

WHITE PAPER

Investing in a Smart Water Infrastructure Future

Synopsis:

- **Federal and local investment in water (water and wastewater) infrastructure has long been below levels needed to meet demand and make water systems resilient to stressors like drought, floods and pandemic.**
- **Conventional upgrades of water infrastructure are expensive, disruptive and often slow.**
- **Proven digital, data-driven solutions are available to modernize water networks at lower up-front cost, lower ongoing operating cost, and with improved delivery of safe and reliable water supplies**
- **A federal policy of grants assistance that places a premium on implementation of next-generation water technologies would modernize both rural and urban water infrastructure affordably, benefitting public health, economic recovery and community access to safe water and wastewater.**

The realities of water services today, and into the future, include: staffing issues, antiquated water and wastewater infrastructure, rising water costs, increased public health concerns over lead, PFAS and other chemical contaminant in drinking water, and a changing climate that creates megadroughts and devastating floods. The Coronavirus pandemic re-enforces these challenges, vividly illustrating the essential nature of water services and the role these services provide to protect public health and support the wellbeing of health care, first responders and other front-line employees. The pandemic also imposes further stressors on outdated clean water and drinking water infrastructure due to the dramatic decline in revenues that parallel the economy's decline. We must as a nation implement effective and efficient responses to protect our water resources. The pandemic can serve as an opportunity to achieve this goal by investing in smart technologies that will respond to these and other challenges and make reliable and affordable water during times of normalcy and crisis.

Federal assistance to support the upgrade of infrastructure, including water, will put people back to work and generate improvements to systems that support improved public health and a robust and resilient economy. Our most recent economic and jobs stimulus initiatives focused on 'shovel ready' projects. Of course, this approach has merit. Yet our recent experiences demonstrated that shovel ready projects have relied on conventional technologies and processes that often failed to incorporate newer technologies that can yield powerful additional economic and health benefits.

The challenge facing the water sector is similar to the one facing the electric utility sector during the 2008-9 financial crisis. Effective grant programs authorized in the Energy Independence and Security Act of 2007 and the American Recovery and Reinvestment Act of 2009 forever transformed the electric industry's resilience, productivity and quality of service by advancing the adoption of smart grid technologies. They also created significant number of

jobs and increased the competitiveness of American industry. A similar historic opportunity now exists to modernize the nation's water infrastructure through a Smart Water Infrastructure stimulus program that would complement other investments in the nation's water resources.

Since 1972, with the enactment of the Clean Water Act, and, in 1996, through the Safe Drinking Water Act, the nation has invested billions of dollars into improving its drinking water and water quality. This has been achieved through direct grants to local agencies and, in the past four decades, through highly subsidized State Revolving Loan Fund loan assistance and innovative financing approaches, including the Water Infrastructure Finance and Innovation Act.

The federal investment, along with local governmental financing, has failed to meet the needs as documented over several years by the American Society of Engineers' Infrastructure Report Card. Such needs continue to outpace financing capacity, because of antiquated infrastructure, new mandates to address water supply protection and water quality impairments, growing demand to address disadvantaged communities' needs, and the increasing challenges associated with resiliency and its impacts to water infrastructure.

The challenge today is **how best can public policy advance the next generation of a critical public health infrastructure, while reducing the costs of providing such services?** We are entering a period of economic and technological transition that offers the chance to exploit the capabilities and benefits of the immense advances in, and accessibility to computing power and capacity; allowing our drinking water and wastewater utilities to leapfrog decades of underinvestment in these areas. We can leverage this capability and deliver a new and improved way of conducting the water sector's business and ensure affordability, public health and resiliency. The coupling of the Internet of Things and smart water technologies with the next generation of water infrastructure can improve the efficiency of operations and deliver safe and reliable water supplies.

This integration can be achieved through a new federal assistance program to support water agencies' effort to develop and implement a smart water infrastructure portfolio through:

- Digital Information:
 - Water delivery services can be made more efficient by creating data management systems that better inform water managers to understand demand and supply needs upon which the storage, treatment and conveyance of water is determined relying upon the findings of such data to justify decisions.
 - Wastewater collection and management of wastewater flows can be fine-tuned to reduce capital investments and wring improved capacity management from collection systems.
- Smart Technologies:
 - Resiliency to respond to changing local and regional climate conditions, such as reduced water losses and reuse of wastewater flows, can be achieved relying upon technologies that will improve the efficiency of physical operations
 - Through the deployment of technologies that deliver real-time data and allow for interactive decisionmaking, water and wastewater managers can implement

actions that would minimize potential system disruptions and enhance decisions that deliver economic efficiencies that address affordability needs for the delivery of services and improved public health.

- System automation and remote monitoring of water and wastewater systems' performance can deliver operational changes to improve operations management to address traditional and emerging needs, including pandemics, climate impacts and natural disasters.
- Asset management and extended lifecycles can be achieved through the use of smart technologies that can, on a real-time basis, better inform water operators on the performance of a conveyance or treatment system, for example, and how to modify management practices.

These elements offer a comprehensive approach to integrate smart water technologies into our national effort to modernize the water infrastructure needs of municipal, industrial, agricultural, and ecosystems. It will deliver a critical infrastructure for public health and robust economic activity and address the growing affordability needs of communities throughout rural and urban America. It will position the nation to address the demands imposed by antiquated systems, stringent water quality and drinking water standards, legacy contaminants, resiliency, and disadvantaged communities' needs, while ensuring continued progress of an improved quality of life in the decades ahead.