U.S. water treatment plants, storage facilities and sewer and distribution lines are crumbling more quickly than government entities can fund and implement repair and replacement projects.

By Caitlin Cunningham

infrastructure matters

Achieving sustainability via utility management practices, rates, water use and watershed protection

Original construction of most American water and wastewater infrastructure dates back to the World War II era, and a growing population, new security threats and increased accountability have utilities thinking more than ever about infrastructure management and maintenance.

"If we don't begin replacing some of that infrastructure today, you can only imagine the size of the capital investment that will be needed in the next 10, 20 or 30 years," said Mark Halleman, vice president of local services and utilities for Infrastructure Management Group, Inc. "It's truly a time bomb."

The outlook is not entirely gloom and doom, though, according to Michael Deane, associate assistant administrator for water, U.S. Environmental Protection Agency (EPA). "It's important to recognize the great job that we've done in this country. Overall, we have a drinking water and a wastewater infrastructure that's certainly one of the best in the world," Deane said. "As opposed to a crisis in infrastructure, we have a good solid infrastructure and face significant challenges in maintaining the progress we have made and making sure we continue to make progress in environmental protection and public health."

As the water and wastewater industries work to overcome these great infrastructure challenges, it is important to keep discussion of the most effective and efficient concepts, tools and funding options moving forward.

A Four-Pronged Approach

In 2006, the EPA launched its Sustainable Infrastructure for Water and Wastewater initiative, the basis of which is the idea that sustainable development practices can help meet the infrastructure needs of the current generation without compromising future generations' quality of life. The initiative promotes water and wastewater utilities' adoption of state-of-the-art management techniques, rates that reflect full service costs, efficient water use and watershed protection.

Management. The EPA and its partners have identified 10 attributes possessed by the most effectively managed water sector utilities, from product quality and financial visability to customer satisfaction and water resource adequacy.

"This is going to be a long-term, ongoing effort with our partners," Deane said, noting that the groups have made available to utilities a series of tools for helping adopt the identified attributes (www.epa.gov/waterinfrastructure/watereum.html). Asset management is a key component in achieving the 10 characteristics. At the heart of asset management efforts are long-term planning, proactive operations and maintenance, life cycle cost estimation and cost/benefit-based capital replacement plans. Urban centers and sewer collection systems are excellent candidates for putting the concept into successful practice.

"There's a lot of infrastructure in the ground that's current condition is unknown," Halleman said. "As a result, it doesn't have any earmarks in budget for renewal or replacement." This underground infrastructure—often forgotten until it breaks—will require the greatest managerial investment over the next five years, he added.

Analyzing and reducing the environmental impact of facilities and organizations, particularly via environmental management systems, can help alleviate infrastructure problems as well.

When managing infrastructure, small systems must take into account capacity development provisions under the Safe Drinking Water Act. Requirements include prioritizing system work, measuring improvements and involving stakeholders in water system capacity efforts. Finally, the EPA advises water and wastewater utilities to carefully consider their use of energy and water. Integrating energy-efficient practices into daily operations and long-term planning can significantly reduce utility spending. Plant upgrades, generators and alternative energy sources are among the most viable options.

Rates. In order to better fund infrastructure maintenance and construction work, U.S. water and wastewater utilities need to help shift the general public's belief that water is inexpensive and endlessly available.

"We're increasingly understanding, although we've always known it, that water is a very scarce and precious resource overall," Deane said. "We don't value it appropriately, and we certainly don't value from a financial standpoint the infrastructure that's necessary in the systems to deliver clean drinking water, take away and treat wastewater and manage wet-weather flows."

Americans pay less for water and wastewater services than the citizens of most other developed nations. Pricing tailored to reflect the actual costs of building, operating and maintaining systems would greatly aid utilities in keeping their infrastructure well-oiled.

"Water is a bargain," Halleman said. We as citizens will always require a high quality of water. As power and chemicals used in water treatment become more expensive and water—in certain parts of the country—becomes scarcer, the cost of water will greatly appreciate. Water rates certainly have to go up. Infrastructure needs to be repaired."

State revolving funds and various watershed resources also may help water and wastewater groups conduct required projects. For more information, visit www.epa.gov/owow/funding.html.

Water Use. Treating water as the precious resource it is will be vital to filling the U.S. water infrastructure gap.

"When [water] becomes expensive, utilities will spend more time finding lost water," Halleman said. "The average utility loses 10% of its water now. You can image if that was gasoline."

Today's average American household uses 127,400 gal of water annually, according to the American Water Works Association. The association's research, however, also indicates that the installation of water-saving features would decrease use by 30%, saving more than $4 billion per year.

Watershed Protection. Cleaner source water can make for lower treatment costs and less wear and tear on systems. Encouraging, and in some cases making mandatory, the collaboration of watershed-boundary entities to protect surface water plays an important role in preserving infrastructure. National Pollutant Discharge Elimination System permit compliance, "green" storm water management practices and water quality trading programs, for instance, contribute to improving impaired water bodies, or preventing the need for the label in the first place.

Following this four-pronged approach can help water and wastewater utilities stop the ticking of the infrastructure time bomb.

"It's very important to look at all the pillars comprehensively," Deane said. "They all have a significant role to play, and missing any one of those, we're not going to be able to achieve sustainable infrastructure for long in this country."

All industry players—from manufacturers and operators to utility managers and lawmakers—and the general public must collaborate to preserve and grow the pipelines, pumping stations, storage structures and other infrastructure elements that keep water safe and flowing. WWD

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