

EVERY DAY, millions of people across the U.S. simply turn on the tap to access clean water, fulfilling basic household needs from drinking and bathing to watering the lawn. Few think about what it takes to deliver that water, and even fewer know that the future of their tap-ready water is at serious risk, as the demand of a growing population meets a deteriorating, historically underfunded infrastructure. This is a crisis we cannot afford to ignore. Water is essential to life itself. Just as the human body cannot survive without drinking water, virtually every aspect of society requires water in order to function. Without it, there would be no fire protection, agriculture, manufacturing, or power grid.

As a nation, we have taken the availability of plentiful supplies of clean water for granted. Yet, aging systems are discharging billions of gallons of untreated wastewater into our surface water every year. Leaking and broken pipes waste nearly two trillion gallons of clean drinking water each year. Every two minutes, somewhere in the U.S. a significant water line ruptures, wasting this precious resource and causing severe economic losses. In the summer of 2011, for instance, the rupture of a century-old water main in the Bronx disrupted New Yorkers' morning commute, damaged two gas mains, shut down electrical service to 500 customers for several days, and put as many as 60 local businesses at risk of closing permanently.

Demand from a growing population is expected to result in water shortages in as many as 36 states by 2013. Due to their low rate of replacement, broken and leaking pipes currently result in 1.7 trillion gallons of water wasted every year. More than 20% of drinking water is lost annually, according to the Congressional Budget Office. Without renewal or replacement, water pipes that are classified as poor, very poor, or life-elapsd will grow to 44% by 2020.

The state of our water systems has earned an alarming D-minus grade from the American Society of Civil Engineers in its 2009 Report Card on Infrastructure. The fix will not come cheaply. In fact, the Environmental Protection Agency projects that as much as one trillion dollars will need to be invested over the next 20 years in order to keep clean water reliably at the tap and wastewater safely contained and treated. Already, then, the cost of not maintaining the infrastructure has come at a staggering price tag. If we fail to adopt sensible solutions now and make the investments needed to bring the infrastructure up to date, it only will grow worse.

The massive network of pipes that deliver water to taps across the U.S. spans four times the length of the National Highway System. It was laid primarily in three phases: late 1800s, 1920s, and post-World War II boom era. Most of these aging pipes are made of cast iron. Built to survive 50 to 75 years, some have been in service for more than a century and now are seriously corroded and leaking. (At least three states—South Dakota, Alaska, and Pennsylvania—still have some water mains made of wood.)

A Crisis at the Tap

BY WALTER LYNCH

"It will take all sectors working together to ensure a safe, clean, and adequate water supply not just for future generations, but for our own as well."

To some degree, the water infrastructure is a victim of its own success. Most Americans never have experienced more than a minor disruption to their water service, making it easy to take its continued delivery for granted. Moreover, because many of our water assets are buried beneath the ground, the need to invest in water and wastewater systems is less visible, and therefore less of a priority, than investing in crumbling roads and bridges.

Then, too, there is the perception that water is, and should remain, "free." After all, it is produced by nature to fill a fundamental human need. What many people fail to realize, however, is that the cost of treating and delivering that water is far from free. In fact, while water typically is the least expensive of Americans' monthly utility bills—averaging a penny a gallon—it is nearly twice as capital intensive to provide as electricity and three times as capital intensive as gas.

Until water is priced in a way that encourages wise use and reflects the true cost of delivering it, and infrastructure investment becomes a national priority, Americans will continue to take water for granted and the system that makes it so easy for them to do so will continue to deteriorate.

How does our water system work? On the surface, it seems simple enough. Untreated water is pumped through the use of pressure from an underground aquifer, river, reservoir, or other source to a treatment facility. There, it is tested and treated for quality and safety before being pumped to the distribution system that delivers it to homes, businesses, and industry.

Each of these three channels, however, needs significant capital to operate and maintain. The pumping station uses large pumps, pipes, and a power source to drive the pumps 24 hours a day, and its sophisticated equipment requires regular maintenance and upgrades. Treatment facilities must keep pace with increasingly stringent En-

vironmental Protection Agency regulations as well as the introduction of new contaminants into the water supply.

Then there is the distribution system: 700,000 miles of pipes that deliver water across vast expanses to homes, businesses, farms, industrial plants, and a multitude of other destinations. In addition to the cost of repairing, upgrading, and replacing pipes, the distribution system requires ongoing testing, as engineers run computer simulations of the hydraulic activity of the water to ensure that an adequate supply reaches its destination under the proper pressure for its intended use. (A fire hydrant, for example, requires water delivered at a higher pressure and through larger pipes than does a residential tap.)

Electricity is one of the largest recurring costs at every stage of the water system. Moreover, paying for the expertise of the hydrologists, engineers, and IT professionals who design, monitor, and protect the water system from everything from equipment failures to water-borne diseases to sabotage also must be taken into account.

With 85% of the nation's water serviced by the public sector, the burden to finance upgrades rests mainly on municipalities, local communities, and, ultimately, state and local governments. The U.S. Conference of Mayors reports that local governments will spend around \$100,000,000,000 this year on water and wastewater systems—and, according to the National League of Cities, there still will be a gap of about \$19,000,000,000 between what we need to invest and what we actually do invest to replace aging facilities that are approaching the end of their useful lives and to comply with existing and future Federal water regulations. That shortfall does not account for any growth in the drinking water demand over the next 20 years.

The Federal government has set up funds to help, such as the State Revolving Fund (1987)

that provides low-interest loans for water infrastructure upgrades to state and local governments. However, SRF, municipal bonds, and other funds available to local governments fall far short of financing all the upgrades necessary. To close the funding gap will require something more.

Public-private partnerships, in which private sector water companies assist in the design, re-building, and operation of publicly-owned water systems, are among the most viable ways for cities, towns, and communities to access private capital and industry expertise. Although it represents only 15% of the nation's water systems, the private sector has been a steward of the U.S. public water supply for 200 years, and has a long-standing record of bringing much-needed capital, efficiencies, and innovations to its municipal partnerships.

The Sustainable Water Infrastructure Investment Act of 2011, introduced in Congress in a rare show of bipartisan cooperation, is an important piece of legislation that would facilitate such public-private partnerships. Should it pass, the act will remove water and wastewater from caps (or limitations) on private investment through the use of private activity bonds, which provide low-cost financing for water and wastewater projects. This will enable local governments to tap into billions of dollars of much-needed private sector capital.

Lifting the caps (which have not been updated since they were implemented in 1986) not only would address the nation's deteriorating water and wastewater infrastructure, but would generate thousands of jobs and help stimulate the economy. According to the U.S. Conference of Mayors, \$6,000,000,000 in infrastructure investment would yield 244,000 jobs annually, and every dollar invested in water infrastructure adds \$6.35 to the national economy.

In addition to funding infrastructure up-

grades, public-private partnerships are essential to solving the overriding challenge facing the future of our water supply: there is a finite amount of source water and it needs to be used in a sustainable way. The private sector is at the forefront of new technologies that are vitally important to help the nation maximize its water resources, such as advanced metering and sensing systems to detect leaks and stop losses of treated water, water reuse (treating wastewater to a high quality for use in heating and cooling systems, irrigation, and other applications), and desalination of seawater or brackish water sources.

These and other innovations are just a few examples of the leadership and expertise the private sector can bring to the table. To solve our nation's water challenges will take a unified effort among government, businesses, and consumers. Policy changes, funding for infrastructure, development of alternative water supplies, and public education all are necessary for significant progress to occur.

There are signs that consumers have begun to recognize the need to invest in water systems. A

March 28, 2011, Gallup Poll found that Americans are more worried about water than any other environmental issue. In addition, a 2010 study by ITT Corporation found that 80% of Americans support water infrastructure reform; 29% believe the water system is approaching crisis stage. As many as three in four anticipate "direct and personal consequences" if water service is disrupted, while 63% indicate they would be willing to pay more on their monthly water bill to help fund infrastructure upgrades.

Similarly, water supply was the top environmental concern of the 700 U.S. utility leaders polled by Black & Veatch for the first time in the five years of the survey. This reveals a growing awareness within the energy industry of the relationship between water and energy issues; in other words, the fact that large amounts of electricity are required to acquire and process water, and large quantities of water are needed to produce electricity.

Cities are recognizing the need for investment in the water infrastructure and are increasing rates to help pay for them, moving closer to a pricing structure that reflects the true cost of treating and delivering water. According to Bloomberg, the cost for water service in U.S. cities has risen faster than the

overall cost of living since 2007. The Cleveland (Ohio) Water Department announced in March 2011 that it is seeking to raise its rates 82% over the next four-and-a-half years, for example, while rates for suburban users in Lancaster, Pa., look to be increasing 65%.

Finally, a two-year collaboration of U.S. businesses, farmers, environmental not-for-profits, and government agencies, under the auspices of The Johnson Foundation at Wingspread, has taken up the call for full-cost pricing as a solution to the impending freshwater crisis, saying that society no longer can afford to treat water as a "cheap, nonstrategic, and infinitely available resource."

As more consumers and government and industry leaders begin to appreciate the value of water and understand what is at stake, we have an unprecedented opportunity to confront the nation's water challenges. It will take all sectors working together to ensure a safe, clean, and adequate water supply not just for future generations, but for our own as well. The time to act is now. Failure, as they say, is not an option. ★

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