



The New Wave of Water Innovation

May 2015



The New Wave of Water Innovation

Water is essential for everything we do. Without it we can't grow food, clean our clothes, put out fires, produce life-saving medicines, or keep businesses open. After working around the clock for decades, water infrastructure is aging and in need of investment. And as changing climate patterns intensify storms, drought, rising sea levels, and flooding, water systems face stresses that their 20th-century builders never anticipated.

We must make investment in water infrastructure a top priority. Rebuilding and modernizing massive water systems offer a once-in-a-lifetime opportunity to chart a sustainable, prosperous course for the nation. Around the country, water agencies, business leaders, and communities are meeting the challenge and implementing ingenious and creative solutions. Water utilities do more than provide an essential 24/7 service—they also serve as economic anchors, environmental stewards, and good community partners.

This briefing paper, issued by the Value of Water Coalition, spotlights innovative solutions to the nation's growing water challenges. Through capital investments, technological innovations, creative financing tools, and cross-sector partnerships, water leaders are building stronger communities and a stronger America.

Building a “Green City by a Blue Lake” Cleveland, Ohio

Lake Erie and its tributaries are a signature asset in Greater Cleveland, driving economic growth and shaping the identity of the region. The 1969 fire of the Cuyahoga River shocked the nation, and though it was only one of 13 times the river caught fire, it brought into bold relief the threat to water supplies and the urgent need for clean water investments. Since then, the Cleveland region has made remarkable progress toward building a green city by a blue lake. It’s an inspiring lesson in how investments in wastewater infrastructure can restore, conserve, and protect even the most fragile waterways, and in so doing enhance the natural environment, the local economy, and community vitality.

Central to the region’s clean water transformation is the Northeast Ohio Regional Sewer District, established in 1972. The District oversees *Project Clean Lake*, which is making strides towards reducing the amount of polluted water discharged into Lake Erie—the source of drinking water for 1.4 million Ohioans. The \$3 billion initiative includes construction of large-scale tunnels, treatment-plant improvements, and green infrastructure projects through 2035 to reduce overflows from aging sewer systems. The District’s operations and capital plan investments overall will contribute an estimated \$6 billion to the region over the next decade, supporting nearly 4,000 jobs.

The District has forged partnerships with neighborhood, business, and government leaders to make sure its capital investments deliver economic and social dividends to the communities it serves. For example, the District has worked with local governments in its service area to transform vacant lots into green infrastructure projects. This revitalizes

Northeast Ohio Regional Sewer District’s Westerly Wastewater Treatment Plant cleans water before it’s returned to Lake Erie. Photo Credit: John Quinn



distressed properties while managing stormwater to help reduce sewer overflows. Green infrastructure projects like this have the potential to create more than \$23 million in economic activity and more than 200 jobs.

It’s fitting that Cleveland Mayor Frank Jackson has made 2015 the Year of Clean Water. Thanks to the prudent clean water investments spearheaded by the Northeast Ohio Regional Sewer District and environmental partners, the region is celebrating and reaffirming its commitment to their valuable waterways.

“”

Water is such a valuable environmental and economic resource for our city, and we look forward to making great progress in 2015.

—Frank Jackson, Mayor of Cleveland

Being a Good Neighbor San Francisco Public Utilities Commission

San Francisco is a tale of two cities. Vast numbers of people and businesses are moving in, driving stunning economic growth and prosperity. The highest-earning households had incomes of at least \$423,000 in 2013, higher by far than in any other big city in the U.S. At the same time, San Francisco has the nation’s second largest income gap (after Atlanta) between the wealthy and the poor.

It’s a tale of two cities in another way. A world-class metropolis, ground zero for the tech economy, sits atop brick sewers that date back to the Gold Rush.

Enter the San Francisco Public Utilities Commission (SFPUC), which provides drinking water, wastewater, and municipal power services. The agency has long recognized that 21st-century water infrastructure is key to the city’s continued growth and competitiveness. The agency also recognizes that by balancing economic, environmental, and social equity goals, it can serve as a catalyst to:

- Revitalize low-income neighborhoods such as Bayview-Hunters Point;
- Advance urban agriculture and sustainable land use by partnering with community organizations to remove, and green up, 13,000 square feet of concrete sidewalks, and construct three urban agriculture sites; and

- Work with teachers in the school district to educate 27,000 students who are the next generation of environmental stewards.

The agency's \$4.6 billion upgrade of the water system incorporated one of the largest project labor agreements in the country. It held construction projects over \$5 million to prevailing wages and local workforce and apprenticeship goals. Additionally, the agency has opened contracting opportunities to a broader group of local businesses by debundling contracts and establishing a Contractors Assistance Center, which provides local and small businesses with tools, resources, and technical assistance to compete for, and perform on, SFPUC contracts.

As the agency begins a 20-year, multibillion-dollar sewer upgrade, it is committed to building on this success. A priority for the sewer capital program is rebuilding the largest wastewater treatment plant, in the heart of the low-income Bayview-Hunters Point neighborhood. As part of the rebuild, the SFPUC is engaging community partners to make physical and programmatic improvements in the facility and develop a thriving community center.

The SFPUC also strives to leverage partnerships with private-sector firms to embed community benefits commitments into professional service and procurement contracts over \$5 million. To date, these efforts have leveraged \$6 million in financial contributions and volunteer hours to local schools.

““

With its visionary approach, the SFPUC is strengthening our communities while building infrastructure that will serve generations to come. This is a great model and will leave a strong legacy.

—Fred Blackwell, CEO, San Francisco Foundation

SFPUC worker at the Southeast Treatment Plant in the Bayview-Hunters Point neighborhood.



Creating a Tech Hub for Advanced Water Solutions The Twin Cities, Minnesota

Water scarcity is one of the biggest challenges of the 21st century, affecting every continent and nearly half the world's population. About 1.2 billion people, from Texas and California to sub-Saharan Africa, live in areas without enough fresh-water supplies. About 1.6 billion more live in places without the infrastructure to collect and distribute clean water and safely remove and treat wastewater. Even regions that seem awash in freshwater—like Minnesota, the Land of 10,000 Lakes and lots of snow—are at risk of water scarcity, as groundwater sources are depleted faster than they can be replenished.

Cutting-edge solutions are critical for making clean water available wherever it is needed and for better protecting and managing water resources while safeguarding the environment. The Twin Cities region of Minnesota is emerging as a leader in developing advanced technology to ensure that water is available, affordable, and accessible in the face of population growth, climate change, and the challenges of aging infrastructure. The region is home to many of the world's largest, most innovative water technology providers. With more than \$729 million in foreign sales in 2012, Minnesota ranks among the top 10 U.S. exporters of water technologies. Nearly 16,000 people work in the sector statewide.

Dow Water and Process Solutions, an anchor company in the Twin Cities region, is a leading supplier of filtration, separation, and purification technologies. The company's more than 1,500 technology-based solutions help produce pure water for manufacturing, eliminate impurities from chemical processes, conserve water through reuse and recycling, and bring drinking water to communities in short supply. Dow is a key partner in the Carlsbad Desalination Project in Southern California, which is building the Western Hemisphere's largest, most energy-efficient desalination plant to turn seawater into high-quality water. Through reverse osmosis, the \$1 billion plant will produce more than 50 million gallons of drinking water daily and provide the region with a locally controlled, drought-proof water supply now and for future generations.

Water industry leaders, municipal and state officials, and researchers at the University of Minnesota are now taking action to position the Twin Cities as a global powerhouse for water innovation. They are undertaking a multi-sector strategy to capitalize on the region's well-established and diverse water technology industry. As the cluster organizes, leaders are coordinating to attract businesses, talent, and capital to the region, spur startups and new partnerships, and improve processes for regulatory approval.

““

As we move toward a circular economy based on virtually no waste, with raw materials continually recycled and reused, innovations in water treatment technologies are an essential piece of the puzzle. They will be key in helping solve our planet's water supply challenges.

—Snehal Desai, Global Business Director, Dow Water and Process Solutions

Recovering Resources, Transforming Communities Metropolitan Water Reclamation District of Greater Chicago

Reclaiming and reusing water is an imperative in the face of a growing national population and the challenges posed by a changing climate. Greater Chicago is leading the way through bold strategies that utilize public-private partnerships and deliver returns on investments for area residents. In the process, the region has created a model for redefining the wastewater industry as an enterprise in resource recovery and environmental stewardship.

This philosophy is evident in the very name of the agency responsible for treating the wastewater of 10.4 million people: the Metropolitan Water Reclamation District of Greater Chicago (MWRD).

The commitment to reclamation has a complicated backstory. Illinois' diversion of water from Lake Michigan has generated litigation and controversy among the Great Lakes states for a century, leading to a patchwork of laws, regulations, and agreements along with recognition of the need for new, smarter approaches to managing essential water supplies. The MWRD's 2015 strategic plan includes a goal to pursue the recovery of natural resources through technological and infrastructure solutions that provide environmental and financial benefits.

For example, the MWRD has contracted with Black & Veatch and Ostara Nutrient Recovery Technologies to design and build a nutrient recovery system at the Stickney Water Reclamation Plant, the largest facility of its kind in the world. The system will improve quality of local freshwaters and produce revenues for the MWRD by extracting phosphorous and nitrogen from waste streams so they can be converted into commercial-grade fertilizer and sold on the market.

In another forward-looking initiative, the MWRD has partnered with Illinois American Water, the largest investor-owned water utility in the state, to reclaim and distribute wastewater to large water users, including manufacturing plants. Once fully operational, this water reuse project will significantly reduce freshwater withdrawals from the Great Lakes while continuing to meet the water supply needs of current customers. This public-private partnership solves the challenge of how to finance large infrastructure projects. Illinois American Water will construct the distribution infrastructure, develop the customer base, buy water from the MWRD, and resell it.

““

The partnership between the Metropolitan Water Reclamation District and Illinois American Water extends beyond conventional thinking and takes historic steps to recognize water as a beneficial resource for agriculture, industry, residents of Cook County, and the utility itself. Other cities are encouraged to adopt this perspective and work towards water recovery and reuse.

—Mariyana Spyropoulos, President, Metropolitan Water Reclamation District of Greater Chicago

MWRD's Stickney Water Reclamation Plant is the largest nutrient recovery facility of its kind in the world.



Cleaning Water Block by Block

Philadelphia Water

Like cities and regions nationwide, Philadelphia is confronting complex environmental, demographic, and economic challenges while working to meet the public's expectations for affordable clean water, effective wastewater management, and flood protection. These challenges are compounded by some of the oldest infrastructure in America—some of the city's underground pipes were built in the 19th century. That's why Philadelphia will invest \$1.7 billion in capital projects in the next six years. Philadelphia Water is taking a unique approach to investment, aiming to be a model 21st-century utility.

A keystone strategy is the *Green City, Clean Water* plan, which will build green infrastructure block by block to capture rain and melted snow and filter polluted runoff before it flows into sewers. The idea is to turn rainwater into a resource to enhance neighborhoods and business corridors, by recycling and reusing it rather than piping it into already stressed streams and rivers. *Green City, Clean Water* illustrates how the right mix of infrastructure investments, conceived in collaboration with communities, can re-energize distressed neighborhoods. Polluted, buried, and neglected creeks and streams are disproportionately located in low-income neighborhoods. By cleaning and greening them, transforming them into open spaces, and building other green amenities, Philadelphia Water hopes to make the whole city a safer, more attractive place to live, play, work, and invest.

This initiative is just one example of Philadelphia Water's investments in new approaches to maximize value for customers. The agency looks for ways to keep costs down, improve service levels to customers, and strengthen the economy. In another example, Philadelphia is pursuing strategies to make all of its wastewater treatment plants Net Zero Energy facilities.

Philadelphia Water's infrastructure investments protect the environment and promote economic vitality.



World-class cities need world-class water infrastructure. In Philadelphia we're making the needed and, frankly, historic investments, and doing so with an eye on transforming the urban landscape, addressing longstanding issues of environmental justice, generating jobs, and creating the most vibrant and sustainable city in America.

—Steven Wray, Executive Director, Economy League of Greater Philadelphia

Conclusion

The United States Conference of Mayors estimates that \$4.8 trillion in capital investment will be needed over the next 20 years to repair water and wastewater systems and maintain current levels of service. It's a daunting task, but it also represents an enormous opportunity.

As the water sector builds innovative 21st-century infrastructure with integrated technologies, water leaders are putting capital investments to work to spur positive change in areas as diverse as climate resiliency, resource recovery, neighborhood revitalization, and job creation.

Water providers are on the front lines of making a better community and economy for all. What is more essential than that?

Our Members

The Value of Water Coalition is fortunate to have a diverse base of members who provide financial support to advance our mission of helping the nation understand that water is essential, reliable, and invaluable.

With gratitude for their leadership, we recognize:

Champion Circle

American Water
American Water Works Association
Black & Veatch
CH2M HILL
MWH Global
United Water
Veolia
Water Environment Federation
Xylem

Leader Circle

Association of Metropolitan Water Agencies
DC Water
Dow Chemical Company
Hampton Roads Sanitation District
Metropolitan Sewer District of Greater Cincinnati
Metropolitan Water Reclamation District of Greater Chicago
National Association of Clean Water Agencies
National Association of Water Companies
Northeast Ohio Regional Sewer District
Philadelphia Water Department
San Francisco Public Utilities Commission

Ally Circle

Alexandria Renew Enterprises
Camden County Municipal Utilities Authority
Hazen & Sawyer
Kansas City Water Services
Los Angeles Bureau of Sanitation

The U.S. Water Alliance provides project and fiscal management support to the Value of Water Coalition.

**Building national will for investment in water
infrastructure and water resources**



To learn more, visit us at:

www.thevalueofwater.org

 [/thevalueofwater](https://www.facebook.com/thevalueofwater)

 [@TheValueofWater](https://twitter.com/TheValueofWater)