



September 2014

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## Reliable Water Service and the Economy

### Introduction

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The details are as clear as the water we drink. The U.S. is quickly approaching a crisis point when it comes to clean drinking water.

The network of pipes that makes it so easy for 300 million Americans to take our clean water for granted spans 700,000 miles and is more than four times the length of the National Highway System<sup>1</sup>. Some of these pipes –originally intended to survive 50 to 75 years – have been in service for more than 100 years. Without renewal or replacement, water pipes in the U.S. that are classified as poor, very poor or life-elapased will increase from 10 percent to 44 percent by 2020<sup>2</sup>.

The American Society of Civil Engineers grades both wastewater and drinking water systems a D<sup>3</sup>. The risks of allowing these systems to lapse are as real as they are alarming. Already, aging wastewater systems discharge billions of gallons of untreated wastewater into our surface waters every year. Leaking and broken pipes waste nearly two trillion gallons of clean drinking water each year. And every two minutes, somewhere in the U.S., a significant water line ruptures – oftentimes underground where it is not visible – risking major damage to roadways and structures. On top of these challenges, we are experiencing more floods and droughts, while aging infrastructure could increase the risk of water-borne illnesses.

Addressing these offers an opportunity. It's no secret that jobs are on everyone's mind in this tough economy. Not only does investment in water infrastructure protect public health, quality of life and promote innovative technologies that help keep America competitive, it also means more jobs and a boost to the nation's economy.

This paper's main focus is the link between water infrastructure investment and a healthy economy as well as innovative solutions to aid the economy. Though water affects the production of goods and services in many sectors and is linked to the market economy, this aspect is not a primary focus of the paper.

### Value of Water

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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 U.S., 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

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1 "Straight Talk on Water Infrastructure," The American Water Works Association.  
<http://www.drinktap.org/consumerdnn/Default.aspx?tabid=198>

2 EPA: "The Clean Water and Drinking Water Infrastructure Gap Analysis"

3 2013 Report Card on America's Infrastructure.

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.

Water sustains agriculture and, thus, our food chain. Vast quantities of water are used to make the silicon chips that help power our computers and cell phones. Electric power plants depend heavily on water, and account for a staggering 39 percent of freshwater withdrawals in the U.S. It could be said our economy runs on water<sup>4</sup>.

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.

### Economic Impact

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It's a simple fact; we can't afford to neglect our infrastructure any longer.

In a study released in 2012 on the economic impact of under-investing in our water and wastewater infrastructure, the American Society of Civil Engineers estimated that remaining on the current tract will cost American businesses \$734 billion in sales between now and 2020, and the cumulative loss to our gross domestic product (GDP) will be \$416 billion, directly due to deteriorating water infrastructure. A modest increase in investment would prevent 700,000 job losses and avoid personal income losses of \$541 billion<sup>5</sup>. Additionally, according to the U.S. Conference of Mayors, every dollar invested in water infrastructure adds \$6.35 to the national economy.

Across the country, water systems – and their customers – are enduring the ramifications of underinvestment and, consequently, poor maintenance. It is estimated that every two minutes a significant water line ruptures somewhere in the U.S.,<sup>6</sup> leading not only to trillions of gallons of water wasted annually, but severe economic losses as well. In the summer of 2011, for instance, the rupture of a century-old water main in The Bronx disrupted the morning commute, damaged two gas mains, shut down electrical service to 500 customers for several days,<sup>7</sup> and put as many as 60 local businesses at risk of permanently closing.<sup>8</sup>

Water main breaks have stranded drivers on washed-out roads, impacted businesses and ruined roads around the nation. They caused a mudslide in California, flooded school libraries in Minnesota and Texas and snarled traffic and flooded homes in Philadelphia. A break in Niagara Falls, N.Y., spewed some 11 million gallons of water. In 2009, 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.

The cost of main breaks added up for California last year. San Diego has paid out at least \$10 million to settle claims and pay contractors for repairs to private property that was damaged by water main breaks since 2004. More than \$350,000 of that was to house people forced from their homes by the breaks<sup>9</sup>.

The potentially high cost of waterborne disease outbreaks should also be considered in economic decisions regarding the safety of public drinking water supplies. For instance, an analysis conducted by the Centers for Disease Control and Prevention on the 1993 *Cryptosporidium* outbreak in Milwaukee concluded the total cost associated with the outbreak was \$96 million, including \$32 million in medical costs and \$64 million in productivity losses. More significantly, there were over 400,000 cases of illness

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4 CERES Report, *Water Scarcity & Climate Change: Growing Risks for Businesses and Investors*; Feb. 2009.

5 American Water Works Association (AWWA): "Buried No Longer: Confronting America's Water Infrastructure Challenge."

6 Duhigg, Charles. "Saving U.S. Water and Sewer Systems Would be Costly," *The New York Times*. 14 March 2010.  
<http://www.nytimes.com/2010/03/15/us/15water.html>

7 Ember, Sydney, "Flooding in Bronx After Water Main Breaks," *The New York Times*. 27 July 2007.

<http://cityroom.blogs.nytimes.com/2011/07/27/jerome-ave-becomes-river-after-a-water-main-bursts/>

8 Paddock, Bary. "Owners of 60 Bronx Businesses Face Going Broke in Wake of Water Main Break," *New York Daily News*. 29 July 2011.

[http://articles.nydailynews.com/2011-07-29/local/29844261\\_1\\_flood-zone-business-owners-giant-water](http://articles.nydailynews.com/2011-07-29/local/29844261_1_flood-zone-business-owners-giant-water)

9 Crow, Kevin; Thronton, Kelly, "Cost Of Main Breaks, Water Loss Add Up For San Diego." *KBPS*. 27 February 2012.

(25 percent of the population) and 104 deaths in just two weeks. The average total costs for persons with mild, moderate, and severe illness were \$116, \$475, and \$7,808, respectively<sup>10</sup>.

The U.S. EPA Clean Watershed and Drinking Water Needs Surveys have identified a total water infrastructure capital investment need of \$632.9 billion over the next 20 years; at current funding levels, there will be a capital funding gap of at least \$224 billion nationwide unless investment increases<sup>11</sup>. As seen with just the few examples mentioned, this issue needs to be a top priority.

### Impact on Jobs

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While there are clear negative economic impacts related to under-investing in water systems, there are also equally compelling positive economic impacts to invest in these systems. Not only will an investment in infrastructure address the nation's deteriorating water and wastewater infrastructure, it will also generate thousands of jobs and help stimulate the economy.

According to a report by the Water Research Foundation and the Water Environment Research Foundation, titled National Economic and Labor Impacts of the Water Utility Sector, \$1 billion invested in infrastructure, creates approximately 16,000 jobs<sup>12</sup>. Additionally, a study by the Economic and Policy Institute, supported by the Rockefeller Foundation, suggested that expenditures on water infrastructure alone could lead to the creation of more than a million jobs over the course of the next five years.

Investing in water infrastructure creates jobs to repair, replace and upgrade our aging water systems. Such investment will ensure safe and reliable water to attract and retain industry, business, and qualified workers — all essential to any thriving community. In addition to directly putting people to work, investments in water infrastructure stimulate other economic activity as water projects depend on pipe, fittings, cement, aggregates, and other products.

On the flip side, if we continue to neglect our infrastructure, there is a potential for infrastructure-related job losses to spread throughout the economy in low-wage, middle-wage and high-wage jobs. The impacts on jobs are a result of costs to businesses and households managing unreliable water delivery and wastewater treatment services.

### Business and Community Impact

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Clean, safe and reliable water systems attract business and manufacturing and can be an important factor in whether a business moves to or expands in an area. Just as important to job creation from investing in infrastructure, is job opportunity loss due to an unsafe, unreliable water supply.

Declines or disruptions in water supply can undermine industrial and manufacturing operations where water is needed for production, irrigation, material processing, cooling and/or washing and cleaning. The semiconductor industry, for example, uses vast amounts of purified water in fabrication plants, for washing the silicon wafers at several different stages in the fabrication process and for cooling various tools; a brief water-related shutdown at a manufacturing plant could compromise all material in production for an entire quarter<sup>13</sup>.

There are several areas in the U.S. that provide an abundant water supply, including Western New York where residents are fortunate to be near two fresh bodies of water with Lake Erie and the Niagara River close by. In his book 'The Future of Water', Steve Maxwell proposed a scenario in which Buffalo, N.Y. could become the commercial capital of North America, as manufacturing and employment returns to the area in large numbers to take advantage of abundant water resources<sup>14</sup>.

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10 Centers for Disease Control and Prevention.

11 U.S. EPA Clean Watershed and Drinking Water Needs Surveys, 2012.

12 National Economic and Labor Impacts of the Water Utility Sector: Executive Report; Sept. 2014.

13 CERES Report, Water Scarcity & Climate Change: Growing Risks for Businesses and Investors; Feb. 2009.

14 "Does a Water Economy Exist? The Impact of the Availability of Water on Employment in U.S. Metropolitan Areas." Craig P. Aubuchon, Analysis Group. Study for EPA.

For Milwaukee, which draws off the Great Lakes and holds a fifth of the world's surface supply of freshwater, they are using water as an economic advantage to appeal to firms in other parts of the country or globe where water may be scarce or more polluted or expensive. The Public Service Commission of Wisconsin has designed "Water Attracting Valued Employers" (WAVE), where new businesses could be offered low-cost or free water in return for job-creating investment.<sup>15</sup>

### Political Platforms

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In the political arena, the desperate need to invest in our nation's crumbling water infrastructure is a truly bipartisan cause that affects every American. During the recent political conventions, both committees included support for water infrastructure in their party platforms:

The GOP Platform, [We Believe in America](#), states: "A federal-State-private partnership must invest in the nation's infrastructure: roads, bridges, airports, ports, and water systems, among others. What most Americans take for granted—the safety and availability of our water supply—is in perilous condition. Engineering surveys report crumbling drinking water systems, aging dams, and overwhelmed wastewater infrastructure. Investment in these areas, as well as with levees and inland waterways, can renew communities, attract businesses, and create jobs. Most importantly, it can assure the health and safety of the American people."

The Democratic Platform, [Moving America Forward](#), states: "And we continue to fight for measures that would strengthen the recovery and create jobs now, including... putting construction workers back to work by investing in our roads, bridges, schools, and water supply... we support strengthening rural water, sewer, and broadband infrastructure to make rural businesses more competitive. We have expanded broadband access to nearly seven million rural Americans, including rural businesses, creating new jobs. We have invested in water and wastewater community infrastructure projects, safeguarding the health of 18 million rural residents and creating even more jobs."

Clearly, water must be on the agenda in Washington. Both parties are focused on the economy and job creation but rarely mention water infrastructure. Meanwhile, the widespread deterioration of America's water infrastructure is reaching a critical stage. With this crisis comes incredible opportunity - forty years of experience proves that investing in water infrastructure creates jobs and boosts the nation's economy. With millions of Americans out of work, the timing could not be better to reinvest in our essential water infrastructure.

### Infrastructure Funding

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In its 2012 Value of Water Index, manufacturing company Xylem Inc. found that 77 percent of Americans are concerned about the nation's water infrastructure system, 88 percent believe it needs reform, and 85 percent support additional investment. Despite this overwhelming public support, the federal role in funding water infrastructure has declined steadily over the past two decades<sup>16</sup>.

American Water supports various types of funding to help improve the nation's water and wastewater infrastructure. One key solution is attracting additional private capital for public water infrastructure projects from investor-owned companies, as well as private capital that is already in infrastructure funds, pension funds, and other sources eager for the long-term, reliable investments that well-run water utilities provide. The U.S. government can help bring additional private capital into communities to bridge the funding gap and flood millions of dollars and thousands of new jobs into our economy. See [American Water White Paper: Financing Solutions for Water Infrastructure Investment](#).

Nationwide, American Water, through its 15 state subsidiaries, has spent about \$1.5 billion in the past three years on infrastructure improvements across the country. The company has a strong and ongoing commitment to investing in infrastructure and keeping it updated, while delivering excellent service customers depend upon at an exceptional value.

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<sup>15</sup> <http://city.milwaukee.gov>

<sup>16</sup> Xylem Inc., 2012 Value of Water Index.

For example, New Jersey American Water typically spends about \$150 million every year on capital projects. Approximately \$40 million of that is spent updating the pipes, pumps and valves that make up its nearly 9,000 miles of underground infrastructure. However, as part of a new distribution system improvement program created recently by the New Jersey Board of Public Utilities, the company has received approval on a foundational filing that will result in more than 400 infrastructure projects across the state, representing an investment of more than \$140 million and more than 900 construction jobs over the next 24 months.

In 2011, Pennsylvania American Water received a \$14.3 million loan when then-Governor Edward G. Rendell announced the commonwealth's investment of \$530 million in nearly 60 green infrastructure, drinking water and wastewater projects in more than 30 counties. According to Rendell, "Funding for projects approved by the PENNVEST Board of Directors demonstrates the commonwealth's commitment reinvigorate the economy by providing safe, clean drinking water and wastewater systems while creating jobs. These projects are vitally needed to put people back to work and to improve our precious water resources for future generations."

Additionally, the Water Environment Federation, a not-for-profit technical and educational organization representing water quality professionals around the world, in cooperation with many of its member associations, is working to send a strong message to Congress and the President about the critical need for water infrastructure investment and the indisputable link between water investment and job creation.

### **Green Infrastructure Solutions**

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Just as other industries have been investing in green infrastructure, the water industry has likewise developed ways to use its resources more efficiently. What's more, these solutions not only make environmental sense, they make economic sense as well. Green infrastructure creates jobs in many sectors. According to recent report from Green for All, adequate investment in green water infrastructure over the next five years could generate \$265.6 billion in economic activity and create close to 1.9 million jobs<sup>17</sup>.

The solutions already being put forward and implemented in the U.S. and abroad include technologies that recycle water for industrial and residential purposes. These types of policies have reduced the demand for water and wastewater, and, therefore have lessened the impacts on existing infrastructure<sup>18</sup>.

Water reuse in the U.S. is a growing practice, with more than 2 billion gallons per day reused<sup>19</sup>, and reused water volume is growing at an estimated 15 percent per year.<sup>20</sup> With so many communities experiencing a reduction in water supply, wastewater reuse is increasingly being explored to meet water demand in an environmentally friendly as well as an economically feasible way. Utilities, municipalities and the industrial private sector are now, more than ever, seeking ways to implement such solutions as a way to reserve water resources and meet demand.

Wastewater recycling not only addresses supply challenges, but is actually an economical long-term water management solution. Although recycled wastewater is highly treated, it does not need the level of treatment and pumping required by potable water, thus saving a significant amount of energy and money. In fact, initial investments in green building technologies often pay for themselves within the first few years a facility is in operation<sup>21</sup>. Wrentham Outlet Mall in Wrentham, Mass. is a case in point. Implementing an onsite wastewater treatment plant allowed the mall to save \$1 million in planning costs and significantly reduces its water bills by reusing half of its wastewater

Water reuse systems can also facilitate business development by helping water constrained communities sustain larger developments. For instance, Foxboro, Mass, a town with very limited water supplies, would not have been able to support the needs of Gillette Stadium using traditional water distribution methods.

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17 Green For All: "Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment," 2012.

18 American Society of Civil Engineers (ASCE): "Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure."

19 WateReuse Association, <http://www.watereuse.org/files/images/04-006-01.pdf>

20 Environmental Protection Agency, <http://www.epa.gov/nrmrl/pubs/625r04108/625r04108.pdf>

21 Winters, Steven. "GSA LEED Cost Study." The U.S. General Services Administration.

But by reusing wastewater, the facility can accommodate 68,000 sports fans and save 250,000 gallons of potable water during each major event. This illustrates how water management technology can not only save money but also create opportunities for economic growth.

Additionally, legislations are being introduced to address green infrastructure. The Green Infrastructure for Clean Water Act of 2011 was established to ensure that projects effectively manage stormwater flow and improve water quality, bringing us closer to a clean-energy economy and improving our outdated water infrastructure. If passed, it would establish up to five Centers of Excellence charged with conducting research on green infrastructure and provide communities with training and technical assistance on how to implement green infrastructure practices. The legislation would also provide funding to help communities develop green infrastructure technologies.

### **Additional Solutions**

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American Water has adopted some best practices to maximize its position with regard to water resources, including saving energy by using water more efficiently, leak detection programs and Integrated Water Resource Management.

*Water/Energy:* Water and energy are intimately interrelated - using water more efficiently conserves energy and ultimately, decreases carbon emissions. Unfortunately, many people generally continue to waste water and ignore this link. Given the interrelationship, one of the best ways to save energy across the country and in our own homes is to use water more efficiently. Water conservation is the most cost-effective and environmentally sound way to reduce demand for water and conserve energy. Additionally, conservation protects the environment, puts less pressure on sewage treatment facilities, uses less energy for water pumping and heating, decreases costs for developing new sources of water supply and decreases greenhouse gas emissions. Fortunately, there are many simple techniques consumers can employ at home to use water more efficiently and to conserve energy preserving our nation's supplies for future generations.

*Leak Detection:* With approximately 7 billion gallons of treated drinking water "lost" each day primarily due to leaks in drinking water pipelines throughout the U.S.,<sup>22</sup> one viable solution to combat this issue is leak detection. It's up to utilities and municipalities to adopt and implement technologies to more effectively manage and conserve water supplies by developing methods to detect, locate and stop leaks. Due to their low rate of replacement, broken and leaking pipes currently result in 1.7 trillion gallons of water (\$2.6 billion) wasted every year.<sup>23</sup> Early detection and repair of leaks saves water and energy and reduces repair costs. A leak detection program can be highly proactive, helping water utilities automate water systems, detecting problem areas earlier, giving customers tools to monitor water use, providing more accurate rates and reducing demand. These solutions not only make environmental sense, they make economic sense as well. Dealing with a main break after it happens is ten times more expensive than addressing the issue before it breaks.

*Integrated Water Resource Management:* It is incumbent upon utilities and their regulators to identify and implement, as appropriate, best practices to facilitate capital attraction, economies of scale and efficient operations if these challenges are to be met in a cost-effective manner. One of the innovative solutions designed to achieve these goals is Integrated Water Resource Management (IWRM). IWRM is the management of the whole hydrologic cycle to achieve a coherent set of water resource policies and uses that balances all reasonable social, environmental, and economic needs in a sustainable way. Many factors outside of the traditional regulated framework or Public Utilities Commission jurisdiction can directly impact the cost and reliability of service to regulated customers. For water service providers it can mean long-term planning incorporating concepts of reuse, watershed protection, wastewater management, groundwater infiltration and recharge, among others.

American Water's large size and technological expertise make it an ideal partner in leveraging the IWRM process. By practicing IWRM, American Water and its partners have been able to preserve water sources and use water wisely while considering the needs of the public and relevant stakeholders.

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<sup>22</sup> American Society of Civil Engineers. "Report Card for America's Infrastructure." 2009.

<sup>23</sup> Xylem Inc., 2012 Value of Water Index.

For example, American Water designed, built and now operates the Fillmore Water Recycling Wastewater Treatment Plant in Fillmore, Calif. This state-of-the-art wastewater treatment plant that recycles 100 percent of the water it treats. The \$42.5 million facility was built to replace an existing, outdated facility that no longer met modern environmental standards. Now, instead of water being discharged into the Santa Clara River as the old facility did, cleaner treated water suitable for irrigation is used on school grounds, in parks and green areas throughout the city of Fillmore.

### **Conclusion**

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We are now at a critical point with respect to our need to invest in water and wastewater infrastructure. This issue has broad political and public support and will require a strong commitment to honor each platform and make water a top priority. By making the investment now, we reduce the costs that will be incurred as a result of delay and we stimulate the U.S. economy by employing more Americans to work on infrastructure replacement. Needless to say, investments in water infrastructure also create lasting benefits by strengthening public health, safety, and our quality of life.

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