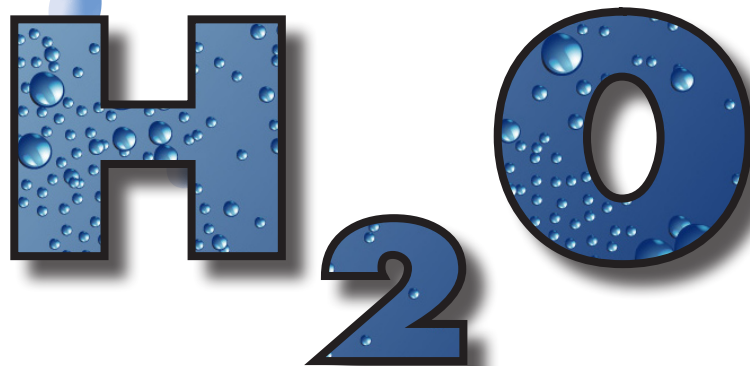


America's water infrastructure brimming with challenges and opportunities

The Structure of



BY FRASER ALLPORT

When it comes to America's deteriorating infrastructure, collapsed and aging bridges seem to get the most attention. But did you know that Bridges received the second highest grade on America's 2009 Infrastructure Report Card, as graded by the American Society for Civil Engineers? That's right — bridges received a solid C, with the Solid Waste category receiving a C+. Five categories received the lowest grade — a D-. Four of those five had to do with our water infrastructure. The U.S. water infrastructure is in need of major improvements and upgrades to meet the challenges of the 21st century, which presents significant opportunities for the construction industry.

THE CHALLENGES

• Water Shortages Pose Real Threat

According to a report from the U.S. Government Accountability Office, at least 36 states expect to face water shortages within the next five years. Experts quote phenomenon such as population growth and "unwise agricultural choices" to explain these water shortages. As a result, industries are faced with unprecedented challenges, as water is vital to most processes, while residents are asked to ration water in states such as California, Georgia, Florida and Arizona.

Water shortages have already had a devastating impact for some industries and regions. For instance, water shortages were at the root of the aluminum industry leaving the Northwestern United States in 2000-2001, and water scarcity is estimated to cost \$24 billion annually in lost industrial output in China.

For example, Lake Mead, the main water source for Las Vegas, is running dry, leaving eight million people at risk of losing their water supply by 2021. While this is not the only example of severe water shortage in North America, it is certainly of great concern, as Las Vegas is one of the fastest growing regions in the United States.

In fact, a Scripps Institute study shows a 50 percent chance of the lake entirely drying up over the next 12 years, and it also reports that before it dries up, water levels will be so low that intake pipes for power plants using the lake will be above the water line. In addition, according to *National Geographic Magazine's* special April 2010 issue on Water, by 2050, a third of the people on Earth may lack a clean, secure source of water.

• Aging Pipes Take Their Toll

Since 1980, the United States pipe network for water transportation has aged considerably, with a predicted 50 percent reduction of pipes previously identified as being in excellent condition. In 1980, 68 percent of U.S. pipes were in excellent condition, while only 32 percent are expected to be in the same condition by 2020. Even more alarming, the number of pipes in poor, very poor or

"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, and the environmental and economic gains of the last three decades." — WIN Coalition

life-elapsed condition will swell from 10 percent to 45 percent over the same period. Booz Allen Hamilton, a leading strategy and technology consulting firm, predicts the required infrastructure spending will hit \$22.6 trillion U.S. dollars globally from 2005 to 2030 as the world's water infrastructure fails.

• **Funding Gap Could Grow to \$122 billion**

In April 2000, the Water Infrastructure Network (WIN) released its first report, *Clean & Safe Water for the 21st Century*. While the report documented significant improvements in water quality and public health associated with America's investments in water and wastewater infrastructure, 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.

In 2002, the U.S. EPA released the Clean Water and Drinking Water Gap Analysis Report. This report estimated that if investment in water and wastewater infrastructure doesn't increase to address anticipated needs, the funding gap over the next 20 years could grow to \$122 billion for Clean Water capital costs and \$102 billion for Drinking Water capital costs.

5 Ways to Utilize Sustainable Technologies To Conserve Water

While few sites will be able to incorporate all of these methods, familiarity with these techniques gives a contractor or designer a variety of tools for reducing strain on municipal infrastructure and saving clients money.

According to David Crawford, president of Rainwater Management Solutions in Salem, Va., "At its simplest, reducing strain on water infrastructure means reducing the need to transport clean water to a site and remove waste water from the site." The following are five high-impact strategies to use less municipal water and produce less waste water while saving the client money :

1. Rainwater harvesting — One inch of rain on a 1,000 square-foot roof produces about 620 gallons of runoff. Capturing and re-using this runoff for irrigation, toilets and urinals, cooling towers and other non-potable uses can dramatically reduce the use of municipal water in a building. For example, at the Western Virginia Regional Jail near Roanoke, Va., harvested rainwater is used for laundry, saving an estimated 4.3 million gallons per year. In areas with consistent year-round rainfall and even in areas with dry summers, rainwater harvesting can combine with HVAC condensate recovery to meet the higher water demands for irrigation and cooling towers. Rainwater harvesting also reduces flows to storm and combined sewers.

2. HVAC condensate recovery — Warm air passing over cold heat exchanger coils in an HVAC system creates condensation on the pipes. According to The Alliance for Water Efficiency, commercial HVAC systems produce three to 10 gallons of condensate per day per 1,000 square feet of air-conditioned space.

Based on this estimate, the HVAC system at the White House (55,000 square feet according to the White House Historical Association) would produce between 30 and 100 million gallons of condensate per year (assuming HVAC is used six months of the year). Capturing and re-using this condensate can greatly reduce a buildings water demand, particularly during the summer months when water use is highest. Reusing this water on-site also keeps the water out of the sewers, reducing the strain on waste-water infrastructure.

3. High-efficiency fixtures — According to the EPA, retrofitting all U.S. houses with water-efficient fixtures would save more than three trillion gallons of water per year, enough water to supply the state of Florida. Improvements in water efficiency can come from ultra-low flush toilets, low-flow showerheads, irrigation controls or any other fixture with a lower water use than normal.

4) Geothermal heating — A study by the Pacific Institute showed that approximately 15 percent of water use in the commercial, industrial and institutional sector is for cooling. While most people think of geothermal as just an energy-saving strategy, reducing the demand on traditional heating and cooling systems will also reduce their water use. Reductions in water use for cooling can also be achieved with reflective roofs, insulation and other energy saving techniques.

5) Low impact development (LID) — LID is a set of strategies for on-lot storm water management designed to improve water quality and reduce the volume of runoff. Many of the LID strategies such as rain gardens, rainwater harvesting and bioswales can also provide amenities on the site. By reducing the quantity of storm water that leaves the site, LID reduces the need for infrastructure to address storm water. Reducing runoff is important in all areas, but particularly important in areas with combined sewers. In these areas, heavy rainfalls can cause sewer back-ups and overflows because the sewer lines are filled with storm water.



THE OPPORTUNITIES

• Five Growth Markets

David Henderson, managing director of XPV Capital Corp. in Toronto, Canada, believes that the Water Industry is currently influenced by five global mega trends. Trends causing more demand are population growth, industrialization and urbanization. Trends causing less supply are outdated and deteriorating infrastructure and the impact of climate change.

Henderson states that these five trends are obviously creating a supply-demand imbalance, which is driving up the price of water throughout the world. Recent headlines in Saudi Arabia and Canada respectively include: “Saudi Arabia Announces Over 4,000 Percent Increase in Water,” Arab News, and “Canada’s Water Rate Increases 58 percent Over Five Years,” Earth Policy Institute. So, the water paradigm has shifted from the regulatory and safety concerns of the 1970s to a 21st Century Supply-Demand Pricing Model.

Henderson and his Venture Capital firm perceive five areas of opportunity in water today:

1) **“Demand Destruction.”** This simply reduces the demand

for water. For example, XPV’s investment in Enviro Tower in Toronto retrofits cooling towers to use less water, energy and fewer chemicals. They use technologies and filtration systems instead of adding chemicals, which allows the water to be recycled many more times than before. This allows the cooling tower to operate more efficiently.

2) **Extracting products from waste water.** For every dollar spent to treat waste, up to \$10 of energy can be removed. One company is converting waste water into slow-release fertilizers, and there will be technologies extracting phosphates, methane, etc. Companies can even convert waste water into a polymer that shares the same properties as plastic.

3) **Water reuse.** Modern technologies allow you to treat polluted waters full of chemicals. These pollutants get into water streams, aquifers and the impacted water becomes unsafe to drink. Advanced water treatments can make undrinkable water drinkable again.

4) **Repairing and retrofitting the existing infrastructure.** Governments do not have the capital to build new infrastructure, so all sorts of technologies are being introduced to extend the life of treatment plants and fix leaks (It is estimated that Canada and the United States lose 40 percent of their treated water as a result of leaky pipes.) Another opportunity is in expanding water-treatment capacities without expanding the size of plants.

5) **Reducing the distribution of water.** Industries will cease discharging waste water for treatment in a plant somewhere else, and treat the water themselves on-site.

Henderson concludes that the challenge is how to transform water systems built with 19th-century technology and design into 21st-century operations. A “smart water network” will bring efficiencies to an existing infrastructure that is not currently automated but needs to be.

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• Job Creation Potential

Federal investment in America's water and wastewater infrastructure will create an estimated 20,003 to 26,669 jobs per \$1 billion of federal investment according to a report produced in July 2009 entitled Sudden Impact. The job creation findings found in Sudden Impact are in line with similar studies conducted by the Associated General Contractors of America and various federal agencies.

Federal investment in water and wastewater infrastructure will result in significant job creation in every region and state. The projected job creation per \$1 billion of federal investment on a state-by-state basis is contained in a report available from the Associated General Contractors of America. Federal investment in water and wastewater infrastructure will also create jobs in communities of every size. Assessments of water and wastewater infrastructure needs conducted by the Environmental Protection Agency, the Government Accountability Office and the Water Infrastructure Network have identified tremendous needs in our nation's largest and smallest communities with projected shortfalls in funding approaching \$500 billion over the next 20 years.

THE RETURNS

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 an 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. ^①

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is accepting applications for work on the DFW Connector project. Currently, we are seeking Carpenters, Laborers, Heavy Equipment Operators, CDL Truck Drivers and Maintenance Personnel.

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Grapevine, TX 75063**

Applications will be accepted during the following times:

Mon, Wed, Fri – 1:30 to 4:30pm

Tues, Thurs – 8:00 to 11:30am and 1:00 to 4:30pm

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