miles of red tape to answer those questions. That is why the association recommends the following regulatory and policy revisions:

- **Streamline Environmental Reviews for Infrastructure Projects.** The current federal environmental review process for federally-funded infrastructure projects is unnecessarily slow and expensive. For example, it takes an average of 13 years for highway and 12 years for transit projects to receive federal approval. As a result, every effort should be made to streamline the environmental review process while protecting the environment by designating lead federal agencies, establishing and meeting clear timelines, simplifying analysis requirements and placing a statute of limitations on claims.

- **Reject the Clean Water Restoration Act.** Congress is currently considering legislation that would significantly expand federal jurisdiction over waters and wetlands under the Clean Water Act. Were this legislation to become law, all construction activity impacting any water or wet area in the United States would be required to obtain a Clean Water Act permit. Where these permits are currently required, they have proven both costly and time-consuming. For example, it is already expected to take up to 3 years for the federal government to address is current backlog of over 15,000 Clean Water Act permit requests. To avoid needlessly delaying billions of dollars worth of construction projects, Congress should preserve state and local authority over local land and water use.



Tim Davis/Courtesy of Flatiron

- **Accelerate Licensing of New Nuclear Power Plants.** With demand for electricity projected to grow substantially within the next two decades, Congress and the Administration need to act on the 30 pending nuclear power plant applications that have been submitted to the Nuclear Regulatory Commission. As one of the few sources that can generate electricity reliably, efficiently and without greenhouse gas emissions, nuclear power must remain an essential component of our power grid. Unfortunately, today's 104 U.S. nuclear reactors operate at more than 90 percent capacity. Constructing a nuclear plant takes years, however. Further needless permitting delays will only increase our national reliance on foreign sources of energy.

- **Revise Environmental Legislation to Encourage Green Construction Activity.** Environmental legislation being debated in Congress creates opportunities for the construction industry by driving demand for energy-efficient buildings and infrastructure. Those opportunities, however, are limited because the cap and trade proposal increases the cost of construction and reduces demand for new commercial, manufacturing and industrial facilities. In addition, the bill could add permitting requirements that block or delay the development of commercial and residential buildings. Congress should revise the legislation to eliminate the cap and trade provisions and instead encourage improvements to our environment and air quality by funding energy efficient infrastructure. The bill also must be revised to clearly pre-empt use of the Clean Air Act to regulate greenhouse gas emissions, an approach economists agree stifles economic growth and construction activity.

- **Establish a Federal Multiyear Capital Budget for Public Works Infrastructure.** Establishing a federal multiyear capital budget for public works will make it easier for officials to plan for, and finance, major, multiyear infrastructure projects. Most states already successfully use multiyear capital budgets. Such an approach is preferable to the current federal budgeting process for key infrastructure like water and wastewater facilities that discourages good long-term asset management by focusing on funding short-term needs only.

- **Avoid Government-Mandated Project Labor Agreements.** Government-mandated project labor agreements have been proven to limit competition for construction work, needlessly denying workers the opportunity to benefit from publicly-funded projects. Worse, government mandated project labor agreements put public officials with little to no experience in construction in charge of setting work rules and schedules, creating inefficiencies and undermining workplace safety. The Administration should avoid using government-mandated project labor agreements at all costs and instead let workers and construction firms negotiate terms of employment and work.

- **Rescind Buy American Requirements.** Well-meaning efforts to stimulate purchases of American-made products too often cause needless delays to construction projects while inflating construction costs. Invariably, significantly more construction workers are impacted by these delays than the limited number of workers that benefit from these requirements. Congress and the Administration should rescind Buy American requirements included in the stimulus and avoid further temptations to expand these requirements beyond their traditional and limited use in federal procurement and highway programs.

The Cost vs. Return on Investment

Some of the proposals outlined in this blueprint will have an impact on the federal budget. Eliminating the Alternative Minimum Tax and extending existing tax breaks and credits will not be easy. However, the new economic activity these measures stimulate will put more Americans to work, increase business expenditures and boost revenue. As a result, income, sales and corporate tax receipts will rise, offsetting some of the costs associated with these changes. It's also worth noting the cost of inaction. If employment and revenue continue their current rates of decline well into next year, the corresponding declines in tax receipts would be far more costly than the tax measures outlined in this plan.

Several of the investments in public infrastructure included in this plan also are likely to have an impact on the federal budget. Boosting funding for navigation and flood control and addressing the modernization and maintenance backlog for federal buildings will require additional General Fund spending. However, these programs deliver a significant return on the taxpayers' investment. Studies have found that every dollar invested in flood control saves $8.25 in prevented floods and associated damages, for example. And modernizing the inventory of federal buildings will deliver long-term savings by increasing federal productivity, decreasing maintenance expenses and reducing energy consumption.

Other proposals outlined in the plan will be covered by corresponding increases in user fees. For example, the additional transportation investments would be covered by increases in the federal user fee, a national infrastructure bank and increases in the private activity bond cap. Additional investments in clean water, meanwhile, would be offset by the establishment of a self-funded Water Trust Fund. In addition, several of the proposals outlined in the plan will increase the amount of capital available for investment in construction, such as easing restrictions on international investments and boosting public private partnerships.

More important than how specific costs are offset is the broader impact a robust and growing construction industry will have on the national economy. Every billion dollars worth of nonresidential construction activity supports over twenty-eight thousand jobs, boosts gross domestic product by $3.4 billion and raises personal earnings by $1.1 billion. Putting this plan in place and turning around this vital sector will unleash a wave of new construction activity that will employ thousands, stimulate new investments in equipment and supplies and lay a foundation for long term economic efficiencies and prosperity.

This plan may not be free, but for every dollar in additional costs, it provides a significant return on investment that will restore lost jobs, boost business activity, restore tax receipts and give our economy the boost it needs to turn hopes of recovery into reality.

On cover:

Wayne Rutherford GC. St. James Church Reno
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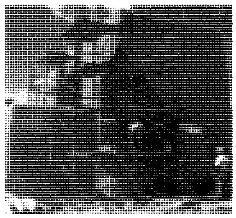
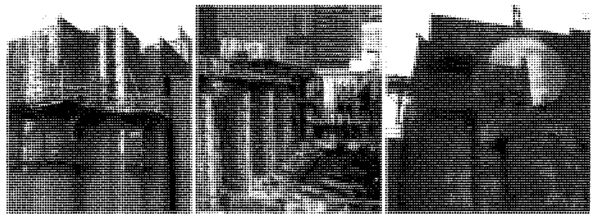
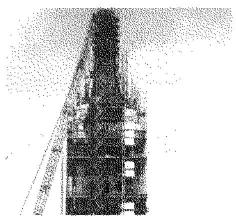


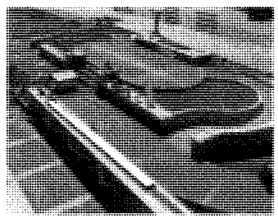
Linbeck Group. Co-Cathedral of the Sacred Heart



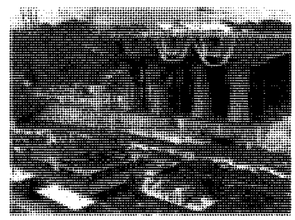
J.P. Cullen & Sons
Milwaukee City Hall Restoration

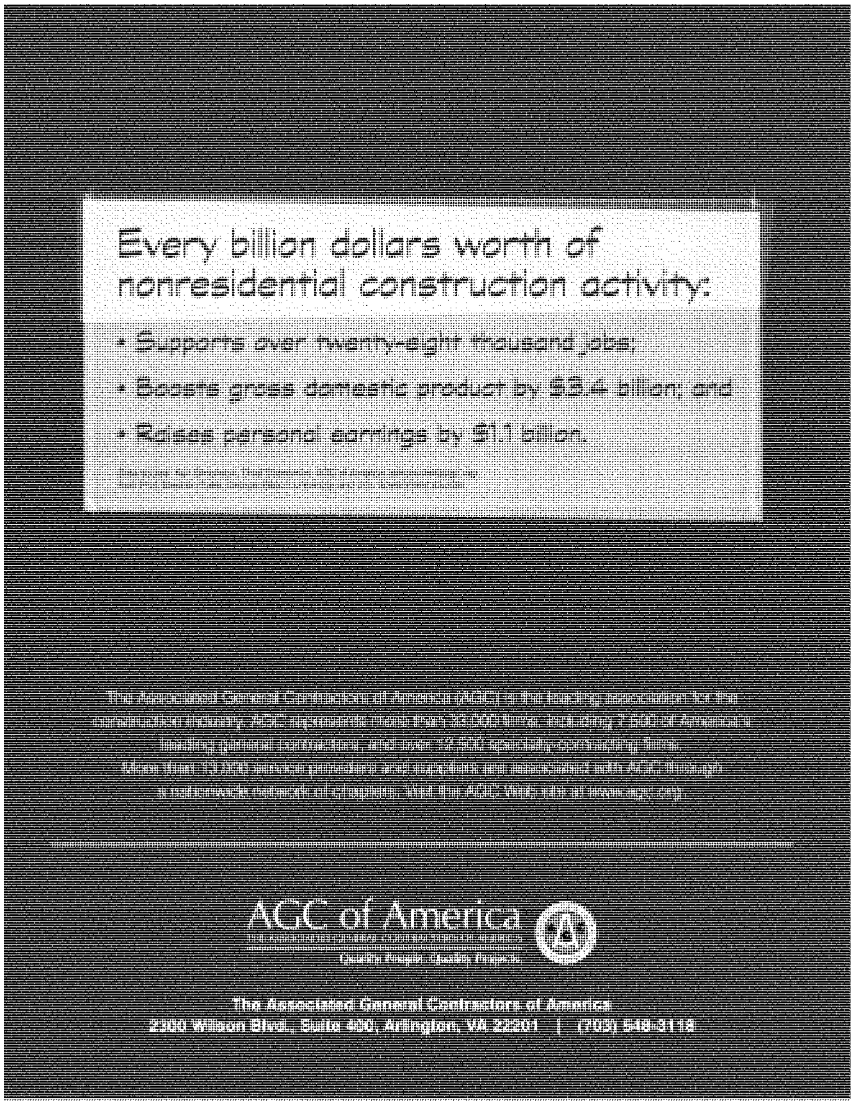


Industrial Builders, Floodwall Modifications



Flatiron-Manson Joint Venture. I-35W Bridge.
Photo by Tim Davis/Courtesy of Flatiron





Every billion dollars worth of nonresidential construction activity:
• Supports over twenty-eight thousand jobs;
• Boosts gross domestic product by $3.4 billion; and
• Raises personal earnings by $1.1 billion.
The Associated General Contractors of America (AGC) is the leading association for the construction industry. AGC represents more than 33,000 firms, including 7,500 of America's leading general contractors, and over 12,500 specialty-contracting firms. More than 13,000 service providers and suppliers are associated with AGC through a nationwide network of chapters. Visit the AGC Web site at www.agc.org.
AGC of America
Quality People. Quality Projects.
The Associated General Contractors of America
2300 Wilson Blvd., Suite 400, Arlington, VA 22201 | (703) 548-3118

Environment and Public Works Committee Hearing December 13, 2011

Follow-Up Questions for Written Submission

Questions for Mr. Richey from: Senator James M. Inhofe

1. While highlighting the economic difficulties that have hit your respective industry, you stated that once an "iron foundry" goes out of business, it is usually gone forever due to regulatory burdens that have been placed on the industry. Will you expand on what those various regulatory burdens might be?

American Cast Iron Pipe Company ("American") is an employee owned company which has been in business for over 100 years. American provides excellent pay and benefits while taking great pride in our commitment to the health, safety and welfare of our employee-owners and the communities surrounding our plants. It is not unusual for people working at American to be the 3rd or 4th generation of their families to do so.

Today, however, that 100 year history of providing quality products to make our country's water supply safe and easily accessible, and of providing our employee-owners and their families a pathway to a financially secure future, is under intense pressure. As described in earlier testimony, the economic downturn has devastated the housing market which in turn has had significantly adverse effects on the water products manufacturing industry. Additionally, local municipalities and water authorities have suffered a decline in the revenues necessary to maintain, repair, improve and expand their water and waste water systems. Finally, the federal government has not given water infrastructure spending a high priority leading to the current EPA estimate that the country needs to spend $300 billion on water infrastructure.

The pressure on the survivability of the domestic water products manufacturing industry comes not only from the marketplace, but also from increasing regulations in recent years. Increased regulations obviously impose additional financial burdens on American companies; burdens that are not borne by our foreign competitors.

While Congress seems to have backed off from passing far ranging cap and trade legislation, the EPA has continued to advance an aggressive regulatory and enforcement agenda. EPA continues to implement its greenhouse gas emissions regulations and permitting requirements, as well as proposed greenhouse gas tailoring rules. Additionally, the iron and steel industry is spending a great deal of time and money complying with reporting obligations and implementing the requirements of the Iron and Steel Foundry Area Source Rule.

While industry, the environmental community, and EPA can disagree on the need for or the implementation of specific policies and regulations, our company and industry understands the overall need to protect the environment for our children and grandchildren. A healthy environment and a safe place to work are American goals, both for our company as well as our country.

Our concern is the seeming disconnect between recognition of the costs to industry in implementing the mechanisms to achieve environmental protection, and how those costs affect pricing and competitiveness, especially, when competing against companies and countries that do not face the same obligations. American workers love to compete and given a level playing field can win most contests. However, the huge disparity in regulatory costs, coupled with a foreign government industrial and trade policy of tariffs, supports, preferences, subsidies and currency manipulations, makes the playing field very tilted against American companies. We can compete against other companies, but not against other countries.

2. Is there anything else you would like to add for the record?

Federal spending should not be divorced from federal policy-making. U.S. taxpayer dollars should not go to foreign producers buoyed by governmental subsidies and a dearth of governmental regulation. Nor should these taxpayer dollars be used to reward those companies who have moved their operations, investment dollars, and jobs from the United States to foreign countries. Rather, federal spending should give a common sense preference (which is notably not an unworkable requirement) to those companies and workers who play by the rules and continue to invest in their U.S. operations, modernizing plants to make them safe, efficient, and compliant with U.S. regulations.

Senator CARDIN. Let me thank all four of you for your testimony. I found it extremely helpful. We all understand that we need the resources to improve our water infrastructure.

It would be, I think, extremely valuable on the reauthorization of the State Revolving Funds. I think that would be very helpful. This Committee has done that; we have gotten it out of the Committee. It is not an easy issue, because of regional differences and the politics of reauthorization of bills in this Congress. But to me, it not only gives you the legal authority of the reauthorization, but it gives you the predictability to know that the program will be there at a predictable level, so locals can do their planning. I agree with that. Mr. Richey and Mr. Freeman, I think both of you mentioned the private activity bond limits, the Menendez-Crapo legislation, which as you noted, I am a co-sponsor. I think that could help. So we do need to get predictable funding.

My first question, though, deals with some of you have pointed out that there are ways that the Federal Government could be more helpful in the way that the money gets out to the local governments. Can you give us any specific recommendations as to some of the concerns that you have on the requirements that the Federal Government has imposed that is restricting your ability to leverage or get money out quicker for water infrastructure? Any specific recommendations?

Mr. FREEMAN. I would be happy to try to answer that question, Mr. Chairman. And I won't say it is Congress as much as possibly the EPA, it is duplicative administrative reporting requirements. Like I said in my testimony, I believe we should be totally held accountable for the use of the Federal money. No way am I saying we shouldn't be. But I believe there is duplication of reporting requirements that would help a great deal.

I am also a little concerned on the additional subsidization level. In Oklahoma, the 30 percent suggested, it would reduce Oklahoma's ability to leverage by [unclear] percent. We are right now providing below market interest rates, 30 percent below market for a drinking water SRF loan and 40 percent below a AAA rate for the smallest of borrower in our State, and I think we are pretty well subsidizing. But I am worried about the ongoing revolving fund nature of the fund with required continued subsidization. I think that the reporting requirements is the main thing, and I would be happy to follow up on that.

Senator CARDIN. That would be helpful, if you could get us the specific concerns you have on the reporting requirements. That would be very helpful to this Committee. I appreciate that.

[The referenced information follows:]

J. D. STRONG
EXECUTIVE DIRECTOR

MARY FALLIN
GOVERNOR

STATE OF OKLAHOMA
WATER RESOURCES BOARD
www.owrb.ok.gov

December 21, 2011

The Honorable Benjamin Cardin
United States Senate
509 Hart Senate Office Building
Washington, DC 20510

Dear Senator Cardin,

I wanted to express my appreciation of your allowing me to testify during the December 13th, 2011 Senate Committee on Environment and Public Works on *"Our Nation's Water Infrastructure: Challenges and Opportunities."* Additionally, I want to express my sincere appreciation to you for your support of improving water and wastewater infrastructure in Maryland and across the nation.

As requested, I am writing this letter to provide additional information on how the SRF programs can be improved in order to accelerate the outlays of federal funds to communities for water and wastewater projects. The SRF programs have been extremely successful committing over $84 billion to projects for wastewater infrastructure and over $20 billion for drinking water infrastructure. It is important to note, however, that the assistance made available to communities is significantly greater than the initial federal investment as a result of state match, loan repayments, issuance of bonds and interest earnings. The SRF accomplishments are many but there is always room for improvement.

Requirements Limiting the Ability of States to Address Infrastructure Needs

- **Green Project Reserve** – The Appropriations Bills from FY 2010 and FY 2011 requires that not less than 20% of the funds be targeted toward "green" projects as defined by EPA. In some States, this means that projects set to address more critical water quality or public health issues are being by-passed by the SRF program to meet the green quota.
    - Increase Flexibility - SRF Programs have long been able to fund projects that are green including high efficiency pumps, reflective roofs, rain gardens, etc. The definition of what should be considered Green should be able to be defined on a state by state basis.
    - Increase Flexibility - Water Quality/Public Health needs vary from State to State and States are in the best position to recognize the priorities for providing assistance. Actual funding levels or percentages required for funding green projects should be at the discretion of the states to ensure that individual state needs are being addressed.
- **Additional Subsidization** – The Appropriations Bills from FY 2010 and 2011 required that not less than 30% of the funds be targeted towards additional subsidization in the form of grants, negative interest, or principal forgiveness. Furthermore, it is strongly encouraged the additional

Linda P. Lambert, Chairman • F. Ford Drummond, Vice Chairman • Joseph E. Taron, Secretary
Tom Buchanan • Marilyn Feaver • Ed Fite • Rudy Herrmann • Kenneth K. Knowles • Richard C. Sevenoaks

OCWP

subsidies should be given to projects that could not otherwise afford such projects. States are already providing the SRF programs to municipalities at subsidized interest rates.

   - Increase Flexibility – Providing the additional subsidization reduces a programs leveraging capacity. In Oklahoma, capacity was reduced by approximately 30% under each program. Should additional subsidization continue it should be provided under circumstances deemed appropriate by the State not EPA.

- **Sustainability Policy** – EPA issued their Clean Water and Drinking water Infrastructure Sustainability Policy as part of its efforts to promote sustainable infrastructure within the water section in October 2011. State SRF programs continually evaluate the sustainability of a system (technical, managerial, and financial) as part of their loan review. EPA emphasizes the importance of directing SRF assistance to projects that support sustainable systems that help build or maintain the technical, financial, and managerial capacity of the recipient.
   - Increase Flexibility – It is in a system's best interest to ensure that they are technically, financially and managerially sustainable. However, EPA's focus on these issues should be addressed through the regulatory portion of their programs not the SRF program which is focused on assisting community's meet their infrastructure needs.
- **Reporting** – Utilizing public funding requires the SRF programs to be transparent. It becomes burdensome, however, when the State Programs have to report the same information in multiple websites and documents. And/or, when the information is available and EPA is unable to extract the information from the appropriate report.
   - Example of Duplication of Reports
      - Federal Funding Accountability Transparency Act website
      - EPA NIMS/Clean Water Benefits Reporting
      - Intended Use Plans
      - Annual Reports
      - Periodic EPA Requests for Information
      - State Websites
- **EPA Consistency** – EPA Headquarters and Regional Offices are partners along with States in the implementation of the SRF Program. The challenge, however, is when EPA guidance is interpreted different ways by the 10 Regional Offices. Obviously there are differences in every state but the guidance should be the same regardless what part of the country you are located.

Thank you again for the opportunity to testify during the Senate Hearing. If you have questions or need additional information, please do not hesitate to contact me by phone at 405.530.8800 or jsfreeman@owrb.ok.gov.

Sincerely,

Joe Freeman, Chief
Financial Assistance Division

Cc: Senator Barbara Boxer, EPW Majority Chairman
Senator James Inhofe, EPW Minority Ranking Member
Senator Tom Coburn

Senator CARDIN. All of you have mentioned the economic impact here. Mr. Scott, I am very impressed that during this economic period you have quadrupled your company. That is certainly impressive. Mr. Richey, your comments about the economic impact.

Explain to me how we can leverage that more effectively, particularly the green infrastructure, which is jobs that can't be exported overseas. What more do you want us to do that could help unleash economic activity, particularly in the green energy or the green sector?

Mr. SCOTT. My suggestion, as I mentioned, our experience in Maryland is probably a good example. In the year 2000, green infrastructure was suggested in our stormwater design manual. The industry, the land development industry, land improvement industry, did not embrace it, mostly because it was a change in the way they had to do business. It is a change in the way we design sites; it is a change in the way we construct sites.

Because of the resistance to change, the green infrastructure didn't happen as a suggestion in the Maryland State design manual. In 2009 the legislature then followed up I think with some pressure from the environmental community to actually mandate it. Now that it is mandated, it is happening.

I heard earlier the EPA has taken a similar tack as far as suggesting approaches, or suggesting the use of green infrastructure. Because it is a significant change in the way the design and construction of new sites occurs, it is not likely that that is going to go very far, if it is just suggested. There have to be more teeth in it to actually make it happen. We watched it over 9 years in Maryland, and that was our experience.

On the maintenance and inspection side of things, it is a similar situation. EPA is working on their stormwater rule, and if that rule has some teeth to it, some meat to it as far as requiring inspection and maintenance of existing stormwater management ponds and systems that have been in place for the past, in some areas 20 to 30 years, if they are not maintained, if they are not inspected, there is no pollutant removal. They are not performing.

So suggestions to do this, and most stormwater management facilities that are constructed, there are suggestions on the plans, and the owners are suggested to inspect and maintain them. But until they actually have to do it, in many cases it just doesn't happen.

Senator CARDIN. Thank you.

Mr. Richey, I just want to make one observation on one of the comments you made. It has to go, we have to highlight that. Twenty-five percent of the treated water is lost.

Mr. RICHEY. Yes, sir, that is because of decaying pipelines. We know that that water has to be treated, it has to be pumped. So you have energy costs, you have precious water that is being lost. But back to the green infrastructure, almost all of our product in ductile iron pipe is made from recycled materials. So the way the Federal Government could help us is put a domestic preference in that the taxpayers are paying for anyway, in the SRFs and PABs, and help us use that recycled material here domestically.

Senator CARDIN. Excellent suggestion. But if we can reduce the leakage by 25 percent, think about the energy savings, think about the efficiency factors, think about the chemicals that don't need to be used. There is a lot of savings, a lot of loss here with that 25 percent. I just didn't want that to go without putting a spotlight on that.

Mr. RICHEY. That is right, Senator, and we would like to see all pipeline replaced with our pipe. We could solve that problem overnight.

[Laughter.]

Senator CARDIN. As long as we use your pipe.

Mr. RICHEY. Yes. OK, any of our pipes, as long as it is ductile iron pipe.

[Laughter.]

Senator CARDIN. Thank you very much.

I will turn to Senator Sessions.

Senator SESSIONS. Mr. Chairman, I will let Senator Inhofe, our Ranking Member, go ahead.

Thank you, Jim, for coming and for your leadership over many years on these issues.

Senator INHOFE. Thank you very much.

On this 25 percent, I was going to ask about that, is that nationwide? I was gone during part of your testimony?

Mr. RICHEY. Yes, Senator, that is an average of 25 percent.

Senator INHOFE. It is an average.

Mr. RICHEY. Some places are going to be worse than that.

Senator INHOFE. Is it going to be worse in some of the more mature parts of the country? Do you have that broken down? Do you know what Oklahoma is, for example?

Mr. RICHEY. I don't have that information, but I believe it would be, in the older, more mature areas where you have older pipelines, yes, some of our pipe has been in the ground for over 100 years and working great. But there are other areas where it just hasn't been maintained properly. Also you have seismic shifts in the soil and the things that destroy pipelines after a lot of use.

Senator INHOFE. Your suggestion is that cast iron lasts quite a while?

Mr. RICHEY. Yes, sir. In fact, we have a club called the Century Club and several communities are members of that, where you have to have your pipeline over 100 years, and you join this club.

Senator INHOFE. Well, I have a request of you. First of all, on that line, I can remember when they would all look at the newer States, like Oklahoma's statehood in 1907, as not having the problems. However, it has turned around now, a lot of the more mature parts of the country have now had new infrastructure. So we don't want to be left out, and I would be interested in maybe, Mr. Freeman, if you can find out the specific information about Oklahoma.

But the request I have of you, Mr. Richey, is that if you think of anything that would make it beneficial to the American Cast Iron Pipe Company to make your job easier in Oklahoma, will you call me personally?

Mr. RICHEY. Thank you, sir.

Senator INHOFE. Mr. Freeman, you mentioned the flexibility, you were here when Mr. Hanlon testified, and I know he is trying, I know where his real concern is in terms of giving flexibility, but you said increased flexibility is still desired. What type of flexibility do you want to recommend right now that needs to be improved?

Mr. FREEMAN. As I previously mentioned, I think that flexibility on the additional subsidization to allow States to implement that as is more necessary from State to State. As I mentioned in my testimony, in Oklahoma through our comprehensive water plan that I know that you have been aware of, Senator Inhofe, we have identified $82 billion in need. What you just said is true, the more mature States, but now it is in Oklahoma.

Senator INHOFE. That is right. And you talked about the small, rural, and disadvantaged communities. We have a lot of those.

Mr. FREEMAN. Yes, sir.

Senator INHOFE. And we have a program, the Credit Reserve Enhancement Program, that we are considering. Do you want to elaborate any more on that?

Mr. FREEMAN. Yes, I would be pleased to. Through our comprehensive water plan, in identifying this large water and wastewater need over the next 50 years, we know that the State Revolving Fund alone, even at its current level of funding, let alone its being possibly reduced, and our State funding programs, are not going to be adequate to meet that $82 billion of need.

And as you are aware, the economic realities nationally, but in Oklahoma I think we are doing a little better than most other States, but still, trying to go ask the legislature for additional moneys, come up with an idea that would require a vote of the people, and Representative Richardson of the Oklahoma House of Representatives is currently working on this with us, would be where instead of the State putting up $50 million or $100 million in additional appropriation, what we would ask is that the State, if the water board ever defaulted on one of our bond issues, one of our State bond issues, that the State at that time would then issue general obligation bonds to meet those defaults.

Statistically, since the water board has been in water and wastewater financing loan-wise since 1985, before the SRF programs were in existence, we have never had any default or any payment problem at all. So statistically, the State would never have to put up a penny of money by issuing those general obligation bonds. If the State would allow us to have, let's say, $100 million, we have already visited with Standard and Poors rating service, we could issue up to $1 billion in additional debt to provide funding for Oklahoma's communities throughout the State.

Senator INHOFE. I appreciate that, and I have often said, one of the reasons I so appreciate this Committee, this Committee has the largest jurisdiction of any committee in the Senate, Environment and Public Works. Of course, you are right in the middle of both of those. One of my concerns, because I do have the background of being the mayor of a major city, is the biggest problems facing communities and counties and cities in Oklahoma is not crime on the streets, it is unfunded mandates.

We are doing a very good job, and you are doing a very good job in Oklahoma. We just want to maximize that and be able to assist you all we can.

Thank you, Mr. Chairman.

Senator CARDIN. Senator Sessions.

Senator SESSIONS. Thank you.

Mr. Richey, I show a map here that indicates the number of States in the United States that have companies that manufacturer cast iron pipe, ductile iron pipe. We have seen the ones in yellow, Mr. Chairman, where plants have closed in recent years.

So just basically, I guess you and Mr. DiLoreto would say that subdivisions are down, very few subdivisions are being constructed, very few shopping centers are being constructed. Private developments are down, and cities have tight budgets, so they are down. Would you say this is putting an extraordinary stress on the people who make the items that compose our infrastructure, and Mr. DiLoreto, our engineering support teams, too?

Mr. Richey, do you want to start?

Mr. RICHEY. Yes, Senator. The jobs are lost; we have lost jobs. And some of those jobs, I am sad to say, may never come back. And now I am worried about the jobs that are still existing, how do we make it through to the recovery of the economy? That is what we are here for today. I think that these two funding mechanisms that we are talking about will allow—it just gives the communities another tool in the toolbox which they can use to raise funds to replace the infrastructure that does need replacing after all these years.

Senator SESSIONS. Well, I tend to agree with that. It is a needed infrastructure item. We have a deep American industry and that industry definitely is in a crisis situation.

Would you agree that from an engineering perspective, Mr. DiLoreto, that it is a tough time?

Mr. DILORETO. Absolutely. I commented that I was in a fast growing utility, we were putting in 200 to 300 meters a month in our utility. Last month we got a 27-lot subdivision, and we thought, oh, my gosh, this is the biggest thing we have seen in 4 years. The civil engineers, their jobs are being lost in that manner. The industry is being lost in that manner. Even my own maintenance workers we have had to change jobs of what they have done. And when an opening comes for one of these positions, hundreds of applications we get.

Senator SESSIONS. Mr. Richey, what would be the impacts on job creation in your sector if a bill like 939 that would lift the volume caps on private bonds became reality?

Mr. RICHEY. Senator, we have estimated about 27,000 jobs would be added by if we could start tomorrow in increasing the private activity bond, taking the cap off of it.

Senator SESSIONS. One of the things, Mr. Chairman and Ranking Member on the Budget Committee, and those red ink numbers just overwhelm you every day, but one way to strengthen the United States balance sheet is to take some of these costs off our balance sheet, so private activity bonds put the total risk on the private activity provider. And in a way it has some costs, and we need to be sure we pay for that cost. But in terms of adding to the debt of the United States, it is much smaller than if we loaned the money out ourselves.

How would the cities utilize, Mr. Richey, the private activity bonds? As a practical matter, how would that work?

Mr. RICHEY. I think what happens is the cities would determine, OK, do I need this funding, because I can't raise it through tax revenues, I can't raise taxes, I am not getting the ad valorem taxes on property. How do I get the funds that I need to replace infrastructure that needs to be replaced?

So they advertise this, private activity bonds are issued. They are tax-exempt from Federal tax, and that encourages investors to take that risk that the local governments don't have to take any more.

Senator SESSIONS. Mr. Freeman, do you have any comment on that from your perspective?

Mr. FREEMAN. No, sir.

Senator SESSIONS. Mr. DiLoreto.

Mr. DILORETO. No.

Senator SESSIONS. Well, it is my understanding that many States are not currently using an entire volume cap. How does exempting water and wastewater plants and infrastructure deal with that problem?

Mr. RICHEY. I think the difficulty there is that many of these projects we are talking about are multi-year projects. When they don't know or the locals don't know if the State Revolving Fund is going to have that funding every year, then there is a lack of funding, a lack of confidence about future projects. And if they had no cap, then they knew they could fund multi-year projects, we would start seeing the infrastructure being developed and being replaced where necessary.

Senator SESSIONS. Let's talk, one moment, Mr. Chairman, you can interrupt me, I just went over my time limit. But the idea of Buy America is something that a lot of us look carefully at. But I have come to have a growing feeling that we need to be far more interested in how we can help our manufacturing that creates jobs in the United States. The Wall Street Journal just had a big article about plants closing and how much it costs the Government, unemployment insurance, food stamps, welfare, other problems that occur there, right out of the Treasury, direct expenditures out of the U.S. Treasury.

But first, Mr. Richey, you are competitive, you are in the world market competition. Would you explain to us some of the things that provide what many would consider unfair advantages from our trading partners? I know China is a manufacturer of pipe and an exporter of pipe. What are some of the advantages countries like that might have that are really unfair in your view?

Mr. RICHEY. Thank you for the question. I sort of divided the two areas. One is unfair practices and the other is societal needs in the United States. So unfair practices, we know that we are competing not with other companies, we are competing with other countries. And I can stand toe to toe with another company, but not another country. The countries I am talking about allow subsidies for their exporters, they manipulate the currency, they have unbelievable high tariffs if I try to ship anything to their country. Yet we have very low tariffs coming into this country.

And we also know that they dump, we know that they sell in this country cheaper than the sell in their own country. So I have all that working against me. At the same time, we have things that we hold near and dear to our hearts here. We want to have a good environment, we want to have safety, we want to have pension plans, we want to have health care. So these taxpayers in this country are actually subsidizing not my business, they are subsidizing foreign competitors, foreign countries when we use taxpayer dollars to buy foreign products for these infrastructure projects and other things.

Senator SESSIONS. If you took the currency manipulation, let's say at 25 percent, which we have estimated on China, that gives an advantage to the importer of that much. And the environmental regulations that you face are far more intense than most of your foreign competitors, is that not correct?

Mr. RICHEY. Yes, sir, in fact, we estimated that 25 percent of the particulate matter in a smoggy day in Los Angeles comes directly from China. So it is not just what happens in this country. We are actually allowing them to pollute this country.

Senator SESSIONS. Well, I think that is a justification for, as we craft this, to try to do it in a way that at least levels the playing field so our manufacturers have that ability.

Now, on the Buy American language, it does not prohibit foreign competition. Can you share some of the things that would allow a foreign competitor to still participate under some of the language, the Buy American language that has been suggested?

Mr. RICHEY. Yes, Senator, in fact, it is really ironic, because it is not just Buy American, it is to encourage foreign competition. Because we are saying, all right, we will compete with you. If you have the same rules, if you sign the international agreements, if you sign a WTO agreement, then come on. We welcome you.

But don't compete against us when you don't allow us a fair shake to get in your country, but you want to come here. We are not asking to Buy American only, it is a Buy American preference unless you sign those international agreements. If you sign the international agreements, no problem. We welcome you and welcome to compete with you.

Senator SESSIONS. Thank you.

Senator CARDIN. Mr. Richey, I think you said that just the way we have to get that message out to not only the American people but the international community. Because on a level playing field, we will do just fine.

Mr. RICHEY. That is right.

Senator CARDIN. And we have allowed foreign countries to subsidize, to do illegal trading practices, including dumping, as you pointed out, and we have not taken appropriate steps to allow our manufacturers to compete on a level playing field.

I just want to identify myself with the comments that you have made, and thank Senator Sessions for those comments. It is about jobs here in America and we can compete and we need to make sure we do everything we can to have a level playing field.

Let me thank the panel again for your testimony. The Committee has received testimony from the American Water Works Association, Water Environmental Federation, Association of Metropolitan Water Agencies, The Clean Water Construction Coalition, the United Association of Journeymen and Apprentices of the Plumbing and Pipefitters Industry of the United States and Canada, and the Subsurface Technologies. Without objection, these statements will be made part of the Committee record.

[The referenced information follows:]

American Water Works Association

Water Environment Federation
the water quality people

ASSOCIATION OF METROPOLITAN WATER AGENCIES

December 12, 2011

The Honorable Barbara Boxer
Chair
Senate Committee on Environment and Public Works

The Honorable James M. Inhofe
Ranking Member
Senate Committee on Environment and Public Works

The Honorable Benjamin L. Cardin
Chair
Senate Subcommittee on Water and Wildlife

The Honorable Jeff Sessions
Ranking Member
Senate Subcommittee on Water and Wildlife

Dear Senators,

The American Water Works Association, the Association of Metropolitan Water Agencies and the Water Environment Federation respectively request to have the following joint statement and its attachment included in the record of the hearing titled, "Our Nation's Water Infrastructure: Challenges and Opportunities," that will take place on December 13. If you or your staff have any questions, please do not hesitate to contact Tommy Holmes at 202-326-6128.

Sincerely,

Tommy Holmes

Tommy Holmes
Legislative Director
American Water Works Association

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American Water Works Association

Water Environment Federation
the water quality people

ASSOCIATION OF METROPOLITAN WATER AGENCIES

Written Statement
for the Senate Subcommittee on Water and Wildlife
on "Our Nation's Water Infrastructure: Challenges and Opportunities"
December 13, 2011

Water Infrastructure: Challenges, Benefits and an Innovative Proposal

The American Water Works Association (AWWA), Association of Metropolitan Water Agencies (AMWA) and the Water Environment Federation (WEF) commend the Senate Subcommittee on Water and Wildlife for addressing the challenges and opportunities surrounding our nation's water infrastructure. High-quality drinking water and wastewater systems are essential to public health, business, and quality of life in the United States. Our organizations and others have documented that our water and wastewater infrastructure is aging and that many communities must begin to increase their levels of investment in the repair and rehabilitation of water infrastructure now in order to protect public health and safety, business continuity and economic viability and to maintain environmental standards. The tenets outlined in this paper provide a path toward truly sustainable water infrastructure for all Americans.

AWWA, AMWA and WEF have long believed that Americans are best served by water systems that are self sustaining through rates and other local charges. However, we recognize that at present, some communities need assistance due to hardship or special economic circumstances. There are also times when communities must access large amounts of funding in a short time period to address major water infrastructure needs. The U.S. Environmental Protection Agency's latest estimates for needed investment in drinking water and wastewater infrastructure shows that more than $500 billion must be invested through 2028 to maintain our current levels of service. And that only includes projects that would be eligible for state revolving loan fund projects (SRF). According to the US Conference of Mayors, more than 95 percent of water infrastructure funding is historically provided by state and local sources.

In addition to the vital role water infrastructure plays in local economic growth and even sustainability, water infrastructure has significant impacts on the nation's economy. The U.S. Department of Commerce has estimated that every additional dollar invested in drinking water or wastewater sector results in an increase in revenue for all industries of $2.62. Furthermore, the Department estimates that every additional job in the water sector creates 3.68 jobs in the national economy.

The primary federal role in water infrastructure is one of leadership. Among other things, that role includes demonstrating and encouraging:

- Utility use of modern asset management tools and full-cost pricing;
- Use of rate structures that accommodate low and fixed-income customers as much as practical;
- Adoption of green technologies and approaches such as water and energy conservation, water reuse, and innovative stormwater management;
- Use of cost-saving watershed and regional strategies, such as system consolidation, regional management, and cooperative approaches among water, wastewater, and highway agencies within a region; and
- Use of advanced procurement and project delivery methods.

However, there is also an important role for the federal government in lowering the cost of capital for water and wastewater investments. Almost 70 percent of American communities use bonds to finance local infrastructure. They pay billions of dollars in interest costs each year. Lowering the cost of borrowing for water and wastewater infrastructure is an important way to leverage local funding and help America rebuild and rehabilitate our aging water infrastructure.

A Novel Approach: The Water Infrastructure Finance and Innovation Act

To lower the cost of infrastructure investments and to increase the availability of lower-cost capital, AWWA, AMWA and WEF urge Congress to enact a "Water Infrastructure Finance and Innovations Act" (WIFIA), modeled after the successful Transportation Infrastructure Finance and Innovations Act (commonly called TIFIA). Such a mechanism could lower the cost of capital for water utilities while having no or little effect on the federal budget deficit. WIFIA would access funds from the U.S. Treasury at Treasury rates and use those funds to support loans and other credit mechanisms for water projects. Such loans would be repaid to the Authority – and thence to the Treasury – with interest.

The Water Infrastructure Finance and Innovations Act would:

- Provide for loans, loan guarantees, and other credit support for large water infrastructure projects and those with national or regional importance. Communities undertaking these projects often find it difficult or impossible to access SRF loans in meaningful amounts, due in part to inadequate capitalization of the SRFs.
- Reduce the cost of leveraging for SRF programs by lending to them directly. WIFIA could lend to those SRF wishing to leverage their capitalization grants at the lowest possible interest rates. This would allow SRFs to make more loans and would increase their ability to offer special assistance to hardship communities if they chose to do so. Currently, about 27 states leverage their SRF programs on the bond markets. WIFIA loans to an SRF would

offer another mechanism to accomplish the same goal and make such a practice more attractive to additional states.

WIFIA should enable projects and state SRFs to obtain financing with no more burden than going to traditional credit markets through a streamlined review and application process. Fitch Ratings, a top credit rating agency, calculates that the historical default rate on water bonds is 0.04 percent. Indeed, water service providers are among the most creditworthy and fiscally responsible borrowers in the United States. Moreover, those states that leverage their SRF programs all have AAA or AA bond ratings and no history of defaults, placing them among the strongest credits in the country. Consequently, WIFIA – because it involves loans that are repaid – involves minimal risks and minimal long-term costs to the federal government. More information on the WIFIA proposal is attached.

The SRF Program

It is also important for the federal government to continue to directly capitalize state revolving funds, which can be used to both broadly lower the costs of water infrastructure investment and to address the needs of communities in hardship or special circumstances. AWWA, AMWA and WEF propose several enhancements to the State Revolving Fund programs to allow them to better serve our communities:

- Continue support for SRF capitalization. Despite growing needs and the implementation of new drinking water regulations, overall federal investment in the SRF programs has decreased significantly in recent years. We ask that Congress carefully consider the broad and important economic and public health benefits that flow from each dollar of support for the SRF programs.

- Provide states with flexibility in using SRF funds. This should include the ability to address the special needs of hardship communities they identify. This flexibility should also include the ability to use state procurement processes and standards that minimize process and administrative "burdens" for grant recipients and for states themselves.

- Eliminate arbitrage restrictions. Allow SRF programs that issue bonds to keep arbitrage earnings on their invested funds to the extent such earnings are used to support additional investment in water infrastructure. Based on historical market rates, this would provide $200-400 million per year in additional funds for water and wastewater investment.

- Streamline the SRF application. Provide incentives to streamline the SRF loan review process. It can take almost a year to obtain an SRF loan. This deters many communities from using the SRF, and leads them to issue higher-cost municipal bonds instead. Due to the revolving nature of the Fund, increasing the pace of awards through streamlining will help increase the revolving flow of funds, allowing even more projects to get built, and so on into the future.

Americans can be proud of the progress we have made in protecting public health and the environment through past investment in water infrastructure, but we risk a reversal of that progress unless significant new investments are made in our aging water and wastewater systems. AWWA, AMWA, and WEF greatly appreciate your leadership on this issue and we look forward to working with you and other members of the committee in the months ahead to develop bi-partisan, sustainable solutions to the water infrastructure challenges that the country faces.

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ASSOCIATION OF METROPOLITAN WATER AGENCIES

A Cost Effective Approach to Increasing Investment in Water Infrastructure:

The Water Infrastructure Finance and Innovation Act (WIFIA)

Background. High-quality drinking water and wastewater systems are essential to public health, business, and quality of life in the United States. The American Water Works Association (AWWA) and others have documented that our water and wastewater infrastructure is aging and that many communities must significantly increase their levels of investment in its repair and rehabilitation to protect public health and safety and to maintain environmental standards. EPA estimates that given current levels of investment, the shortfall between actual and necessary levels of investment in water infrastructure will exceed $530 billion over the coming twenty years. Other estimates vary, but they all point to a very large "infrastructure gap." This gap has profound implications for public health, welfare, the economy, and our quality of life.

The organizations above believe that Americans are best served by water and waste water systems that are self-sustaining through rates and other local charges. Indeed, in 2005 Americans invested $84 billion to build, operate, and maintain water and wastewater infrastructure, with more than 95 percent of those funds representing state and local monies without federal assistance or subsidies, according to the U.S. Conference of Mayors.

However, the federal government can play an important role in facilitating increased local spending on infrastructure by lowering the cost of capital for water and wastewater projects. Almost 70 percent of American communities use bonds to finance local infrastructure. They pay billions of dollars in interest costs each year. Lowering the cost of borrowing for water and wastewater projects represents an important way to leverage local funding and help America rebuild its aging water infrastructure, since lowering the cost of capital can offer significant cost savings to the utility and its customers. For example, lowering the cost of borrowing by three percent on a thirty year loan can reduce total project cost by over twenty percent. In this way, low interest financing has the same effect as making a grant to cover part of the project's costs *– except that the financing will be repaid to the federal government and will not add to the long-term deficit.* The savings for local borrowers can significantly accelerate water infrastructure investment by making it more affordable for utilities and their customers.

Investment in Water Infrastructure Benefits the Nation. Lowering the cost of infrastructure investment pays dividends in many ways. It makes it possible to "do more (infrastructure) with less (money)." The US Department of Commerce Bureau of Economic Analysis estimates that for every dollar spent on water infrastructure, about $2.62 is generated in the private economy. And for every job added in the water workforce, about 3.68 jobs are added to the national economy, according to the Bureau. Moreover, these national benefits come on top of improved public health, a cleaner environment, better fire protection, and a better quality of life in the community.

A New Approach: The Water Infrastructure Finance and Innovation Act. To lower the cost of infrastructure investments and increase the availability of lower-cost capital, we urge

Congress to enact a "Water Infrastructure Finance and Innovation Act" (WIFIA), modeled after the successful Transportation Infrastructure Finance and Innovation Act (commonly called TIFIA). Such a mechanism could lower the cost of capital for water utilities while having little or no long term effect on the federal budget. WIFIA would access funds from the U.S. Treasury at long-term Treasury rates and use those funds to provide loans or other credit support for water projects. Funds would flow from the Treasury, through WIFIA, to larger water projects or to State Revolving Funds wishing to borrow to enlarge their pool of capital. Loan repayments – with interest – would flow back to WIFIA and thence into the Treasury – again, with interest. See the attached table for a simplified illustration of the flow of funds.

This funding mechanism would allow the Water Infrastructure Finance and Innovation Act to:

- Provide for loans, loan guarantees, and other credit support for large water infrastructure projects. These large projects often find it difficult or impossible to access SRF loans, and in many states large projects are expressly excluded from SRF eligibility because they would leave little room to finance other projects.

- Reduce the cost of leveraging for State Revolving Fund (SRF) programs by lending to them directly. WIFIA could lend to those State Revolving Funds wishing to leverage their state or federal capitalization grants at the lowest possible interest rates. This would allow SRFs to make more loans and would increase their ability to offer special assistance to hardship communities if they chose to do so. Currently, 27 states leverage their SRF programs on the bond markets. WIFIA loans to an SRF would offer an alternative mechanism to accomplish the same goal and make such a practice more attractive to additional states.

- Ensure a streamlined approach to financing. WIFIA should be directed to develop a streamlined review and application process and make decisions with no more burden to the applicant than required by traditional credit markets.

Low Cost to the Federal Treasury. The Authority would operate much like the TIFIA program in providing credit assistance. Under the Federal Credit Reform Act, a federal entity can provide credit assistance only to the extent that Congress annually appropriates budget authority to cover the "subsidy cost" of the loan, i.e. the net long term cost of the loan to the Federal Government based on the risk of default. In this way, Congress directly controls the amount of lending – but the budgetary impact is also minimal because it reflects the net long-term cost of the loan, and most loans are repaid in full. In the case of TIFIA, the leverage ratio is approximately ten-to-one, where $1 in subsidy appropriation supports $10 in credit assistance. This ten-to-one ratio may be even higher for water infrastructure due to the very low historical default rates on water projects. Fitch Ratings, a top credit rating agency, calculates that the historical default rate on water bonds is 0.04 percent. Indeed, water service providers are among the most fiscally responsible borrowers in the United States. Moreover, those states that leverage their SRF programs have no history of defaults, placing them among the strongest credits in the country. Consequently, WIFIA – because it involves loans that are repaid with interest – involves minimal risks and minimal long-term costs to the federal government.

The following examples show in simplified form how WIFIA would work and the benefits that could accrue to project sponsors.

Example: Water or Waste Water Utility. Assume a water or wastewater utility wished to fund a $100 million project at the lowest possible cost. If the utility is an A-rated municipal utility, in the market conditions existing in May 2011 the utility could finance the project on the municipal debt market by selling 30-year bonds at an interest rate of 5.4%, plus a 1.5% underwriting fee on loan principal amortized over the life of the issuance.

As an alternative the utility might apply for a WIFIA loan. WIFIA could support all or a part of the project, which might also involve municipal bonds, cash financing, an SRF loan, and/or private capital. A WIFIA loan reflects long term Treasury rates, plus a small mark-up (say, 1/8th of one percent) to cover WIFIA administrative costs, and would total 4.04%in May, 2011.

Further assume that in the project year, Congress has appropriated $400 million for WIFIA to be used to cover the "subsidy cost" of its loan portfolio, i.e. the estimated cost of defaults. It is reasonable to expect (based on calculations following Office of Management and Budget and Congressional Budget Office guidelines) that $400 million in appropriated budget authority could cover $4 billion or more in WIFIA credit assistance. In making each loan, WIFIA would have to set-aside a corresponding amount of its appropriated budget authority to cover the default risk for that loan. Upon approving a $100 million loan, WIFIA would disburse $100 million in federal Treasury funds for the project and set aside $10 million to cover the risk of default on the project.

In accordance with the repayment schedule, the project sponsor would repay the WIFIA loan in full and with interest. All funds borrowed from the Treasury would be returned to the Treasury, with interest. As for the amount appropriated, the subsidy appropriation would have been based on the assumption that, over the entire portfolio of WIFIA loans, 90% of the funds would be repaid in full. If the repayment rate is ultimately greater across the loan portfolio, and the funds set aside were therefore not needed to cover defaults, a corresponding portion of the subsidy appropriation would also be returned to the Treasury. In some existing federal credit programs, the repayment of loans with interest and fees results in a net profit for the government. In this way, it is possible that WIFIA would have zero long-term cost to the government, or even return to the Treasury more than was appropriated and borrowed.

While imposing minimal cost on the federal government, using WIFIA would offer significant savings to the utility. In this example the utility – and its rate paying customers – save over $1 million dollars annually in debt service, and almost $33 million over the life of the loan, compared to the municipal bond markets. Of course, the level of savings to be anticipated will change if the bond market changes. If the spread between municipal bonds and Treasury rates increases or decreases, this level of savings would also increase or decrease. The figure below demonstrates that lower-cost capital from WIFIA would be equivalent to an outright grant of about 16%, given market conditions in May 2011. Unlike a grant, however, the loan will be repaid.

Annual Debt Service on $100 Million Loan	
30 Year Municipal Bond @ 5.4%	$6,906,800
30 Year WIFIA Loan @ 4.04%	$ 5,811,129
Annual Savings	$ 1,095,671
30 year savings	$32,870,130
Debt Service Savings	15.9%

Example: State Revolving Fund. Assume a State Finance Authority administers both the Drinking Water and Clean Water SRF programs in its state. Assume as well that numerous projects in the state have received SRF loans over the years, and several larger projects in the state have received WIFIA loans, but the state has more applications than it can approve in the current year, given available funds.

The state could decide to enlarge its capital base by either 1) borrowing money from WIFIA or 2) selling SRF bonds. Assume that in discussion with rating agencies, the state has learned that its SRF bonds will be rated A. Based on market conditions in May 2011, an A-rated 30-year issue would carry an interest rate of approximately 5.4 % plus a 1.5% underwriting fee on loan principal amortized over the life of the loan. As in the example above, a 30-year WIFIA loan would carry an interest rate of 4.04% (including the small mark-up to cover the WIFIA's administrative costs).

Instead of issuing bonds, the state might decide to seek WIFIA financing, and apply for a $30 million WIFIA loan to enlarge its capital base. If the application is approved, these funds could be used alone or in combination with state funds, SRF funds, and other sources of capital to support projects that achieve compliance with current regulatory requirements, replace aged infrastructure, eliminate sanitary sewer overflows, improve reliability of service, and install new technology to achieve greater operational efficiencies.

Once the loan is approved, WIFIA would borrow $30 million from the Treasury and provide those funds to the state SRF. When it received the funding, the SRF could use the funds alone or in combination with other capital, in accordance with its normal process. Each community that received a loan from the SRF would have to repay the state to the same extent it normally would under the SRF program. The state would use the flow of loan repayments or other revenues to repay its obligation to WIFIA.

As can be seen below, using WIFIA would save the state – and its taxpayers – over $300,000 annually and almost $10 million over the life of the loan, compared to a state bond offering. As in the example above, this level of savings is equivalent to an outright grant of about 16%. Of course, these numbers will change with changing conditions in the bond market. If the spread between municipal bonds and Treasury rates increases or decreases, the savings will be more or less dramatic. Savings the state realizes by borrowing from WIFIA could be used to support additional SRF loans, reduce interest rates to SRF borrowers, or reduce the overall level of state spending.

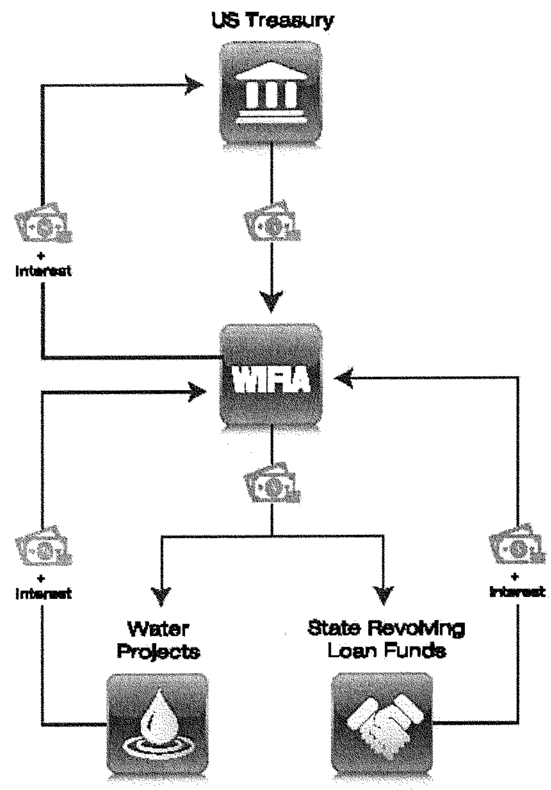
Annual Debt Service on a $30 Million Loan

30 Year State Bond @ 5.4%	$2,072,040
30 Year WIFIA Loan @ 4.04%	$1,743,339
Annual Savings	$328,701
30 year savings	$9,861,030
Debt Service Savings	15.9%

Conclusion. Enacting a Water Infrastructure Finance and Innovation Act (WIFIA) modeled after the successful transportation program known as TIFIA offers a modern, effective way to help increase this nation's level of investment in water and waste water infrastructure, at the lowest possible cost to the federal government. WIFIA would access Treasury funds at long term Treasury rates and in turn offer assistance in the form of low interest loans, loan guarantees, and other credit support to larger water and waste water projects and to State Revolving Funds that wish to leverage their capital. Such loans would be repaid with interest. The benefits of such low-cost financing to large water projects – which often lack access to State Revolving Funds – would be significant. As noted above, the long term cost to the Federal Treasury is minimal, and could even be positive, given the extremely low historic default rate on water projects.

How WIFIA Works

Water Infrastructure Finance and Innovation Authority



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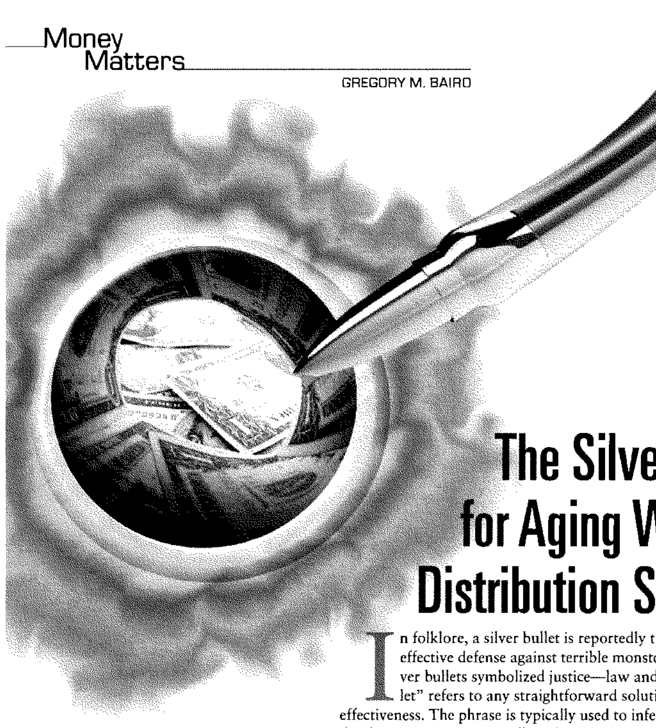

Baird

The Silver Bullet for Aging Water Distribution Systems?

In folklore, a silver bullet is reportedly the only kind that provides an effective defense against terrible monsters. For the Lone Ranger, silver bullets symbolized justice—law and order. Today, a "silver bullet" refers to any straightforward solution perceived to have extreme effectiveness. The phrase is typically used to infer that some new technologic development or practice will easily cure a major prevailing problem. If the evil monster or major problem is corrosion or pipe-replacement costs, then indeed, polyvinyl chloride (PVC) pipe would be the silver bullet to meet the challenges and costs associated with the aging water infrastructure crisis for water and wastewater systems.

UNDERSTANDING THE TARGET

In response to population growth, the United States installed underground water infrastructure during three main periods: the 1800s, 1900–45, and post-1945. Pipes constructed in each of these three eras will all start to fail at nearly the same time over the next couple of decades for reasons ranging from age and corrosion to inadequate design and poor installation. Additionally, the useful life of the materials has become shorter with each new investment cycle (WIN, 2002).

According to the AWWA report *Dawn of the Replacement Era* (2001), the oldest cast-iron pipes—dating to the late 1800s—have an average useful life of about 120 years. As a group, these pipes will last anywhere from 90 to 150 years, but on average they need to be replaced after they have been in the ground about 120 years. Because manufacturing techniques and materials changed, the 1920s vintage cast-iron pipes have an average life of about 100 years. Manufacturing techniques and materials continued to evolve, resulting in the pipes laid down post-World War II having an aver-

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age useful life of 75 years. Using these average life estimates and counting the years since the original installations shows that water utilities will face significant needs for pipe replacement over the next few decades. Replacement of pipes installed from the late 1800s to the 1950s is upon us, and replacement of pipes installed in the latter half of the twentieth century will dominate the remainder of the next one.

Utilities are faced with reviewing new methodologies and materials to select the best-fit, right-cost solution to age-old problems. Doing things the same old way and expecting different results does not meet the standards of an effectively managed utility.

Corrosion costs. The majority of pipes needing replacement are failing primarily because of their age and the excessive corrosion that has weakened pipes both externally and internally. Tuberculation is a form of internal corrosion and biofilm contamination that develops in iron pipes and restricts water flow. This restricted water flow can lead to additional problems. Internal corrosion can also be a breeding ground for bacteria. Photographs of old water mains with built-up internal corrosion faster feelings of distrust when the public realizes the utility has been providing them with drinking water from the pipe for the past 50 years. Unlike iron pipe, PVC is not affected by tuberculation. Its smooth, noncorrosive, and bacteria-resistant surface stays clean for decades.

PVC REPORTED TO LEVEL THE CORROSION PLAYING FIELD

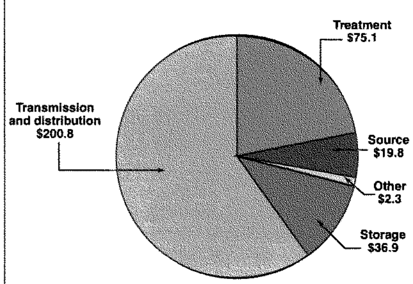
In many ways ductile iron behaves the same as gray cast iron. Some research has concluded that the corrosion behavior and corrosion resistance of ductile and gray cast irons would not be significantly different (Angelfire, 2011). Other studies have indicated that ductile iron might corrode faster than gray cast iron (Angelfire, 2011). Soils with lower resistivity are likely to cause more rapid pitting to ductile iron at rates that increase as the resistivity decreases, according to data compiled from various surveys and studies conducted in the United States, Canada, and Europe (Angelfire, 2011).

The high cost of mitigating pipe corrosion and distribution water quality issues is starting to be better understood. The useful life of pipe varies considerably, depending on such factors as soil conditions, materials used, and character of the water flowing through it. Corrosion of various metals and concrete is a common problem in some soils. Corrosion affects materials both on the surface and within the soil to various degrees. Streets, highways, sidewalks, houses, and pipelines for gas, sewage, and water are a few examples of the structures and facilities that are exposed to corrosion. Selecting the wrong pipe material or failing to protect pipe can greatly shorten the lifespan of sewer and water lines. Corrosion affects both main lines buried under streets and service lines that connect to homes and businesses. Line maintenance may be continuous and costly where the materials are not suited to the soil. The risk of corrosion is rated in soil survey reports as low, moderate, or high. Soils are rated for corrosivity in a natural condition or the condition evident during a soil survey. Local soil conditions, such as excess moisture and alterations of the landscape, can accelerate corrosion. Additionally, fertilizer and industrial wastes can alter soil conditions and increase their corrosivity (USDA, 2004).

In a sense, corrosion can be viewed as the spontaneous return of metals to their ores. The economic aspects of corrosion are far greater than most people realize. According to a 2001 report (Koch et al), the cost of corrosion in the United States alone was $276 billion per year. Of this, about $121 billion was spent to control corrosion, leaving the difference of $155 billion as the net loss to the economy. Utilities—particularly drinking water and sewer systems—suffer the largest economic impact, with transportation being a close second (Lower, 2009). A real-time estimate is displayed on the corrosion cost clock at www.watermainbreakclock.com.

The firing range. The main hot spots for these failures and resulting pipe replacement are in the industrialized population growth centers that were established after World War II. In 2001, the Water Infrastructure Network (WIN)—a consortium of industry, municipal, and nonprofit associations—estimated that as much as $1 trillion over a 20-year period would be needed to sustain water and wastewater systems in the United States when both capital investment needs and the cost of financing were considered (Baird, 2010a). The US Environmental Protection Agency (USEPA) estimated $334.8 billion (in

FIGURE 1 Total 20-year need by project type (in billions of dollars)*



Percentage not equal to 100 because of rounding

**Calculated according to 2007 dollars*

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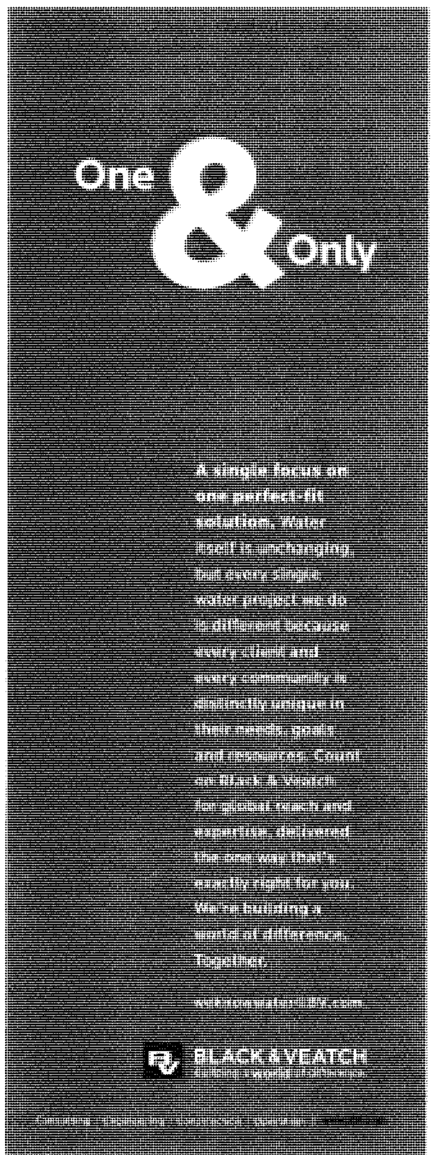

2007 dollars) would be needed to maintain just drinking water systems over the next 20 years (USEPA, 2009).

Pipe replacement costs. The majority (60%) of the replacement costs are for water transmission and disrribution pipes. In 2007, this number was estimated at $200.8 billion (Figure 1). Given that the economic downturn has resulted in deferred maintenance and delayed capital projects, this number is expected to increase to more than $250 billion. If the amount was mostly financed through long-term 30-year debt to achieve intergenerational equity among ratepayers, the figure would increase to $500 billion over the next 20 years. Ultimately, however, the ratepaying public will have to finance the replacemenr of US water infrastructure either through higher rates or taxes. Local funds are expected to cover the cost of the great majority of the nation's water infrastructure needs in the United States (AWWA, 2001).

"The staggering cost of maintaining, operating, rehabilitating, and replacing our aging water infrastructure requires a new partnership between federal, state, and local government," said Dennis Archer, mayor of Detroit, Mich., and president of the National League of Cities (USEPA, 2011a). Efforts to engage multiple stakeholders in order to lower the cost of borrowing will conrinue to gain local political support, but efforts will face heavy competition for funding priorities in Washington, D.C. Utilities that have effectively managed their pipe replacement programs and have addressed their corrosion issues do not want to subsidize those that have not.

Utilities are constantly caught between needing to finance the high replacement costs of underground infrastructure and the political pushback resulting from rate increases and affordability issues. The upshot is many managers are turning to long-term capital project and infrastructure financial planning to demonstrate the cost savings of PVC over ferrous materials such as ductile iron and steel, while also addressing corrosion issues and matching long-term performance. Additionally, the completion of long-term infrastructure financial and asset management plans will be critical to attracting and retaining current and future bondholders and investors.

To understand the nature and scope of the emerging infrastructure challenge, AWWA undertook an analysis of 20 US utilities. The analysis projects future investment needs for pipe replacement in these 20 utilities (Figure 2) and provides a forecast called a "Nessie curve." The Nessie curve is a graph of the annual replacement needs for a particular utility, based on when pipes were installed and how long they are expected to last in that utility before it becomes economically efficient to replace them (AWWA, 2001).

Required rampups in water system replacement costs will continue. Long-term, low-cost options need to be openly accepted by all municipalities and utilities. PVC, and even new improvements to PVC, will be required to meet the growing challenge.

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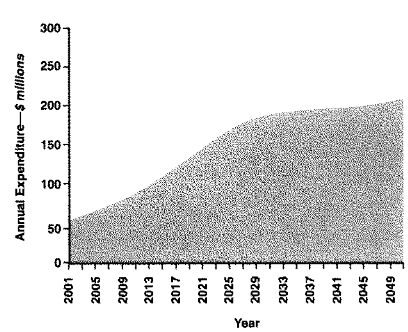
AIMING FOR AFFORDABILITY

The USEPA continues to send forth important new strategic public policies on twenty-first-century water challenges such as "Coming Together for Clean Water: EPA's Strategy for Achieving Clean Water" and "EPA's Clean Water and Drinking Water Infrastructure Sustainability Policy." These approaches promote sustainability and cost-effective planning but remain silent on any clarification about affordability except that the public needs to understand the value of water. The USEPA's writing on the wall about what the value of water and full-cost pricing mean seems to point to a 5% allocation of average household income to water and wastewater services (Baird, 2010b). For many citizens, this represents a 200–400% rate increase when 20% of lower-income families may already be paying more than 4% of their household income for water. As part of the solution, low-cost, sustainable, environmentally friendly PVC pipe should be considered in every open-cut pipe project for replacement needs or system expansion requirements.

The main question for policy-makers and utility managers is whether the increasing rate of infrastructure spending that utilities are facing over the next 20 years can be financed by the utilities themselves at rates customers can afford (AWWA, 2001). Accordingly, engineers must consider costs and funding in every planning and design decision. As with Rome, the infrastructure wasn't built in a day. Our water and wastewater infrastructure was built over generations and can be rebuilt at an affordable pace if we make smart decisions now (AWWA, 2006).

Developer fees affordability. Even for growth-related pipe projects and water distribution system expansions, the development community is concerned with the initial cost of the pipe. Developers in many areas are subject to development fees or connection/tap fees to help offset the cost of growth to a municipality or utility (AWWA, 2000). As a result, developers are strongly voicing their concerns over legitimate procurement and bidding practices that include PVC pipe as a low-cost, long-term, durable and sustainable option.

FIGURE 2 Projected expenditures for water main replacement caused by failure for 20 utilities



Utility managers no longer enjoy the benefits of being the silent utility and selecting design practices and materials from the past. In general, design practices in the United States are not drastically different from those used 30 years ago. However, research conducted in Europe and Japan suggests the broad goal of sustainability is not being achieved by current design practices in the United States (USEPA, 2011b).

Ratepayer affordability. As with metal pipes, improvements in PVC pipe manufacturing and design standards have helped improve durability and performance. These factors and cost comparisons have helped reduce the overall financial burden and historical infrastructure liability for ratepayers. In the March 2011 issue of *U.S. Mayor*, Jennifer Hosterman, Pleasanton, Calif., mayor and co-chair of the US Conference of Mayors Water Council, explained that PVC pipe is about 70% cheaper to use and less labor-intensive to install than is ductile iron pipe. Hosterman stated, "Giving taxpayers the best bang for the buck should be the chief goal for mayors and local elected officials across the country," and went on to explain that Pleasanton's approach rests on a dedication to improving customer service, managing tax dollars wisely, and adopting open procurement policies that welcome alternate and better-performing materials like PVC pipe (*U.S. Mayor*, 2011).

Many municipalities and utilities have adopted these polices and in return have saved tens of millions of dollars in capital costs while reducing operational and maintenance costs. Some utilities have chosen to keep rates at a minimum on the basis of these cost savings, while others have reinvested in advanced metering infrastructure to further transform their organization as a twenty-first-century utility. The materials' cost comparisons have also helped increase the public's perception of the utilities' due diligence and in return have helped justify the requirement for future rate increases. Conversely, utilities that fail to adopt open procurement practices to include the financial analysis of PVC materials versus historic pipe purchases are open to harsh criticism by both ratepayers and potential bondholders.

UNDERSTANDING THE WEAPONS IN COMBATING AGING INFRASTRUCTURE

The water industry is moving toward asset management practices. The benefits of this shift are helping utility managers make better decisions regarding condition assessment, life-cycle assessment, and life-cycle costing; leak-monitoring and investigation; prioritization of rehabilitation; and the selection, design, and timing of replacing aging assets.

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Life-cycle costing. To assist utilities, asset management firms are regularly applying low-cost PVC sliplining as an intermediate renewal solution and extending the pipeline life by a minimum 40 years. PVC, with 75 to 95 years of minimum expected life and low maintenance, is then typically selected to achieve overall lower life-cycle cost projections. Both US and European sources consider PVC to have a durable life expectancy of more than 110 years. With a common-sense and affordable approach, powerful, secure, and reliable networks of pipes, equipment, and treatments that will provide clean and safe water far into the future can be developed.

Various other life-cycle cost comparisons and assessments have also found PVC to be a prudent choice. The discussion of life-cycle costs should not be confused with academic studies known as "life-cycle analyses" (LCAs). A life-cycle cost comparison looks at the costs to the user of a product from purchase through disposal. LCA, on the other hand, attempts to account for all the environmental effects of a given product—from production through use and disposal. Depending on the data categories that are included, LCAs may provide useful environmental information, but they are not a substitute for a life-cycle cost comparison. Life-cycle costs do not directly depend on the environmental impacts included in an LCA; rather, life-cycle costs reflect durability and ease of maintenance as well as initial costs (Ackerman & Massey, 2003).

Life-cycle assessment. One life-cycle assessment study conducted in the Netherlands and comparing PVC and cast-iron pipes using the eco-indicator 99 impact assessment method demonstrated that PVC performs significantly better from an ecologic point of view (Ministry of Housing, Spatial Planning and the Environment, 2000). If pipes are assessed according to the Swiss method of ecologic scarcity (Frischknecht et al, 2006), the findings are essentially the same except for disposal. As a result, recommendations are that both iron pipe and plastic pipes should be collected and recycled separately, if possible. The European Plastic Pipes and Fittings Association (www.teppfa.org/pdf/HSELCAWindspergerStudy.pdf) offers an appropriate collection system methodology. Recycling is the final conclusion for low environmental impact.

Carbon footprint testing. Recio and colleagues (2005) conducted an energy consumption study in which the same mean lifetime (50 years) was assumed, a similar protocol of inspections was followed, and the energy consumption associated with operation and maintenance was the same regardless of the pipe. The study showed that in the case of pipes for drinking water, PVC pipe required the least amount of energy and generated the smallest amount of CO_2 emissions, whereas recycled ductile-iron pipe had the poorest results according to the same measures. Even if recycled material is used in manufacturing the ductile-iron pipe, the energy consumption is still 26% higher than for the PVC pipe. The most unfavorable case corresponds to ductile-iron pipes without recycled material, in which the energy consumption is in the range of 56% higher than PVC (Recio et al, 2005).

Monitoring PVC pipes through leak detection. The National Research Council Canada conducted studies that involved extensive field tests carried out under controlled conditions at a specially constructed experimental leak detection facility in Ottawa, Can. Commonly used acoustic leak detection equipment was evaluated by inviting several experienced leak detection teams from utilities and service companies in Canada and the United States to participate in "blind" leak detection tests. Equipment used by the teams included listening devices and leak noise correlators. Commercial leak noise correlators were generally found to be capable of locating any possible gasketed joint leak in plastic water distribution pipes (NRCC, 2011).

SELECTING THE BEST AMMUNITION

The water industry faces a number of distribution system deterioration problems, including water quality problems related to tuberculation and internal pipe corrosion, low-pressure and high-head-loss problems, system leakage, and main breaks. A properly selected pipe material should help address these common issues.

PVC is strong, lightweight, durable, and resistant to chemicals; it does not corrode. The interior of PVC pipe is also smooth, and because it does not corrode, there is no tuberculation by corrosion by-products. Also, PVC does not serve as a nutrient, which makes it resistant to biological degradation from bacteria and other microorganisms. PVC provides the lowest biofilm formation potential of all the other common water pipe materials being used. The most common joining is the gasketed bell-and-spigot joint, but thermal fusion or butt-weld joints are also used for directionally drilled, trenchless installations for pipeline rehabilitation and relining (*Opflow*, 2005).

PROPER LOADING AND INSTALLATION

Proper installation is vitally important in every pipe project. "Manufacturers of large-diameter PVC pipe place a mark on the spigot of the pipe to indicate the proper insertion depth into the adjoining bell during installation. If proper installation procedures are followed, inserting the spigot into the bell does not create significant stresses in the pipe," stated Steve Folkman, associate professor of mechanical and aerospace engineering at Utah State University in Logan (Folkman, 2011). It is critical that utilities make certain their installation crews are well trained and even have an inspector to ensure complete compliance as a best practice while still achieving a high degree of cost savings. Manufacturers also provide procedures for proper

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assembly of pipe joints. The Handbook of PVC Pipe (PVC Pipe Association, 2011) offers guidance for the assembly of PVC pipe.

THE BULLSEYE: SUSTAINABILITY THAT'S AFFORDABLE

The USEPA's Aging Water Infrastructure (AWI) research program (www.epa.gov/awi/accomplishments.html)—using research, information, meaningful metrics, methods, and technologies for strategic asset management—will be developed to support the goal of ensuring that our nation's water infrastructure is sustainable. PVC delivers on many of the AWI Research Program's focuses, including:

- reduced life-cycle costs for water infrastructure management,
- extended service life of existing infrastructure,
- reduced high-risk water main breaks,
- improved condition assessment and decision-making capabilities,
- reduced potable water leakage and intrusion potential,
- increased use of performance and cost data for decision support and the adoption of asset management, and
- increased adoption of innovative technologies.

PVC is considered in the top 20 engineering advancements according to a 1999 issue of *Engineering News Record*. The Australian Green Building Council, administrator of the PVC credit as parr of that country's GreenStar Program, understands the importance of low-cost, sustainable materials, stating: "PVC cannot be ruled out as a material for use in the built environment" (PVC Forum, 2010).

TAKING AIM AT THE TARGET

The water industry must continue to apply condition assessment and asset management techniques to infrastructure repair/replacement programs, and to incorporate affordable solutions into new prioritized capital plans to reach an acceptable level of sustainability. Many utilities have selected PVC as a means to accomplish these achievable goals, as demonstrated by the existence of more than 1 million miles (260 million bell-and-spigot connections) of PVC water pipe throughout North America.

In other places around the world, PVC piping is recognized as a beneficial product that is a bacteria-resistant material. PVC helps maintain the quality of water when it flows from local borehole wells to various communities in rural Africa. The bacteria-resistant

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PVC piping is essential to ensuring that residents continue to receive safe and clean water (Duffy, 2007).

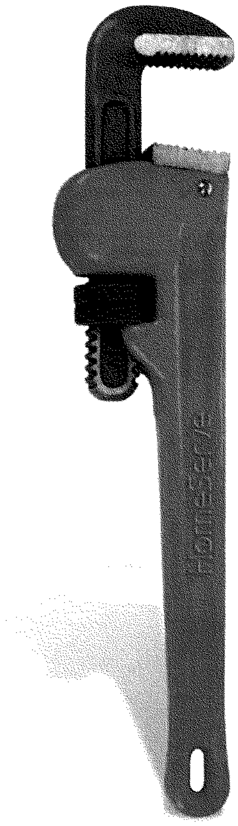
According to Bryan Karney, professor of civil engineering at the University of Toronto, a national program to replace older pipes with hydraulically efficient plastic pipes could achieve greenhouse gas emission reductions amounting to 5% of Canada's obligations under the Kyoto Protocol. PVC was chosen because it is corrosion-proof and leak-resistant; the ultrasmooth surface means that less energy is required to pump water from source to tap (Hollands, 2008).

PVC pipe has gained significant popularity worldwide, not only because of its competitive price, but also because of its longevity. A study presented in Milan, Italy, at a worldwide pipe symposium reported that vinyl pipe installed 70 years ago in Germany could easily function for another 100 years. Longer-lasting and lower-maintenance infrastructure assets such as PVC save taxpayer dollars by making water systems more efficient. In Canada, Calgary and Edmonton are saving an estimated $5 million a year in avoided water main–repair costs because of their extensive use of PVC pipe (Hollands, 2011).

WHERE IS THE SMOKING GUN?

PVC pipes do not contain lead or cadmium and are governed by strict standards and extensive quality control checks, including hydrostatic proof tests performed on each pipe. Green consumerism has jumped the gun on applying plastics concerns to long-term sustainable and affordable underground PVC piping solutions. Modern PVC pipes used in water systems should not be characterized as plastic bags. Opponents fail to mention that there is an "unacceptable" category for underground long-life PVC pipes (PVC, 2011). PVC is recognized by many as a silver bullet to meet the challenges and costs associated with the aging water infrastructure crisis for water and wastewater systems. PVC is a versatile material and is indeed a game changer for a nation dealing with corrosion issues while looking for financially sustainable infrastructure to meet both replacement and expansion needs.

—Gregory M. Baird (greg.m.baird@agingwaterinfrastructure.org) is managing director and chief financial officer (CFO) of AWI Consulting. He served as the CFO of Colorado's third-largest utility with financial oversight on the Prairie Waters Project and as a California municipal finance officer. Baird is a graduate of Brigham Young University's Marriott School of Management with a master's degree in Public Administration. An active member of AWWA, Baird also serves on the Economic Development and Capital Planning Committee with the Government Finance Officers Association for the United States and Canada.



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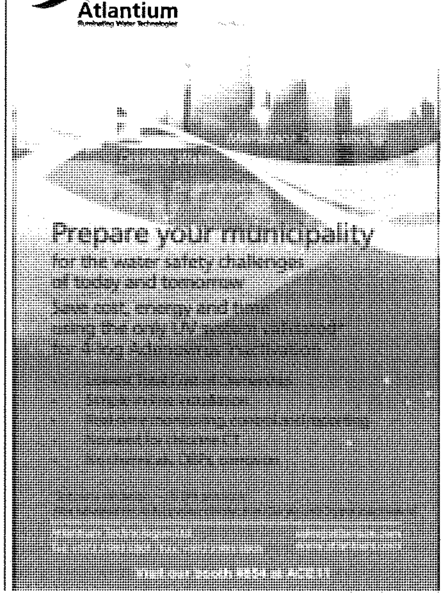

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Contractors Association Of West Virginia
Wisconsin Underground Contractors Association

* Steering Committee Member

December 12, 2011

Chairman
Subcommittee on Water and Wildlife
Committee on Environment and Public Works
U.S. Senate
Washington, D.C. 20515

Dear Mr. Chairman:

On behalf of the Clean Water Construction Coalition, I am writing to respectfully request that the enclosed statement be made part of the official record of the December 13 hearing held by the Subcommittee on Water and Wildlife entitled "Our Nation's Water Infrastructure: Challenges and Opportunities."

As always, the Coalition supports your leadership and efforts in securing enactment of the Clean Water and Safe Drinking Water authorization legislation. Thank you again for this opportunity and we look forward to continue working with you.

Sincerely yours,

Robert A. Briant

Robert A. Briant
Chairman

United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada

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December 13, 2011

The Honorable Benjamin Cardin, Chairman
The Honorable Jeff Sessions, Ranking Member
Subcommittee on Water and Wildlife
Senate Committee on Environment & Public Works
410 Dirksen Senate Office Building
Washington, DC 20510

Re: Challenges and Opportunities in U.S. Water Infrastructure

Dear Senators Cardin and Sessions:

On behalf of the more than 340,000 members of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada ("United Association"), I am writing to express our strong support for increased investments in America's crumbling water infrastructure and to thank you for convening a hearing to discuss this critically important topic.

The United Association is the leading trade union representing workers in the plumbing and pipe fitting industry in the United States and Canada. The United Association as an organization invests roughly $200 million per year in training centers across the country in order to produce the best-trained and most highly-skilled workers our industry has to offer. For this reason, we are not only knowledgeable about what it takes to build and maintain water infrastructure that is environmentally-safe and protective of public health and safety, but also well-equipped to do the massive work that will be needed to bring our country's water infrastructure into the twenty-first century.

America's water infrastructure is facing a funding crisis that will, absent action by the U.S. Congress, impose substantial risks on public health and safety and the quality of our environment. Correcting this problem will require large and sustained investments but such investments would do more per dollar to create American jobs than perhaps any other government jobs program.

Critical Need for Water Infrastructure

Over a decade ago, on June 6, 2000, David Whitman of *U.S. News and World Report* published an article which highlighted a nationwide water infrastructure crisis already underway. Citing numerous disturbing examples, Mr. Whitman reported that "Aging sewer systems are now faltering around the nation, endangering the health of hundreds of thousands of Americans and creating hefty repair bills for municipalities and consumers."[1] The Assistant Administrator of the Office of Water for the U.S. Environmental Protection Agency ("EPA"), G. Tracy Mehan, III, characterized the EPA's most recent *Clean Water and Drinking Water Gap Analysis* as a "more clinical report" of the trend documented in Whitman's *U.S. News* article.[2] A recent white paper on this issue explains how neglect of our water systems imposes serious harm to public health and safety:

> Our decaying water infrastructure pollutes our waters, sickens our children, and wastes natural resources. The U.S. Geologic Survey estimates that the U.S. wastes six billion gallons of clean drinking water each day, or 14 percent of total use, through leaky pipes in need of repair. This is enough water to supply our ten largest cities with drinking water daily.
>
> Sewer overflows and leaks are a grave health threat to our communities. The U.S. Environmental Protection Agency (EPA) estimates that up to 3.5 million Americans fall sick each year from swimming in waters contaminated by sanitary sewer overflows (SSOs). This sewage contains pathogens such as bacteria, parasites, and viruses, as well as pharmaceuticals, synthetic hormones, and personal care products.

Flawed water infrastructure also hurts business and commerce. Exposing the problem of ruptures in water mains, the *New York Times* has written that "[t]he dangers of the nation's plumbing are everywhere" and stressed the following: [3]

> This year water main breaks have stranded drivers on washed-out roads around the nation, caused a mudslide in California and flooded school libraries in Minnesota and Texas. Last month, just after Gov. David A. Paterson attended the opening of a new subway station in Lower Manhattan, service to the subway line was suspended when a water main that was installed in 1870 burst, flooding the tracks. A break in Niagara Falls, N.Y., spewed some 11 million gallons of water.
>
> Failing pipes plagued Warren, Mich., just outside of Detroit, this winter. After the city suffered 107 breaks in the course of one particularly cold month — three times the average — the mayor, Jim Fouts, declared a state of emergency so he could hire outside workers to help his overwhelmed city crews cope. A break outside a shopping center created a sinkhole that engulfed a van, and left the center without water for three days.[4]

[1] David Whitman, The Sickening Sewer Crisis, *U.S. News and World Report* (Apr. 4, 2010), *available at* http://www.usnews.com/usnews/news/articles/000612/archive_016392.htm.

[2] G. Tracy Mehan, III, Remarks at EPA Forum: "Closing the Gap: Innovative Responses for Sustainable Water Infrastructure (Jan. 31, 2003), *available at* http://water.epa.gov/infrastructure/sustain/upload/2009_05_26_waterinfrastructures_aa-remarks_si_waterinfrastructureforum-2003.pdf.

[3] Michael Cooper, Aging of Water Mains is Becoming Hard to Ignore, *New York Times* (Apr. 17, 2009), *available at* http://www.nytimes.com/2009/04/18/us/18water.html.

[4] Green for All, Water Works, Rebuilding Infrastructure, Creating Jobs, Greening the Environment, p. 2 (2011), *available at* http://greenforall.org.s3.amazonaws.com/pdf/Water-Works-Report.pdf

It is for reasons such as these that the American Society of Civil Engineers (ASCE) gave our country's wastewater and drinking water infrastructure grades of "D" and "D-" in its 2009 report card.[5] Based on the experiences of United Association members across the country, one could argue ASCE was being generous in its scoring.

Notwithstanding mounting evidence of massive neglect, the water infrastructure funding gap has unfortunately not been addressed for over a decade now. Rather, the state of our water infrastructure has only worsened and EPA estimates that the current shortfall in water infrastructure funding stands at more than $500 billion over the next two decades.[6] For American communities and families, the consequences of this shortfall are far greater than the occasional leaky faucet. According to EPA, there are an estimated 240,000 water main breaks *each year* in the United States.[7] In far too many cases, these breaks are attributed to pipes which are more than 100 years old and made from such out-of-date material as wood.[8]

Water Infrastructure Investment as Jobs Engine

Investing in our nation's water infrastructure is not only essential for public health and safety reasons, but such investments can serve as a major jobs creator to provide critically needed employment for unemployed and under-employed Americans. According to a study commissioned by the Alliance for American Manufacturing, water infrastructure is *number one* in job creation among all available infrastructure options, with nearly 20,000 jobs created for $1 billion invested.[9] Other organizations which have researched the issue have reported even higher job numbers than the Alliance. For example, the Clean Water Council found that up to 26,669 jobs are created per $1 billion invested, while the American Public Works Association's research indicates that more than 40,000 jobs per $1 billion are created.[10]

What's more, the U.S. Conference of Mayors has reported that each job created in water infrastructure adds 3.7 jobs elsewhere.[11] This means, based on the above research, that

[5] American Society of Civil Engineers, Report Card for America's Infrastructure (Jan. 2009), *available at* http://www.infrastructurereportcard.org/report-cards.

[6] U.S. Environmental Protection Agency Website, U.S. Water Infrastructure Needs & The Funding Gap (Last visited Dec. 8, 2011), *at* http://water.epa.gov/infrastructure/sustain/infrastructureneeds.cfm.

[7] U.S. Environmental Protection Agency Website, Water Distribution Systems (Last visited Dec. 2011), at http://www.epa.gov/awi/distributionsys.html.

[8] *See* Cooper, *infra* note 6.

[9] Jim Christie, U.S. Water Infrastructure Needs Seen as Urgent, Reuters (May 8, 2009), *available at* http://www.reuters.com/article/2009/05/08/us-infrastructure-summit-water-idUSTRE5473IG20090508.

[10] Clean Water Council, Sudden Impact: An Assessment of Short-Term Economic Impacts of Water and Wastewater Construction Projects in the United States (Jun. 2009), p. 6, available at http://www.nuca.com/files/public/CWC_Sudden_Impact_Report_FINAL.pdf; U.S. Conference of Mayors, Trends in Local Government Expenditures on Public Water and Wastewater Services and Infrastructure: Past and Future (Feb. 2010), p. 43, at http://www.usmayors.org/publications/201002-mwc-trends.pdf.

[11] *See* American Water Works Association, Job Creation (Last Visited Sept. 6, 2011), *at* http://www.awwa.org/Government/content.cfm?ItemNumber=44004&navItemNumber=44055.

annual investments at the level EPA says is needed, i.e., $25 billion, could be expected to add *several million jobs each year to the American economy.* Needless to say, at a time when working families across the country are wrestling with high unemployment, this level of job growth could not come soon enough.

In addition to creating a tremendous number of jobs, water infrastructure investments are able to produce such jobs quickly. This was recently evidenced by the speed at which the $6 billion in water infrastructure funding under the Recovery Act reached projects on the ground. Specifically, according to EPA and the Government Accountability Office, all 50 states succeeded in awarding their water infrastructure funds under the Recovery Act within 1 year of the Act's passage.[12] These funds were used to support more than 3,000 projects.[13] Based on this record, we can have confidence that returns on water infrastructure investments would be immediate.

In considering possible legislation to fund water infrastructure projects, the Subcommittee's work is made easier by the fact that some very good bipartisan options were previously introduced in the 111th Congress. One such option was Rep. Earl Blumenauer's Water Protection and Reinvestment Act of 2009 (H.R. 3202), which would have created a Water Infrastructure Trust Fund similar to the current highway trust fund, in order to guarantee a dedicated source of revenue to help states repair, replace and maintain water infrastructure each year. Funding of $10 billion per year to start would have provided through modest fees on a broad base of water users and polluters.

The United Association strongly supports the concept of trust fund for water infrastructure as a general matter. Our water infrastructure is no less important – and is in even greater need of repair – than our highways, roads and bridges, which benefit from dedicated funding. In addition, there are singular public health and safety concerns associated with our water infrastructure that are not present in other infrastructure areas. For example, while Americans can see and avoid potholes in the road, they cannot always see or avoid contamination in our water supply. For such reasons, our water infrastructure merits at least the same commitment in terms of upkeep that our government assigns to highways, roads and bridges.

Another strong bipartisan option from the previous Congress that the Subcommittee should consider is the Water Infrastructure Financing Act (S. 1005), which was sponsored by Senator Cardin and co-sponsored by Senators Boxer, Inhofe, Crapo, Feinstein, Mikulski and Sanders. This bill would have provided $39 billion over 5 years, or $7.8 billion, to fund critical water infrastructure projects. It would have also done so in an efficient manner by channeling funding through the existing Clean Water and Safe Drinking Water Revolving Loan Funds. Measures such as these represent precisely the sort of bipartisan collaboration, and large-scale down payments, that will be needed to begin addressing our country's water infrastructure crisis.

[12] U.S. Government Accountability Office, Recovery Act Funds Supported Many Water Projects, and Federal and State Monitoring Shows Few Compliance Problems (Jun. 2011), p. 2, *available at* http://www.gao.gov/new.items/d11608.pdf.

[13] *Id.*

While multiple options exist to repair and replace our crumbling water infrastructure, it is absolutely imperative that we make these investments. The adverse consequences to public health and safety are already being borne by American communities and can be expected to increase on a dramatic scale in the coming years unless serious action is taken. What's more, given the state of the economy and the tremendous potential for job creation that water infrastructure investments offer, there is every reason to move these investments forward *now*. In doing so, Congress would not only be addressing a serious challenge to public health and safety, but also be doing a great deal of good for our economy and working families across America.

Thank you again for holding a hearing on this critically important topic.

Sincerely,

William P. Hite

William P. Hite
General President

WPH:bdh

Statement for the Record

On behalf of

Subsurface Technologies, Inc.

before the

Subcommittee on Water and Wildlife

of the

Environment and Public Works Committee

United States Senate

SUBSURFACE TECHNOLOGIES

Well Rehabilitation: Restoring a well to its most efficient hydrological condition by various treatments or reconditioning methods

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Statement for the Record

On behalf of

Subsurface Technologies, Inc.

before the

Subcommittee on Water and Wildlife

of the

Environment and Public Works Committee

United States Senate

December 13, 2011

Chairman Cardin, Ranking Member Sessions, and members of the Subcommittee, Subsurface Technologies, Inc. (STI) appreciates the opportunity to submit this statement for the record on the criticality of addressing the nation's aging water infrastructure and the opportunities that doing so provides regarding job creation and economic growth.

STI has devoted 25 years to developing highly effective, environmentally sound methods of restoring and improving the aging infrastructure of wells at ground water systems. Our methods restore lost capacity, increase water volume, reduce energy footprints, decrease pumping costs and solve water quality problems. STI's solutions are economically affordable, easy to incorporate and help facilitate job growth at the utilities we work with.

The deterioration of wells can most often be attributed to the inherent characteristics of the aquifer, the well design or construction, water quality and other environmental factors. When a well has deteriorated beyond the point where maintenance programs can resolve their decreased water yields, rehabilitation is needed.

While the infrastructure of all wells eventually ages, the need to restore well infrastructure is disproportionally greater among small communities. Preventative maintenance and rehabilitation costs are 10-20% of the costs of new well construction, which means that investing in ongoing well care is a sound investment for water systems. However, as many financially constrained small water systems cannot afford robust investments in rehabilitation, they often wait too long before attempting to rehabilitate their wells and find that degradation has passed the point of restoration.

Enabling small groundwater systems to invest in well infrastructure through a variety of economically sound and job producing proposals such as infrastructure banks, low interest loan programs and other funding mechanisms should be considered of the utmost importance in the fight to promote our nation's environmental and economic priorities.

Well-related infrastructure work done by STI at small groundwater systems helps financially depressed communities grapple with reductions in their water yield, an inability to meet EPA mandates and stagnant local economies. By hiring local labor to implement our technologies and maintain the systems we put in place, STI works with utilities to leverage job creation from their existing need to service already aging and degraded infrastructure systems.

STI projects that beginning next year, the infrastructure we do on wells will lead to an estimated 25-30% growth in our hiring every year for the next 5–7 fiscal cycles. As project volumes and revenues increase, we will continue to hire local workers to meet demand and expand our company field staff accordingly.

These jobs will expand along the eastern seaboard and into the Midwest, creating economic engines through those locations.

STI applauds the Committee's leadership in recognizing the imperative to repair and replace aging infrastructure across the water sector. As the Committee considers new water infrastructure funding mechanisms, we implore you to consider setting aside a small portion of funding to identify innovative and affordable technologies for small and disadvantaged communities to address the infrastructure needs of their aging wells.

Setting aside resources for this purpose will enable small communities to have a wider range of proven solutions from which to choose when considering how best to comply with local, state and federal mandates. Currently, the market-orientated process is not resulting in the most innovative technologies being made available to small systems and federal funding mechanisms for doing so do not exist.

In conclusion, STI would like to reiterate its thanks and support for the Committee's efforts and strong leadership in this area. It is only through the continued partnership and collaboration between the public and private sector that our nation's water infrastructure needs will be met and job creation will be accelerated.

Senator SESSIONS. Mr. Chairman, Mr. Richey has provided a series of reports and documents that would support the testimony he has given. I would like to make that part of the record and ask that the record be left open for additional statements or comments.

Senator CARDIN. Without objection, all that will be agreed to, and that will be included in the record.

With that, the Committee will stand adjourned. Thank you all very much.

[Whereupon, at 11:40 a.m., the Committee was adjourned.]

[Additional material submitted for the record follows:]

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Hearing on *Our Nation's Water Infrastructure: Challenges & Opportunities*

Senate Environment and Public Works Committee

Statement of
Diane Linderman, P.E., PWLF
President of the American Public Works Association

December 13, 2011

PRESIDENT
Diane Linderman, P.E., PWLF
Richmond, VA

EXECUTIVE DIRECTOR
Peter B. King

Madam Chair, Ranking Member Inhofe and members of the Committee, thank you for the opportunity to submit testimony relating to the recent hearing on *Our Nation's Water Infrastructure: Challenges and Opportunities.* My name is Diane Linderman, President of the American Public Works Association (APWA). I submit this statement reaffirming APWA's support for action that creates increased funding for capital investment in water and wastewater infrastructure on behalf of the more than 28,500 public works professionals who are members of APWA.

APWA is an organization dedicated to providing sustainable public works infrastructure and services to millions of people in rural and urban communities, both small and large. Working in the public interest, APWA members plan, design, build, operate and maintain transportation, water supply and wastewater treatment systems, waste and refuse disposal systems, public buildings and grounds and other structures and facilities essential to the economy and quality of life nationwide.

APWA supports actions that create increased funding for capital investment in water and wastewater infrastructure. APWA supports the continued authorization of the State Revolving Fund for capital investment in drinking water and wastewater systems to continue to protect the public health. APWA supports all efforts to establish increased funding opportunities for water, wastewater and stormwater treatment system enhancements with particular emphasis on funding priority for small to moderate and rural systems, or those currently operating under administrative orders related to the Safe Drinking Water and Clean Water Acts.

APWA members take a lead role in the effective management of facilities protecting water quality and are too familiar with the challenges local jurisdictions face keeping up with the demand for clean safe water. The state of the nation's drinking water and wastewater infrastructure is dire. Local jurisdictions struggle to fund water infrastructure capital projects. The current infrastructure system is deteriorating and strains under the increasing demand for clean and safe water fueled by population growth. According to the EPA's most recent clean water and drinking water needs assessment surveys, local communities will need $300 billion in wastewater and $335 billion in drinking water infrastructure improvements for capital expenditures over the next 20 years..

Investing in and updating the nation's aging water system is beneficial to the environment and the economy. Studies show that up to 25% of treated water is lost. Sufficient funding of water and wastewater facilities will increase sustainability by ensuring that water loss is kept to a minimum. Additionally, the Water Infrastructure Network estimates that every $1 billion invested in waster infrastructure capital creates nearly 28,000 jobs.

APWA supports all efforts to close the water infrastructure funding gap. It is a national problem and it deserves a national solution. Federal grants are the most preferred form of funding and ought to be pursued. Another funding mechanism, State Revolving Funds (SRFs) have proven to be a successful mechanism that provides local jurisdictions with needed funds for water infrastructure capital and APWA supports continued federal support for this program. Clean and Safe Drinking Water SRFs have provided $111 billion to local governments for water infrastructure since its inception. SRFs are a vital resource, especially for small and rural communities. The Clean Water SRF provides 23% of water infrastructure funding for localities with fewer than 10,000 residents and the Drinking Water SRF provides 37%.

In addition to reauthorizing the SRF, APWA also supports the creation of a variety of innovative funding mechanisms to increase investment in water infrastructure and to provide public works directors with a range of options for determining how best to fund critical capital investment projects. The current economic environment compels localities to seek innovative solutions to the water infrastructure funding crisis. Local jurisdictions should not and cannot solely rely on public sources of funding. The creation of public private partnerships, raising the cap on private activity bonds, creation of a long term dedicated funding source such as a trust fund to fund local water system projects, or the establishment of a national infrastructure bank should all be available as potential funding vehicles for water infrastructure.

The consequences of inadequate investment in water infrastructure are dismal. Without increased funding in water infrastructure local communities will not be able to keep pace with growing demand for clean and safe drinking water and economic opportunities will be lost. Robust federal investment in water infrastructure, however, is smart investment that can address important public health and environmental concerns while also improving economic competitiveness and creating much needed jobs. Water infrastructure funding should be a national priority; the stakes are too high to neglect this problem.

Conclusion:

Madam Chair and Ranking Member Inhofe and members of the Committee, thank you for holding this hearing and continuing to pursue a solution to the nation's looming water infrastructure funding crisis. We are especially grateful to you and Committee members for the opportunity to submit this statement. APWA stands ready to assist you and your Congressional colleagues as you work to craft a solution to this critical problem.

Statement of

The Associated General Contractors of America

to the

Subcommittee on Water and Wildlife

Committee on Environment and Public Works

U.S. Senate

For a hearing on

"Our Nation's Water Infrastructure: Challenges And Opportunities"

December 13, 2011

AGC of America
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
Quality People. Quality Projects.

Building Your Quality of Life

AGC is the leading association in the construction industry. Founded in 1918 at the express request of President Woodrow Wilson, AGC now represents more than 33,000 firms in nearly 100 chapters throughout the United States. Among the association's members are approximately 7,500 of the nation's leading general contractors, more than 12,500 specialty contractors, and more than 13,000 material suppliers and service providers to the construction industry. These firms engage in the construction of buildings, shopping centers, factories, industrial facilities, warehouses, highways, bridges, tunnels, airports, waterworks facilities, waste treatment facilities, dams, hospitals, water conservation projects, defense facilities, multi-family housing projects, municipal utilities and other improvements to real property.

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
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Statement of
The Associated General Contractors of America
Subcommittee on Water and Wildlife
Committee on Environment and Public Works
United States Senate
December 13, 2011

The Associated General Contractors of America (AGC) is pleased to write today to explain the many possible tools that could and should be active in the water and wastewater infrastructure financing toolbox.

Founded in 1918 at the express request of President Woodrow Wilson, AGC is the leading association in the construction industry representing more than 33,000 firms in nearly 100 chapters throughout the United States. Among the association's members are approximately 7,500 of the nation's leading general contractors, more than 12,500 specialty contractors, and more than 13,000 material suppliers and service providers to the construction industry. These firms engage in the construction of buildings, shopping centers, factories, industrial facilities, warehouses, highways, bridges, tunnels, airports, waterworks facilities, waste treatment facilities, dams, hospitals, water conservation projects, defense facilities, multi-family housing projects, municipal utilities and other improvements to real property. Many of these firms regularly undertake construction financed by the Environmental Protection Agency's (EPA) State Revolving Loan Fund Program (SRF) and the Department of Agriculture's Rural Utilities Service. Most are small and closely-held businesses.

Even before the current economic downturn, many of our cities and towns, which include everything from large urban to small rural communities, had experienced substantial challenges repairing and replacing water infrastructure that is quickly reaching the end of its useful life. Many communities do not currently have the financial resources to make the necessary investments to meet federal water quality standards and face significant practical and political challenges enacting rate structures to raise adequate capital and make the improvements that are needed. Water infrastructure needs continue to multiply as chronic underinvestment in federal water infrastructure financing programs is compounded by an evolving and expanding regulatory landscape. State and local governments will continue to bear the brunt of this double-edged problem. EPA projects between $400 to $600 billion is needed in infrastructure improvements over the next 20 years simply to keep pace, yet consistent dwindling of federal commitment to the SRF programs has resulted in a gap in funding of more than $20 billion annually.

When the federal government began mandating quality standards for drinking water and wastewater discharge through legislation like the Clean Water Act and Safe Drinking Water Act, it also recognized that forcing local governments to spend billions of dollars to upgrade facilities and equipment to comply with regulatory burdens was impractical. The EPA's SRF program is the vehicle the government uses to avoid foisting the burden of maintaining national water standards onto local ratepayers alone. Given that it is in the federal interest to set water quality standards, then so too must it be in the federal interest to provide financing help to operators so they can meet those standards. This is even more salient now with the sharp drop-off in State revenues and lack of budgetary flexibility most states have due to balanced budget requirements.

Federal investments in infrastructure also are often the best way to ensure the health, safety and economic vitality of sparsely populated rural communities. Many rural communities, indeed many rural states, lack the resources needed to finance the construction of major infrastructure projects like advanced wastewater treatment plants or safe drinking water filtration systems. The federal government is uniquely suited to supporting infrastructure investments in these rural communities, especially when so much of our nation depends on the commercial traffic that travels through them and the agricultural products that come from them.

Economic Advantages

Spending on construction creates jobs. We at the Associated General Contractors of America found that for every $1 billion in spending on infrastructure, 28,500 jobs are created in construction and construction-related activities which includes 9,700 (34%) direct construction jobs; 4,600 (16%) indirect jobs in supplier industries (mining, manufacturing and services); and 14,300 (50%) induced jobs resulting from purchases out of the additional income of workers and owners in the directly and indirectly supported industries. The US Conference of Mayors found that every job created in water and sewer infrastructure creates over 3 additional jobs in the national economy to support that job.

Federal support for drinking and wastewater systems also delivers a tremendous return for taxpayers by lowering healthcare costs, reducing the cost of cleaning up polluted waterways and contributing to increased economic vitality. Regular federal investments in infrastructure also save taxpayers money as it costs a lot less to maintain infrastructure than it does to repair it. The cost of replacing water pipes through routine maintenance is typically between $100 and $300 per linear foot. The cost to repair a water main break is approximately $1,500 per linear foot, not including the costs of flooding damage, closures of businesses, and health hazards to those in the area.

Potential Tools in the Toolbox

There are several infrastructure financing options that have been suggested or have been in use at one time, but none that have remained consistent over the last several decades. There needs to be stability and predictability for state and local governments, which would allow them to create long-term construction plans, which in turn give stability and predictability in the water and wastewater construction markets. Giving municipalities and their contractor partners access to all the tools in the infrastructure financing toolbox will help achieve this.

The first and most immediate solution is simply to halt the assault on the annual appropriations to the federal water infrastructure financing pathways - such as EPA's SRFs and USDA's Rural Utilities Service. The House voted to cut almost $1 billion in critical funding when it passed the appropriations for the EPA earlier this year. This instability hurts long-term planning, and can actually drive up the cost of construction because contractors will leave the market for more stable types of construction. AGC of America believes that a more stable revenue stream benefits everyone and is required to ensure that we are keeping up with the national need for safe and clean water.

The only bright spot in recent years was the American Recovery and Reinvestment Act, which provided $4 billion and $2 billion for the Environmental Protection Agency's Clean Water and Drinking Water State Revolving Loan Funds, respectively. Unfortunately annual Congressional appropriations for water infrastructure projects have been diminishing steadily over the years while national needs continue to increase. In addition, the Recovery Act saddled the SRF program with needless 'Buy American' restrictions that artificially constrained the supply chain, resulting in institutional paralysis, overcorrection, and project delay. While national and project-specific waivers helped to alleviate the morass caused the application of these regulations to programs that had never had to comply previously, the delays and cost overruns needlessly reduced the effectiveness of the Recovery Act spending.

While increased appropriations would go a long way toward alleviating the short-term problem, they would not solve the long-term problem of market stability and predictability. With the volatility inherent in the annual appropriations process, a sustainable, long-term funding mechanism is needed to provide market certainty for construction firms and local water authorities. This new long-term funding mechanism should be multi-year and utilize the existing SRF framework to move funds from the federal to state and local levels. This long-term mechanism should also embrace the "user pays" concept that other infrastructure funding mechanisms have implemented with success to create a budget-neutral, user-fee financed, clean water trust fund. The best long-term solution would be to establish this national clean water trust fund, to be financed by a wide array of small broad-based user fees.

There is ample precedent for dedicated federal trust funds to tackle problems too big for states to handle alone. The GAO has identified more than 120 federal trust funds in operation. These trust funds help ensure funding for other critical projects, including Highways, Airports, Harbor Maintenance, even Oil Spill cleanup. But in this case we can use the model of the highway trust fund that has been extremely successful to build a dedicated long-term, sustainable, off-budget source of funding for water infrastructure such as a trust fund, which would create market certainty in the water and wastewater markets.

Polling has shown that people believe that the government has a responsibility to provide clean water. In fact, 86 percent of Americans support legislation by the U.S. Congress that would create a long-term, sustainable, and reliable federal trust fund for clean and safe drinking water infrastructure. The Government Accountability Office (GAO) in 2009 released a report entitled "Options for a Clean Water Trust Fund" which acknowledges that our nation faces tremendous challenges in replacing and rehabilitating our water infrastructure. As the GAO's report states, a trust fund for water infrastructure may not be the only solution to our water infrastructure needs in America but it would establish a multi-year commitment to address the nation's pressing water needs.

Additionally, while a trust fund would be the best solution, it is still only one tool in the toolbox of financing and funding mechanisms that Congress should make available for use by state and local governments. Alternative and creative methods of financing water infrastructure must be embraced in these tough times. As traditional methods of funding fall out of favor, it is important to seek fresh and creative approaches. However, it is crucial to note that these creative and alternative mechanisms should supplement, rather than replace, the traditional financing mechanisms, such as the SRF, which are already proven to work.

One such creative mechanism is the highly successful, but short lived, Build America Bonds (BAB) program in the Recovery Act. BABs are taxable bonds for which the U.S. Treasury Department pays a 35 percent direct subsidy to the issuer to offset borrowing costs. The program financed nearly $38 billion in water and sewer infrastructure projects over the two years it was active. That's more than ten times the combined amount appropriated to the SRFs for FY2010 (the best year for SRF appropriations not adjusted for inflation).

Another important financing mechanism to consider would be a federal water infrastructure bank. One of the success stories of the Surface Transportation Program has been the Transportation Infrastructure Finance and Innovation Act program (TIFIA). It may be possible to replicate that success for the water and wastewater infrastructure markets. This is especially true given that water and wastewater systems already have a built in system of collecting revenue (for loan repayment purposes) through ratepayers. A national program that was able to give direct loans and loan guarantees to water infrastructure projects could help take some of the pressure off municipalities with large needs. Such a program already exists in statute in Section 213 of the Clean Water Act, but it has never been funded or utilized. This structure can be used, modified, or even replaced if necessary to allow state and local governments to utilize the full faith and credit of the U.S. Treasury with loan guarantees to lower the overall cost of the project. An ideal water infrastructure bank would also be authorized to give direct loans for large projects, adopt a sensible project value minimum dollar amount, and reconcile the qualifications for "national or regional significance" that exist in other proposals for a national infrastructure bank.

A final method of directing funds to water infrastructure would be to secure access to private investment in water infrastructure. Private activity bonds (PABs) can be an important tool for financing infrastructure investments in our communities by providing long-term financing for capital-intensive infrastructure projects. PABs are a form of tax-exempt financing available to entities like state or municipal governments that want to partner with a private party to meet a public need. Interest paid on bonds issued by State and local governments generally is excluded from gross income for Federal income tax purposes, which allows the interest rates on such bonds to be lower. This, in turn, lowers the borrowing costs for the beneficiaries of such financing.

Congress controls the total volume of tax-exempt bonds by limiting issuance in each state with an annual cap – for example, in 2010 the volume cap for a state was the greater of either $90 per resident, or $273.8 million. Water and wastewater projects should be removed from this annual volume cap, allowing those projects to no longer have to compete with the dozens of other categories of public spending these bonds finance, because these projects provide their own revenue source for repayment of the loans. Exceptions from the volume cap are currently provided for other governmentally owned facilities such as airports, ports, high-speed intercity rail, and solid waste disposal sites.

PABs employ the best features of successful public-private partnerships, spreading risk and encouraging innovation. By reducing a government's project management burdens and its risk (with PABs, the private entity assumes much of the financial risk and administrative responsibility), multi-year projects and a broader project load become more feasible as the government has more resources to allocate. Also, PABs do not affect the municipality's bond rating, an important benefit of PABs for municipalities. There is considerable private capital that could and would be invested in water infrastructure if the proper mechanisms were available, with some Wall Street estimates putting that value between $2 and $5 billion per year in new private spending.

Concluding Remarks

AGC thanks the Committee for the opportunity to submit this statement for the record. The SRF program is highly successful, but is in danger of being underfunded out of existence or actively de-funded. AGC of America believes the approach outlined above must to taken to give every locality – from the smallest rural towns to the biggest urban centers – the widest range of possible mechanisms to fund water and wastewater construction. Many of these options have been sporadically available in the past and remain good ideas waiting to come off the shelf. A true solution to the water infrastructure financing crisis would include making all of these options available all the time. Permanent long-term solutions are the only way to avert further crisis, let municipalities and contractors plan for the future, and truly safeguard our environment and health.

Written Statement

Clean Water Council

Subcommittee on Water and Wildlife
Environment and Public Works Committee
U.S. Senate

Our Nation's Water Infrastructure: Challenges and Opportunities

December 13, 2011

The Clean Water Council (CWC) is a coalition of some 40 national organizations representing underground utility construction contractors, design professionals, manufacturers and suppliers, labor representatives and other organizations committed to ensuring a high quality of life through sound environmental infrastructure.

The need to invest in America's underground environmental infrastructure is well known, clearly documented, and has broad support. According to the Environmental Protection Agency (EPA), $298 billion in investment is needed over the next 20 years to address America's wastewater infrastructure needs, and $334 billion in investment is needed over the same time period for drinking water infrastructure improvements.

SRF Investment
EPA's State Revolving Fund (SRF) programs are successful federal programs that help ensure the quality of America's wastewater and drinking water facilities. Federal capital investment to the SRF programs provide urgently needed resources for communities across the country to repair and rebuild their water and wastewater infrastructure. These projects are critical to maintain compliance with health-based standards, such as installation and replacement of failing wastewater treatment and water distribution systems.

Revolving loans work in perpetuity. The SRF programs have successfully leveraged federal grants into tens of billions in revolving loans. These loans are repaid at low cost by local communities to the states, who in turn redistribute the funding to other priority environmental infrastructure projects. The SRF model has been hailed as the most successful federally sponsored infrastructure financing program ever.

However, in recent years the SRF programs have fallen under attack. After being subject to a nearly $1 billion reduction in SRF funding under this year's continuing resolution, funding for the Clean Water SRF was reduced to $1.55 billion, down from $2.1 billion in FY 2010, and the Drinking Water SRF was cut to $990M, down from $1.4 billion. In total, the SRF programs received approximately $2.5 billion, cut from the $3.5 billion provided in FY 2010.

To make matters worse, SRF funding faces further cuts next year. In fact, some in Congress are looking to return to FY 2008 levels, which would reduce annual appropriations to the Clean Water and Drinking Water SRFs to $689 million and $829 million, respectively.

A major impediment to increasing SRF investment is the inability in Congress to pass a robust SRF reauthorization bill. Despite the fact that authorization of the Clean Water SRF lapsed in 1994, Congress has continued to fund the program because of its effectiveness. However, the lack of passing reauthorization legislation has certainly contributed to these reductions in funding.

While we understand the need to consider new and innovative financing methods for water and wastewater improvements across America, federal investment through the SRF programs is needed in both the short and long term. Therefore we encourage you to support increases in SRF appropriations, and for this committee to advance legislation that would reauthorize the SRF programs as soon as possible.

Economic Impacts of Water Infrastructure
In 2009, the CWC released a new study on the job creation and enhanced economic activity that comes with investment in water and wastewater infrastructure projects. The study, titled *Sudden Impact: Assessment of Short-Term Economic Impacts of Water and Wastewater Projects in the United States*, shows that a $1 billion investment in water and wastewater infrastructure results in:

- the creation of up to 27,000 new jobs with average annual earnings for the construction portion of the jobs at more than $50,000;

- total national output (i.e., demand for products and services in all industries) of between $2.87 and $3.46 billion;
- personal (household) income of up to $1.06 billion; and
- approximately $82.4 million in state and local tax revenue.

Of particular note, each of these economic impacts occurs during and immediately after project construction. Significant supplementary economic benefits will also accrue in the future, decades-long service life of each facility when repair and maintenance activities are conducted on these systems. In both the short-term and long-term, economic benefits ripple through local economies from manufacturers to distributors to construction laborers, and countless other industry sectors. In fact, the study found that investment in water and wastewater infrastructure creates measurable employment in 325 other standard industry classifications. Copies of the *Sudden Impact* are available to any and all members of the subcommittee upon request.

Use of Tax Exempt Private Activity Bonds
Given the financial challenges and mounting debt faced by all levels of government, expanded use of public-private partnerships is becoming increasingly clear. Lifting the state volume cap on private activity bond (PAB) financing for water infrastructure projects would inject billions of dollars of low cost, private capital into infrastructure repairs, while shifting the economic risk away from cash-strapped municipalities and to the private sector. Private activity bonds are a form of tax-exempt financing that encourages state and municipal governments to collaborate with sources of private capital to meet a public need without increasing the debt of local governments – the debt is borne by the private sector. Currently, the tax code caps the volume of most types of federal tax-exempt bonds that may be issued in a given year, and allocates them state-by-state based upon population.

Historically, most of the tax-exempt bonds have been issued to politically attractive, short-term projects such as housing and education loans. This tendency has limited the amount of such bonds that can be utilized for long-term water infrastructure projects; in fact in 2007 only 1.3% of all exempt facility bonds were issued to water and wastewater projects.

Local governments have successfully used PABs for a variety of public purposes: public housing; school loans; airports; recreation and cultural facilities; solid waste facilities; port facilities; airport terminals; and, certain industrial pollution prevention projects. In the past, PABs have been used to solve critical infrastructure problems including the solid waste disposal crisis in the 1980's, where the private sector invested over $20 billion in new waste-to-energy facilities to avoid massive groundwater pollution and reduce the growing number of hazardous waste sites.

Lifting the cap for water projects funded by PABs would generate significant, affordable capital for infrastructure repair and construction for municipalities, thereby ultimately benefitting users and customers. Additionally, these are projects that private investors are willing to invest in and absorb the risk. The revenue impact would be nominal relative to the significant benefits: each year a mere $354 million in lost federal tax revenue over 10 years (according to scoring from the Joint Committee on Taxation in 2010) would generate as much as $50 billion annually in private dollars over the same time period. This would be a sound and cost-effective investment of government resources and would demonstrate the value of public-private partnerships.

Therefore the CWC strongly supports the Sustainable Water Infrastructure Investment Act (S 939 / HR 1802) that would lift water and wastewater projects from under the state volume cap on private activity bonds. The measure falls under the jurisdiction of the Senate Finance Committee, but we hope members of this subcommittee will support and consider cosponsoring the measure.

Conclusion

To sum up, Congressional support of traditional water infrastructure financing through EPA's SRF programs coupled with innovative financing through use of public-private partnerships as provided in the PAB legislation would result in an successful combination of public and private sector resources to repair and rebuild America's underground environmental infrastructure, put the construction industry back to work, and contribute to the Nation's economic recovery. We thank you for your consideration.

Statement by the Construction Management Association of America

Senate Committee on Environment and Public Works
Subcommittee on Water and Wildlife
"Our Nation's Water Infrastructure: Challenges And Opportunities"
December 13, 2011

The Construction Management Association of America's more than 8,700 members include many owners of infrastructure projects and programs in the public sector, along with professional practitioners of Construction and Program Management who work for both owner organizations and companies that provide professional services to owners.

CMAA has long been a strong supporter of increased federal investment in infrastructure. We particularly support and encourage such innovative investment vehicles as public private partnerships, a National Infrastructure Bank, Build America and similar bonds, TIFIA financing, and the like.

The case for increased federal infrastructure spending is usually expressed in terms of the need to repair, modernize and expand existing systems (which are often quite old and deteriorated), together with a pressing need to create jobs. So much attention has been paid to the inadequacy of our current infrastructure assets that we need not restate that point here.

Moreover, the link between infrastructure spending and employment is clear. The Washington Suburban Sanitary Commission, a CMAA member organization, provides a compelling example. WSSC states that its in-progress, $158 million Bi-County Water Tunnel Project alone is creating nearly 3,500 jobs. The Commission's ongoing water main replacement program, which has replaced more than 115 miles of mains during the last three years, has created more than 3,700 jobs. As Jerry N. Johnson, general manager and CEO of WSSC, puts it, "we have many more projects than we have dollars to fund them." He also shared this information with CMAA:

> "Our data suggests that every $5 million received in (federal) assistance SAVES our ratepayers the equivalent of one percent on WSSC's operating budget; conversely, every additional $5 million in operating and capital costs to maintain this critical infrastructure equates to a one percent rate INCREASE on ratepayers."

Federal investment in this vital area, then, not only creates good, long-term jobs but also protects the public against potentially burdensome increases in the cost of an indispensable resource.

While these are certainly valid points, a number of additional factors need to be addressed when considering water infrastructure investments in particular.

Water affects the quality of our life in ways that often are not fully appreciated. In many parts of our nation, availability of water has emerged as a primary obstacle to continued economic growth and development. Ongoing population growth will only intensify this problem. It has been predicted, for example, that the population of the United States will grow by 130 million by 2050. Multiply that by 150 gallons of water per person per day, plus 60 gallons of wastewater generated per person, per day, and we see the true dimensions of the challenge. The greatest impacts resulting from this growth will fall on states already struggling with water scarcity, including California, Florida and Texas. In California, it has been predicted that urban water use will expand by 67 percent between now and 2030. We also don't fully appreciate the impact that water scarcity issues have on other areas. How much electricity do we use each year, for instance, in pumping water to areas of shortage?

Dallas Water Utilities currently serves 2.4 million people in Dallas and 22 surrounding cities, but the agency projects it will need to meet the water needs of three million customers by 2024. Part of its answer is an $800 million expansion of its East Side Treatment Plant.

"You would be rationing water or you would limit growth to the area," says Jennifer Cottingham of DWU. "That's often what happens to communities that don't plan for the future.

"Ask any real estate developer and they will tell you that there is no development where there is no water supply. Many of them will go as far as to say that water departments control growth with water supply. Many industries are also dependent on abundant water supply. The DFW metroplex has experienced tremendous economic growth in the last 50 years for what some say are two reasons: great planning for water supply after the drought of record in the 1950s and the DFW Airport."

Economic growth, though, is not the only reason to care about better water infrastructure.

We also continue to strive for improvements in water quality, which often require improvements in the performance and capacity of water treatment facilities. These gains come at a substantial cost, which local communities are often unable to meet.

Consider the experience of another CMAA member. The Metro Wastewater Reclamation District in greater Denver, CO is currently planning how it will implement a proposal, scheduled for rulemaking in March 2012, to further control nutrients such as phosphorus and nitrogen in its municipal wastewater treatment plants effluents.

The District tells us that it "estimates that the cost to meet the technology-based effluents proposed by the state of Colorado would be $28.4 million, which is in addition to the $250 million the District is currently spending to meet existing effluent limits for ammonia and nitrate. While the Metro District has the ability to finance these improvements through its Annual Charges for Service and the issuance of bonded debt at reasonable interest rates, many Colorado communities do not. Most communities in Colorado are dependent on state revolving loan fund programs for low-interest loans, if they can afford to repay the cost of the capital improvements at all...The cost to meet the technology-based effluent limits greatly surpassed funds currently available through the state's revolving loan fund. Increased federal funding to meet the infrastructure needs to address the national priority to reduce nitrogen and phosphorus in our waters is critical to success."

CMAA actively advocates other measures that can be expected to improve the "payoff" on infrastructure investments. We support legislation and/or regulation that would allow public sector owners to make use of a wider range of project delivery methods – such as Design-Build and Construction Manager At Risk – in addition to the traditional low-bid, design-bid-build method. The professional service of Construction Management is equally appropriate in the context of any of these delivery methods.

We encourage all owners to adopt and apply the provisions of our *Construction Management Standards of Practice, 2010 Edition* in all of their projects as a proven means of controlling schedule, quality, risk, and cost. We believe applying the SOP leads to better project outcomes. We have also formed an alliance with the Construction Industry Institute (CII) at the University of Texas, as part of which we are integrating CII's library of validated construction Best Practices into our SOP. We believe this is the right approach to enhance transparency and accountability in the expenditure of public funds. With funding challenged and the needs so great, we cannot afford to tolerate any avoidable waste or delay.

Meeting this water infrastructure challenge is not merely a matter of enabling economic growth; it really impacts the quality of life in our communities *now*, and whether that quality of life can be maintained in the future.

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PVC PIPE ASSOCIATION

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Written Statement for the Senate Committee on Environment and Public Works/Subcommittee on Water and Wildlife on "Our Nation's Water Infrastructure: Challenges and Opportunities," Tuesday, December 13, 2011.

Sustainable, Corrosion-Proof Piping for America's Water and Wastewater Infrastructure

The Uni-Bell PVC Pipe Association is a not-for-profit organization representing 95 percent of the manufacturing capacity of the North American PVC pipe industry. Our pipe producing members operate over 90 facilities in the U.S. and our associate members (suppliers) hundreds more. PVC pipe extrusion facilities are found in 32 states across the United States: California has the most plants (9), followed by Texas (6), Arizona (5) and Pennsylvania (5).

The PVC pipe industry serves a vast and complex market including 54,000 drinking water systems, 10,000 wastewater facilities and 15,000 sewer and wastewater contracting firms. PVC water and sewer pipe producers contribute in excess of $14 billion annually to the U.S. economy and support over 25,000 jobs.

Building and replacing water and sewage lines across the U.S. will cost between $660 billion to $1.1 trillion over the next 20 years. These pipelines, however, are deteriorating faster than the rate at which they can be replaced because of corrosion, which is the leading cause of the watermain break epidemic in North America (estimated at some 300,000 breaks annually). According to a 2002 congressional study, corrosion is also a drag on the economy, costing U.S. drinking water and wastewater systems over $50.7 billion annually. As a result, any comprehensive and truly sustainable underground infrastructure strategy must address corrosion.

Today's corrosion crisis is due to the materials used in America's piping networks over the last hundred years. At first, cast iron was used, with ductile iron gradually replacing it as the material of choice. Both now suffer from corrosion. Moreover, the burden of old technology materials is not limited to the cost of repairing and replacing failed pipelines. It includes the cost of losing treated water from leaking systems. Leaking pipes made from old technology materials lose an estimated 2.6 trillion gallons of drinking water annually, or 17 percent of all treated water pumped in the United States.

The solution to these problems begins with sustainability, durability and corrosion resistance, and this is why more utilities must actively consider alternative piping materials like PVC in their bidding processes. Increased durability means fewer leaks, better water conservation and lower costs. Accordingly, any comprehensive action plan for water and wastewater infrastructure renewal must also include reform of municipal procurement practices that limit competition, shackle innovation and increase costs. We believe that to get the most efficient and sustainable use of federal money for water and wastewater projects, fair and open competition must be the operating standard. Federal grants provided to municipalities should have open competition stipulations similar to those used by the United States Department of Agriculture for its water and sewer grant programs for rural communities. In this way federal dollars obtain maximum value for taxpayers.

With over two million miles in service, PVC pipe has been celebrated by *Engineering News Record* as one of the top 20 engineering advancements of the last 125 years. A study by the American Water Works Research Foundation recently quantified the life expectancy of PVC pipe at more than 110 years – making it excellent for long-term asset management and sustainability. Furthermore, PVC pipe is more efficient to manufacture, taking four times less energy to make than concrete pressure pipe, and half that used for iron pipe. As well, PVC pipe is cost-effective, has watertight joints and its lightweight reduces transportation and installation costs, yielding additional greenhouse gas reductions. It is also totally recyclable, though most of it has yet to enter the recycling stream given its great durability.

The PVC pipe industry is an active member of the Clean Water Council (CWC). We support continued federal funding of FY 2012 of the State Revolving Funds (SRF's) for drinking water and clean water programs. These are essential programs that greatly help to maintain and improve these very important infrastructure systems. With the proposed decreases in government spending for water and wastewater systems we also believe S.939, the Sustainable Water Infrastructure Act of 2011, is critical to the continuous funding of this infrastructure. This legislation is important because it removes state volume caps on Private Activity Bond's (PAB's) for water and wastewater projects – opening the door for much needed additional revenues.

The PVC pipe industry thanks you for letting us submit a statement for this important hearing and we will be pleased to answer any questions you may have.

Respectfully,

Bruce Hollands
Executive Director

The Vinyl Institute

Statement for the Record

Water and Wildlife Subcommittee
of the Senate Committee on Environment and Public Works

"Our Nation's Water Infrastructure: Challenges and Opportunities"
Tuesday, December 13, 2011

The Vinyl Institute (VI) respectfully submits this statement to the Water and Wildlife Subcommittee of the Senate Committee on Environment and Public Works. The comments we offer relate to testimony provided by witnesses invited to address the Subcommittee on Water and Wildlife at the December 13 hearing on the subject, "Our Nation's Water Infrastructure: Challenges and Opportunities."

About our industry

VI represents the leading manufacturers involved in the production of polyvinyl chloride (PVC or vinyl) resin in the United States. PVC is one of the most versatile, valuable materials on the market today. Our industry generates an estimated $50 billion a year in products such as critical-care blood bags and medical tubing, energy-efficient window frames and roofing, fire-resistant insulation for electrical wire and cable, and others. Federal taxes from producing the raw material alone amount to $230 million, and replacing all PVC products would cost US consumers an estimated $17.7 billion annually in higher costs for alternatives that may not perform as well.

An estimated 13 billion pounds of PVC were manufactured in 2010, creating high-paying jobs for tens of thousands of American manufacturing workers and many more for transporters, distributors, installers, and recyclers. Vinyl products are made in hundreds of plants in almost every state. The vinyl industry is projected to grow 5 percent through 2014 as construction picks up, consumers seek more energy-efficient products, and innovative new designs reach the marketplace.

One of the vinyl industry's most valuable products is pipe to deliver safe drinking water and to move sewage effectively to treatment facilities. VI has a long-standing interest in promoting the rebuilding and expansion of the nation's water infrastructure systems. Among all infrastructure systems, none is more critical to public health and a clean environment than our water delivery and sewage-handling infrastructure.

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The problems are well recognized.

The deplorable state of our nation's deteriorating drinking water and sewer infrastructure systems is well documented by the U.S. Environmental Protection Agency and industry analyses and reports. Each year the quality and performance of these systems worsens and the number of dollars needed annually to fix the problems becomes more staggering. Drinking water and wastewater pipes are deteriorating due to corrosion, joint leaks and line breaks with an estimated 2.6 trillion gallons of treated drinking water lost every year in the U.S. This translates to approximately $3 billion in lost revenue to utilities yearly. Also, in regions where water is scarce, the loss of water from leaking and breaking pipes has become a critical availability problem. These well-recognized specific problems can be addressed effectively, however, with a national commitment to additional capital investment, proper design and planning, and the use of high-performance, non-corroding pipe systems that have a long life expectancy.

PVC pipe is the preferred high-performance pipe solution for water infrastructure.

PVC pipe offers a cost-effective, energy-efficient, non-corroding drinking water and sewage delivery solution to our water infrastructure problem. PVC's lighter weight makes it easier and less costly to handle, transport and install. In fact, most PVC pipe sizes can be handled manually, reducing the need for expensive installation equipment.

Sludge, slime and other residue buildups are virtually nonexistent because of PVC's extremely smooth inner surface. And, the smooth interior walls of PVC pipe translate into increased flow rates at flatter grades, resulting in reduced trenching costs, fewer lift stations, and better energy efficiency, saving utilities and rate payers money for installing and operating water infrastructure systems.

PVC pipe will resist earth and live load deflection and can bend under shifting soil conditions. It will withstand corrosive soil conditions and require virtually no maintenance. But if it does become damaged, it can be easily hand-cut and repaired, resulting in lower repair costs and less interruption in water and sewer service to the consumer.

Federal legislation is needed to promote water infrastructure redevelopment throughout the U.S.

VI for many years has supported increases in the federal contribution to state revolving funds (SRFs) for clean water and safe drinking water programs through reauthorization of the Clean Water Act and the Safe Drinking Water Act. Historically, the amounts budgeted by the President and appropriated by Congress for these accounts have differed significantly, but overall we have seen a troubling downward trend in federal support in recent years.

Matching federal funds serve as an important catalyst to state and local government funding of drinking water and wastewater systems. Without federal support, state and local bonds to finance projects may not go forward. For many local communities that cannot support water infrastructure system upgrades alone, federal assistance not only helps with upgrades but prevents further deterioration.

The ability to attract private investment in water infrastructure solutions should be another high priority for this Congress. The bill, S. 939, the "Sustainable Water Infrastructure Investment Act of 2011," sponsored by Senator Robert Menendez should be given high-priority attention by the Senate as the House takes up an identical counterpart bill, H.R. 1802, sponsored by Rep. Bill Pascrell, Jr. These bills enjoy strong bipartisan support in both bodies and should proceed to committee mark up and floor consideration.

Reluctance to move bipartisan water infrastructure legislation has been tied in part to the inability to find revenue offsets to fund the water infrastructure programs. On the broader and more costly funding question for the SRF programs, VI is committed to supporting one or more solutions among the many that have been offered or may yet be advanced. Funding must be sustainable over multiple years at a level that is effective in substantially reducing the significant backlog of unaddressed priority projects.

Congress has an opportunity to advance the private activity bond (PAB) legislation now, however. Congressional Budget Office scoring indicates the revenue impact of the proposed bills is less than $50 million annually. Under budget rules adopted in both bodies, this amount does not require revenue offsets, thereby removing a procedural barrier that has stalled other legislative programs in the House and Senate. Tapping private sector financing through state PABs must be a top priority of Congress, and moving S. 939 and H.R. 1802 should be high on the congressional agenda in 2012.

PVC Pipe in Use Today is Dissimilar to the Plastic Pipe Exhibit Used in the Hearing

In the hearing, Senator Whitehouse introduced a piece of plastic water pipe obtained from the Kingston Water District in Rhode Island. It was an old service line pipe of unknown age that had been connected to a main line made of cast iron. The cast iron main line was heavily tuberculated, with significant mineral deposits around the inside. The plastic pipe also had mineral deposits inside. A statement was made that plastic pipe can tuberculate in the same way as cast iron and ductile iron pipe and similarly result in a constricted interior obstructing normal flow.

VI spoke with the Kingston Water District following the hearing regarding the plastic pipe exhibited during testimony and learned this pipe was manufactured and installed in the early 1970s. Mineral deposits occurred within approximately 3 feet of the connection to the main cast iron line that was corroded and tuberculated. This variety of plastic pipe was replaced in the mid to late 1980s with PVC and/or polyethylene (PE) plastic service pipe. We were told the Kingston Water Service is no longer observing the type of mineral deposits in PVC pipe seen in the early plastic pipe sample.

Indeed, decades of experience show that PVC pipe does not tuberculate or corrode as metal pipe does. Federal funds should be dedicated to high-performance pipe that will not require replacement from corrosion and breakage in 30-50 years or require corrosion-resisting practices such as applying constant electrical current. Effective stewardship of federal funds should mean using more PVC pipe – the best-performing, most cost-effective pipe product available for long-term water system performance.

Buy America requirements in water infrastructure legislation could be counterproductive.

The hearing testimony raised questions about the policy of requiring products used in water infrastructure projects funded by the federal government to be made in the U.S., in whole or in part. While members of the VI are U.S.-based manufacturers, and much of the material they manufacture here is made into finished products in this country, these companies also export PVC resin that can be made into pipe, as well as other end products, in other countries and imported back into the U.S. VI is concerned about the policy implications of rigidly barring foreign-made products in water infrastructure projects. International competition helps determine the price, quality and availability of PVC, and the use of this U.S.-made material, even if some of it is processed into a product abroad, can represent the best deal for U.S. consumers, utilities and the economy.

Moreover, congressionally constructed trade barriers may trigger an international response in which foreign markets are closed to American products. U.S. trading partners may be inspired by Made in America requirements to erect barriers to U.S. imports in their countries. The U.S. Congress, committed as it is to free trade, should not promote policies that limit U.S. exports by raising Made in America barriers to foreign products for water infrastructure projects. This is contrary to carefully balanced existing bilateral and multilateral trade agreements.

If suppliers of water infrastructure products are concerned about unfair trade practices of foreign competitors, existing law and regulations offer tools to challenge foreign dumping and other unfair practices.

Finally, U.S. suppliers of water infrastructure products promoting Buy America provisions in infrastructure legislation may find it difficult to prove all materials contained in their products originate from the U.S. Commodity markets are international, and some component materials used in finished products are likely to originate abroad. Proving 100 percent Made in America will be a difficult, time-consuming and unproductive exercise. Issues surrounding the implementation of conflict minerals reporting requirements under the recently passed Dodd-Frank legislation underscore the problems of prohibiting the use of foreign-made goods in the U.S.

In closing, VI wishes to reiterate the PVC industry's support for enhanced water infrastructure funding while encouraging members of the Environment and Public Works Committee to support policies that promote high pipe performance while avoiding restrictive trade policies.

Thank you for the opportunity to offer these comments.

Sincerely,

Allen Blakey

Allen Blakey
VP, Industry & Government Affairs

Since 1933, the Official Publication of The United States Conference of Mayors
March 28, 2011
Volume 78, Issue 05

U.S. MAYOR

MAYORS, CITY, COUNTY OFFICIALS RELEASE CDBG ECONOMIC IMPACT REPORT

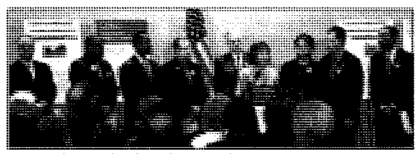
Leverages Over $13 Billion in Economic Activity Annually

By Elena Temple-Webb, Dave Gatton and Gene Lowe

The U.S. Conference of Mayors, the National League of Cities, and the National Association of Counties at a March 16 press conference in the Hart Senate Office Building continued their fight to Save CDBG and avoid draconian cuts (62 percent) in the program. These cuts were passed by the U.S. House of Representatives in H.R. 1 in February.

At the event, the three organizations released a major report outlining the broad economic impacts of the Community Development Block Grant program. Prepared independently by IHS Global Insight, the report calculated the economic impacts of the CDBG program in ten cities and counties. Between 2003-2008, these ten communities spent an annual average of nearly $300 million, which generated per year 9,080 jobs;

See CDBG on page 3



Left to right, IHS Global Insight Regional Economies Director James Diffley, Prince George's County Executive Rushern Baker, USCM Community Development and Housing Chair Newton (MA) Mayor Setti Warren, Tarrant County (TX) Judge NACo President Glen Whitley, Davenport (IA) Mayor Bill Gluba, USCM President Burnsville (MN) Mayor Elizabeth B. Kautz, NLC 2nd Vice President Avondale (AZ) Mayor Marie Lopez Rogers, NLC 1st Vice President Bluffton (IN) Mayor Ted Ellis, and NLC President Charlotte (NC) Council Member James Mitchell.

Conference of Mayors Reaches Out to Mayors in Japan See Story on page 7

President Kautz to NLC: We Stand United on CDBG

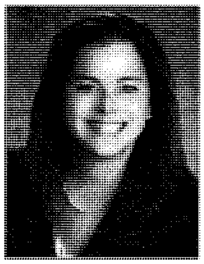
Mayors Discuss CDBG, Funding Priorities with Chairman Inouye

Best Practices

U.S.MAYOR
1620 I Street NW, Fourth Floor
Washington, DC 20006

Pleasanton's Underground Infrastructure: Sustainability, Cost-Efficiency Through Better Materials Procurement Practices

By Pleasanton (CA) Mayor Jennifer Hostermon



Pleasanton (CA) Mayor Jennifer Hosterman

Pleasanton (CA) is one of the best places to live in the U.S., according to Money Magazine. As a long-time resident and fourth-term mayor, I am not surprised the city is recognized for its recreational, educational and cultural facilities as well as a climate that are second-to-none. Our residents are proud of the general high quality of life: a low crime rate, clean streets, and stable employment – even in these times of high unemployment. We are also committed to building and maintaining state-of-the-art infrastructure – particularly the underground water and wastewater systems. That is why we have embraced a non-traditional approach to pipe material selection and installation. The city enjoys several significant public benefits from doing so.

The city grew rapidly in the 1960s and 70s, and to accommodate the growth, it was necessary to expand water and wastewater pipe systems. The city contracts for water purification and wastewater treatment services, but owns and maintains the pipe systems. Over the years, various piping materials were used. At first asbestos-cement pipe was installed, later being replaced by ductile iron. Local soil with high alkalinity and other factors, such as soil moisture and stray electrical currents from other utilities, accelerate the corrosion of buried metal infrastructure. Thus, corrosion-induced failure led to adoption of costly measures to protect the iron pipe.

Pleasanton is not alone in this respect. A 2002 Congressional study found that corrosion costs U.S. drinking water and sewer systems $50.7 billion annually.[1] Pipe corrosion is a leading cause of over 850 daily water main breaks throughout North America.

Pleasanton's utilities department adopted a variety of measures to deal with corrosion., Pleasanton Utilities Superintendent Dan Martin has overseen operations and maintenance of the water and wastewater pipe systems in addition to his many other utilities responsibilities. Utilities managers strive to build durable, sustainable utilities that minimize operating and maintenance costs. When rehabilitating or expanding the infrastructure with ductile iron pipe, we typically require corrosion protection based on several systems that include epoxy coatings, polyethylene sleeves and sacrificial anodes connected to the pipe. While these protective measures have performed well, they greatly increased initial material and placement costs.

While traditional modes of doing business may be the best way, it is always fair to challenge the status quo, especially if a more efficient and sustainable approach is available.

– Pleasanton (CA) Mayor Jennifer Hosterman

As a solution to corrosion and to better control costs, Pleasanton began using corrosion-proof PVC pipe in the mid-1980s because it doesn't need coatings, liners, or other materials to ensure strength or sustainability. Martin, who reports to the mayor and city council regularly, indicates that for the past decade over 90 percent of our pipe installations have involved PVC, which now represents about one third of our water and wastewater lines.

The results have been very impressive. Cost savings are confirmed by city staff. Jim Gotcher, our city construction manager, reports that PVC pipe is about 70 percent cheaper than ductile iron. He also emphasizes that PVC's cost-effectiveness results from various factors in addition to its relative cost advantage compared to traditional pipe materials. For example, he says that it doesn't need the corrosion protection of ductile iron pipe, and installation is less labor intensive and can be done with lighter equipment.

This alternative pipe material performs well in the sustainability category. PVC pipe failures are extremely rare, helping to hold the line on operation and maintenance costs – which are, according to a 2010 U.S. Conference of Mayors Report on Trends in Public Expenditures on Water and Wastewater, have far surpassed capital costs. Other public works information suggests that water and wastewater pipe O&M costs are increasing by six percent above inflation yearly.[2] Additionally, PVC pipe is totally recyclable, though most of it has yet to enter the recycling stream given its durability and expected long in-use life-cycle.

As mayor, I am committed to the goal of continually enhancing our community's livability and sustainability. Like other mayors, I rely heavily on city council and staff to be key drivers in establishing policies and programs that ensure Pleasanton's high quality of life and its dedication to excellence. Part of this approach to improving customer service is managing with an eye for the rainy day, spending smarter and opening procurement policies to alternate materials like PVC pipe. As well, reserves were set aside in good times, allowing the city to continue investing in its infrastructure today.

Ten years ago, we initiated programs to improve how Pleasanton manages its work, including sewer and water systems, to upgrade our services and expand opportunities for our population. Pleasanton's demonstrated progress and outside recognition have come from being adaptive, flexible and open to better technologies such as PVC pipe, and other infrastructure materials and ways of doing city business. This is all part of good-government and smart-government.

While traditional modes of doing business may be the best way, it is always fair to challenge the status quo, especially if a more efficient and sustainable approach is available. From service delivery to procurement practices it makes sense to keep an open mind from staff to council to mayor.

(Endnotes)

1 *U.S. Department of Transportation and the National Association of Corrosion Engineers: Corrosion Costs and Preventative Strategies in the United States, March 2002.*

2 *Water Infrastructure Network, Clean & Safe Water for the 21st Century: A Renewed National Commitment to Water and Wastewater Infrastructure, April 2000.*

Mayors are invited to submit the "Best Practices" of their cities to U.S. MAYOR. Contact Public Affairs at 202-293-7330 or send e-mail to info@usmayors.org

THE BOND BUYER
THE DAILY NEWSPAPER OF PUBLIC FINANCE

A Better Path for Infrastructure

Friday, October 28, 2011

By Gregory M. Baird

While many officials may just want to throw money at our nation's infrastructure issues ("We already have the infrastructure bank we need," the Washington Post, Sept. 29), there is common sense in doing things smarter.

For instance, much of our infrastructure is not managed correctly and results in early failures. Prior to any new public-private or federal funding or bailouts, infrastructure asset management best practices should be employed with the goal of maintaining an asset at an acceptable level of service at the lowest life-cycle cost.

Asset management guides the asset investments in all stages, including planning, acquisition, operations, maintenance, renewal and decommissioning.

Take our water and wastewater systems – 60% of the $700 billion-plus costs are the underground pipes. The wood pipes of the 1800s, the thick, grey, cast-iron pipes of the 1900s, the thin ductile iron pipes of the post-1950s, all need to be replaced because of age and corrosion.

These pipes are not going to fail all at once, so asset management helps direct the repair-replacement strategy, amount and timing of the investment.

Another huge replacement cost savings includes the use of non-corrosive materials like PVC, which studies suggest has a design life of 110 to 170 years or greater, at 30-70% of the metallic pipe costs.

Our nation can go a long way on the path of self-help in better managing our infrastructure and making wise replacement decisions. The federal government can focus on removing the state volume caps on private-activity bonds to generate $50 billion for private funding of public water-wastewater projects.

Washington can and should also support WIFIA (the Water Infrastructure Financing Innovations Authority) to offer low-cost capital loans to water utilities, and SRFs (state revolving funds) at a time when the White House is proposing to cut 38% of SRF funding.

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Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
58	10	Charlestown	Community ISDS Repair Program	$900,000
57	10	North Kingstown	North Kingstown Community Septic System Loan Program	$300,000
56	10	South Kingstown	Community OWTS Repair Program	$1,000,000
50	10	Westerly	Community Septic System Loan Program	$300,000
49	10	New Shoreham	Community Septic System Loan Program	$300,000
45	10	Warwick	Community Septic System Loan Program	$150,000
43	11	Narragansett	Phase II Stormwater Program Compliance	$150,000
43	5	NBC	Phase II CSO Facilities WCSOI West	$18,076,000
43	5	NBC	Phase II CSO Facilities WCSOI Site Demolition	$667,000
43	5	NBC	Phase II CSO Facilities WCSOI Regulator	$1,096,000
43	5	NBC	Phase II CSO Facilities WCSOI North	$24,000,000
43	5	NBC	Phase II CSO Facilities OF 037 North	$15,126,700
43	5	NBC	Phase II CSO Facilities OF 037 West	$24,608,000
43	5	NBC	Phase II CSO Facilities OF 037 South	$15,126,700
43	5	NBC	Phase II CSO Facilities OF 027	$11,412,000
43	5	NBC	Phase II CSO Facilities Program and Construction Management	$30,315,000
42	4C,10	Warwick	Community Sewer Tie-in Program	$150,000
41	5	NBC	Phase II CSO Facilities WCSOI Main	$116,332,000
41	5	NBC	Phase II CSO Facilities SCSOI Regulator Modifications	$2,530,000
41	5	NBC	Phase II CSO Facilities SCSOI Main	$73,578,500
41	5	NBC	CSO Phase II Facilities Design	$19,791,366
41	5	NBC	Phase II CSO Facilities OF 106†	$10,197,000
40	11	Charlestown	Elimination of Directed Stormwater Discharge into Green Hill Pond†	$200,000
40	11	South Kingstown	Phase II Stormwater Program Compliance	$150,000
40	11	South Kingstown	TMDL Program Implementation	$650,000
39	5	NBC	Floatables Control Facilities for CSO Outfalls	$3,395,000
39	10	Tiverton	Community Septic System Repair Program	$300,000
39	4C	Warwick	Sherwood Park Sewer Project/WSA Contract #90	$1,500,000
39	4C	Warwick	Greenwood East Sewer Project/WSA Contract #87A	$8,700,000
38	10	Narragansett	ISDS Management Program	$250,000
36	2	NBC	Field's Point WWTF Nitrogen Removal Upgrade	$71,789,000
36	6	North Kingstown	North Kingstown Town Wide Facilities Plan	$100,000
36	4C	Warwick	Strawberry Field Rd. Sewer Project/WSA Contract #77A	$3,000,000
35	10	Exeter	Community Septic System Loan Program	$300,000
35	10	Hopkinton	Community Septic System Loan Program	$300,000
35	10	Glocester	Community Septic System Loan Program	$300,000
35	6	Portsmouth	Illicit Discharge Detection Program	$100,000
35	10	Richmond	Community Septic System Loan Program	$300,000
34	10	Portsmouth	Community Septic System Repair Program	$10,000,000
34	10	Portsmouth	Septic Repair Financial Assistance Program	$12,000,000
33	4C, 4D	Narragansett	Harbour Island Sewers	$7,585,600

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
32	5	Newport	Implementation of System Master Plan for CSO Control	$35,000,000
31	10	Warren	Touisset Onsite WWMP Implementation - CSSLP	$750,000
30	2	NBC	Bucklin Point WWTF Nitrogen Removal Facilities	$52,688,000
30	2	Smithfield	Smithfield Facility Tertiary Treatment Upgrades†	$7,000,000
28	4C,4D	North Smithfield	St. Paul Area Sewer System	$6,179,700
28	4C,4D	Warwick	Bayside/Longmeadow I Sewer Project/WSA Contract #86A	$5,000,000
28	4C,4D	Warwick	Warwick Vet's Force Main Relocation	$600,000
27	2	Cranston	Wastewater Treatment Plant Upgrades	$30,000,000
26	11	Newport	Stormwater Infrastructure Improvements	$500,000
26	4C,4D	North Kingstown	Post Road North 3	$3,500,000
26	4C,10	North Smithfield	Community Sewer Tie-in Program	$300,000
26	3B,11	Warren	Water Street Sewer Line Replacement and Stormwater Abatement	$2,000,000
25	11	Middletown	Easton's Point Stormwater Quality Improvements	$2,250,000
25	12	Providence	Land Purchase for Water Quality Protection†	$10,000,000
25	4C	South Kingstown	Upper Salt Pond Collection System	$2,100,000
25	6	Tiverton	Facilities Plan Update	$150,000
24	11	Barrington	Stormwater Drainage Upgrade/Rehab	$1,500,000
24	6	Bristol	CMOM Program	$350,000
24	4C,4D	Narragansett	Great Island Sewers	$8,750,300
24	1	North Kingstown	QDC Infrastructure Upgrades	$5,000,000
24	4C,4D	North Kingstown	Post Road North 2	$8,500,000
24	4C,4D	North Kingstown	Post Road North 1	$20,500,000
24	4C,4D	North Kingstown	Community Tie-in Program	$300,000
24	4D	North Kingstown	Newcomb Road Sewer Main Replacement	$600,000
23	10	Bristol	On-Site Wastewater Management Program	$300,000
23	4C	Burrillville	Eastern Village Sewers- Contract 19A-3	$2,100,000
23	11	Cranston	Storm Drain Upgrades	$500,000
23	11	East Greenwich	Hill and Harbor District Stormwater Abatement†	$800,000
23	10	Smithfield	Community Septic System Repair Program	$250,000
23	4C,4D	Westerly	Town Wide Sewer Expansion	$91,850,000
22	4C	Narragansett	Baltimore/Rhode Island Avenue Sewers	$1,409,300
22	4C	Tiverton	Bay Area Sewers	$5,300,000
22	4C	Tiverton	Summerfield Lane/Craig Ave. Sewers	$275,000
22	4C	Tiverton	Old Colony Area Sewers	$4,400,000
22	4C	Tiverton	Randolf Avenue Sewers	$585,000
22	4C,10	Tiverton	Community Sewer Tie-In Program	$300,000
21	4C	Burrillville	Expansion of Sanitary Sewer System- Contract 21	$2,100,000
21	4C,4D	Burrillville	Eastern Village Sewers- Contract 19C	$2,300,000
21	11	East Greenwich	McHale Athletic Fields Stormwater Mgmt.†	$1,500,000
21	2	Warwick	WWTF Upgrades to Comply with RIPDES Permit- Contract #91	$14,000,000
21	2	Woonsocket	Wastewater Facility Upgrades	$50,000,000
20	3B	Bristol	Wastewater Pump Station Improvements, Constitution and Mt. Hope	$2,500,000

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
20	6	Portsmouth	Small Lot Septic Solutions Study	$250,000
19	4C	Burrillville	Eastern Village Sewers- Contract 19B-2	$2,800,000
19	4C	Coventry	Wendell Ave. Sewer Project- Contract 9	$750,000
19	2	Cranston	Odor Control at the Plant and Covering Clarifiers	$5,000,000
19	1	Narragansett	Regional WWTF Process Upgrade	$8,887,200
19	11	RI Airport Corporation	Glycol Collection and Treatment Facility	$25,255,000
19	1	South Kingstown	South Kingstown Regional WWTF Septage Receiving Facilities	$500,000
19	2,6,7	West Warwick	WWTF Process Improvements (Phosphorous)	$8,200,000
18	6	Burrillville	Wastewater Facilities Plan Update	$125,000
18	3B	Middletown	Continental/Valley Neighborhood Sewer Replacement	$1,597,500
18	10	Portsmouth	Cluster Treatment Systems	$10,000,000
18	4C	Smithfield	Cortland Ave., Baldwin Dr., Kimberly Ann Dr., Crabapple Ln., Christopher Dr.	$1,500,000
18	4C,4D	Smithfield	Lower Sprague Reservoir Area-Indian Run Plat., Totem Pole Tr.	$5,000,000
18	11	South Kingstown	Replacement Street Sweepers (2)	$300,000
18	3B	Warren	Televising Interceptors along Metacom Ave.	$200,000
18	4C,4D	Westerly	Phased Collection System Expansion	$30,000,000
17	3A	Bristol	Inflow Source Removal	$4,000,000
17	4C	Coventry	Main Street and Industrial Drive Sewer Extension	$2,721,000
17	4C,10	Cranston	Community Sewer Tie-In Program	$500,000
17	11	Glocester	Catch Basin Retrofit Program	$250,000
17	1	Narragansett	Regional WWTF Hydraulic Expansion	$5,564,160
17	8	Richmond	Richmond Landfill Cap Compliance	$100,000
16	4C,4D	Coventry	Fast Track Sewer Interceptor (Contract 1&2) Refinance	$6,485,601
16	3A	East Greenwich	Inflow/Infiltration Analysis	$400,000
16	11	Glocester	Chepachet River Park Stormwater Retrofit†	$609,000
16	1,12	NBC	Field's Point WWTF Wind Turbine†	$14,953,778
16	1,12	NBC	Bucklin Point WWTF Biogas Reuse Energy Project†	$2,813,000
16	4C	Smithfield	Austin Ave., Mapleville Rd./Colwell Rd.	$2,420,000
16	1	South Kingstown	South Kingstown Regional WWTF Process Upgrades	$3,700,000
16	1	South Kingstown	South Kingstown Regional WWTF Phase II Hydraulic Expansion	$3,600,000
16	1	South Kingstown	Regional WWTF Replacement Generator	$300,000
16	4C,4D	South Kingstown	Saugatucket Pond (North Road) Sewers	$2,300,000
16	4C,4D	Warwick	Bayside/Longmeadow III Sewer Project/WSA Contract #86C	$3,910,000
15	3A,3B	Barrington	Sewer Line Rehabilitation	$3,500,000
15	6	Barrington	Sewer System Evaluation Study	$1,000,000
15	1	Bristol	WWTF Headworks & Misc. Improvements	$3,000,000
15	1	Bristol	Replacement of Existing RBCs	$4,400,000
15	4C,10	Coventry	Community Sewer Tie-In Program	$500,000
15	10	Cranston	Community ISDS Repair Program	$200,000

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
15	1	Narragansett	Scarborough WWTF Upgrades	$8,237,000
15	8	Smithfield	Landfill Closure (Ridge Road)	$3,000,000
14	3B	Bristol	Sewer Cleaning and TV Inspection	$270,000
14	4C	Narragansett	Alexander Drive Sanitary Sewers	$90,000
14	1	NBC	Regulatory Compliance Building	$21,296,000
14	3B	NBC	Branch Avenue Interceptor Improvements	$1,887,000
14	3B	NBC	Louisquisset Pike Interceptor Replacement	$2,600,000
14	4C	Warwick	Northwest Gorton Pond Sewer Project/WSA Contract #88	$2,875,000
14	4C	Warwick	GAPS (Miscellaneous Sewer Extensions)	$2,300,000
13	3A,3B	Bristol	Sewer System Repairs	$1,500,000
13	4C	Burrillville	Union/Emerson Sanitary Sewers-Contract 20	$1,100,000
13	4D	Coventry	Tiogue Ave. West (Nooseneck Hill Road)- Contract 7	$1,300,000
13	4C	Coventry	Hopkins Hill East Sewer Project	$2,200,000
13	4C	Coventry	Huron Pond Area Sewer Project	$2,800,000
13	4C,4D	Coventry	Quidnick Village- Contract 8	$4,800,000
13	4C,4D	Coventry	Lakeside Area II Sewer Project- Contract 11	$2,300,000
13	4C,4D	Coventry	Tiogue School & East Shore Dr.-Contract 10	$4,410,000
13	3B	East Greenwich	Water Street Collector Rehabilitation	$1,600,000
13	2	NBC	NBC Fire Code Compliance	$100,000
13	4D	South Kingstown	South Road Interceptor	$1,700,000
13	4D	South Kingstown	Curtis Corner Road Interceptor	$2,200,000
13	6	Warwick	CMOM/Asset Management/GIS Survey	$500,000
13	2	West Warwick	Advanced WWTP Improvements - Clarifier Addition	$4,000,000
13	3B	West Warwick	Clyde Interceptor	$1,400,000
12	3B	Barrington	Ejector Stations (5) Rehab/Upgrade	$1,000,000
12	8	Barrington	Landfill Closure #3	$1,500,000
12	8	Barrington	Landfill Closure #4	$1,500,000
12	1	Burrillville	WWTF- General Improvements and Maintenance Upgrades	$150,000
12	3A	Cranston	Inflow/Infiltration Study Implementation	$900,000
12	3B	Cranston	Pump Station Safe Capacity Upgrades	$1,400,000
12	4C	Narragansett	Angler's Court Sanitary Sewers	$228,000
12	3B	NBC	Cleaning and Inspection of NBC Interceptors	$3,500,000
12	1	Smithfield	Smithfield Treatment Plant Upgrades-HVAC†	$750,000
12	4C	Smithfield	Richard St. and Hazel Point	$565,000
12	4C	Smithfield	Green Lake Dr. and Russ Stone Dr.	$855,000
12	4C	Smithfield	Fanning Lane Area	$2,850,000
12	4C,4D	Smithfield	Friendship Ln., Domin Ave., Potter Ave., Rawson Ave., Sydney St., Myers St., Ridge Rd.	$1,235,000
12	4C,4D	Smithfield	Highview and Hilldale Estates	$6,415,000
12	4C,4D	Smithfield	Levesque Dr., Jambray Dr., Dongay Dr., Elna Dr., John Mowry Rd., Brayton Rd.	$3,450,000
12	6	Warren	Facility Plan Updates for Nitrogen Removal and Flow Discharge Limit	$375,000

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
12	1	Warwick	WWTF Flood Protection Measures	$8,000,000
11	4C,10	Bristol	Service Connection Loan Program	$150,000
11	3B	Narragansett	Sprague Pumping Station	$1,050,000
11	11	Narragansett	Phase I- Porous Pavement at Town Beach S. Parking Lot	$588,765
11	11	Narragansett	Phase II- Porous Pavement at Town Beach N. Parking Lot	$1,033,967
11	6	NBC	River Model Development	$378,000
11	6	West Warwick	Inflow/Infiltration Study Implementation	$500,000
10	3B	Burrillville	Pumping Stations- General Improvements and Maintenance Upgrades	$500,000
10	3B	Middletown	Town-wide CIPP Sliplining & Manhole Rehab Annual Program	$570,000
10	3B	Middletown	Marshall Village Pump Station Replacement	$625,000
10	3B	Middletown	Stockton Dr. Pump Station Replacement/Removal	$575,000
10	3B	Middletown	Stockton Dr. Collection System	$900,000
10	3B	Middletown	Commodore Perry Village Sewer Improvements	$495,000
10	3B	Middletown	Easton's Point Sewer Improvements	$2,000,000
10	3B	Middletown	Forest Ave. Sewer Relining and Repair	$2,100,000
10	3B	Middletown	Sewer Main Upgrades (Newport/Middletown Line)	$750,000
10	3B	Middletown	Aquidneck Ave. Sewer Upgrade	$465,000
10	6	Middletown	SSES Inflow&Infiltration Investigation	$370,000
10	1,12	Narragansett	Scarborough & SK Regional Treatment Plants' Wind Energy Feasibility Study and Data Collection†	$250,000
10	3B	NBC	Improvements to NBC Sewers-FY 2012	$1,500,000
10	3B	NBC	Improvements to NBC Sewers-FY 2010	$702,000
10	3B	Smithfield	Improvements to Town's Pump Stations	$320,000
10	4C	Warwick	Governor Francis Farms III Sewer Project: WSA Contract #85B	$5,060,000
9	4C	Coventry	Woodland Sewer System	$1,000,000
9	3B	Cranston	System Wide Sewer Repair	$1,400,000
9	3A	Narragansett	Sand Hill Cove Area I/I Study/Removal	$200,000
9	3A	Narragansett	Pier Area Flow Improvements	$100,000
9	3B	Narragansett	Bonnet Shores Pumping Station	$150,000
9	3B	Narragansett	Mettatuxet Pumping Station	$95,000
9	3B	Narragansett	Wolf Road Pumping Station	$55,000
9	3B	NBC	New IM Facilities	$6,609,000
9	6	NBC	Site Specific Study	$452,000
9	1	Smithfield	Upgrade Smithfield Wastewater Treatment Plant's Fire Protection System	$250,000
9	4C	Smithfield	North Candy Court Sewers	$160,000
9	4C	Smithfield	Elmgrove Avenue	$720,000
8	3B	NBC	Interceptor Easements- NBC AVI	$1,386,892
8	3B,7	NBC	Interceptor Easements- NBC BVI	$1,361,425
8	6	NBC	Hydraulic Systems Modeling	$327,000

Rhode Island Department of Environmental Management
Office of Water Resources
Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
8	3A,3B	Newport	Sanitary Sewer Improvements I	$4,000,000
8	3A,3B	Newport	Sanitary Sewer Improvements II	$4,000,000
8	4C	North Kingstown	Pine River Road	$1,300,000
8	4C	North Kingstown	Mark Drive	$3,600,000
8	4C,4D	North Kingstown	Post Road South 1	$3,500,000
8	4C,4D	North Kingstown	Post Road South 2	$9,300,000
8	4D	North Kingstown	ASQAH Road Sewer Replacement	$600,000
8	3B	South Kingstown	Silver Lake/Kingston Pump Station Upgrades	$500,000
8	3B	South Kingstown	Replacement Jet-Vac Truck	$290,000
8	1	Westerly	Energy Efficient Blower Upgrade†	$385,000
7	6	Barrington	GIS Software	$10,000
7	12	Barrington	Vactor Truck	$260,000
7	6	Narragansett	Lane Canonchet/Little Neck Pond Water Quality Analysis	$100,000
7	3B	NBC	Omega Pump Station Rack Room	$113,000
7	1	New Shoreham	Upgrade Electrical Switchgears, Motor Control Center, Power Distribution System	$800,000
7	3A	Smithfield	Smithfield Infiltration and In-Flow Removal- SSES	$1,500,000
7	3B	Warwick	Cedar Swamp Line Break Emergency Repair (Refinance)	$2,000,000
7	4C,10	West Warwick	Community Tie-In Program	$300,000
6	3B	Cranston	Sewer Pump Station Flood Proofing	$500,000
6	6	NBC	NBC System Wide Facilities Planning	$1,392,400
6	2	Westerly	WWTF Expansion	$7,500,000
5	3B	NBC	Moshassuck Valley Interceptor Replacement	$2,884,000
5	3B	NBC	NBC Interceptor Easements	$5,432,000
5	3B	NBC	Rehabilitation of NBC CSO Interceptors	$6,068,000
4	1,12	East Providence	Forbes Street Solar Project†	$10,000,000
4	3B	Narragansett	North Interceptor Access Road	$100,000
4	3B	Newport	Railroad Interceptor Replacement/Relocation	$3,000,000
4	3B	Newport	Hazard Ave. and Coddington Wharf Pump Station Improvements	$200,000
4	3B	Warren	Locust Terrace Pump Station Upgrade	$350,000
4	3B	Warwick	Upgrades to the Warwick Ave. Pump Station	$345,000
4	3B	Warwick	Upgades/Relocation of the Knight Street Pump Station	$1,750,000
4	3B	Warwick	Redirect Lockwood Force Main Away from Apponaug Pump Station	$1,150,000
4	3B	Warwick	Upgrades to the Oakland Beach Pump Station	$500,000
4	3B	Warwick	Reconstruction/Relocation of Bellows St. Pump Station	$800,000

Total: $1,257,420,854

† Qualifies for Green Project Reserve

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2012 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)

Not Rated - Project Already Funded/Under Construction/Completed

Points	Category	Community	Project Name/Number	Cost ($)
---	4C,4D	Coventry	Lakeside I Sewer Project-Contract 8	$2,896,000
---	4C	East Greenwich	Howland Farm Sewer Extension	$600,000
---	3B	NBC	Field's Point WWTF Flow Control Efficiencies	$1,740,000
---	5	NBC	Tunnel Odor Control	$1,500,000
---	5	NBC	Resident Services for Phase I Construction	$36,220,000
---	5	NBC	Tunnel Pump Station & Site 1 Fitout, 067 Facilities	$58,900,000
---	4C	Warwick	Governor Francis Farms II Sewer Projects/WSA Contract #85A	$4,500,000
---	4C,4D	Warwick	Bayside/Longmeadow IV Sewer Projects/WSA Contract #86D	$4,370,000

Total: **$110,726,000**

Not Rated - Not Applicable/Not Eligible

Points	Category	Community	Project Name/Number	Cost ($)
---	---	Barrington	Utility Truck	$70,000
---	---	Barrington	Compost Screener	$300,000
---	11	Westerly	Misquamicut Municipal Drainage Project	$880,000

Total: **$1,250,000**