

Great Water Cities: Reflections on Leadership in Urban Water Management

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Water always has been central to human development. It is essential for life and prosperity and plays a unique role in many cultures. Access to water to meet public, industrial, or transportation needs has influenced where people have settled and has shaped communities. Industrialized countries have made huge investments in urban water infrastructure and institutions. Improving the quality of life in developing countries will require major investments – of both financial resources and ingenuity – in water.

There are many challenges for today's water profession, sector, and institutions. In the developed world these include financial pressures and competing priorities, such as the need to meet increasingly stringent regulations and also the need to replace or upgrade aging infrastructure. In other parts of the world, cities are grappling with questions of basic services. Climate change and population growth and shifts are adding both urgency and uncertainty. Despite these obvious difficulties, I would argue that this is a wonderful time to work in water. New thinking and practices are emerging that point to more sustainable approaches to urban water management. These can be relevant for both communities with legacy water infrastructure and those seeking to meet new demands or the needs of previously unserved or underserved populations.

Diverse cities around the globe are leading the way by making water a central priority and showing how it can be managed in a way that is not just more sustainable, but provides benefits ranging from livability to economic vitality and overall resilience. At the Water Environment Federation (Alexandria, Va.) we have begun using the term "Great Water Cities" to describe these leaders and the examples they provide. We believe there are lessons that can be learned from these innovators that can help others get on the path to being a Great Water City, and to that end, are convening a series of conversations to foster dialogue and identify effective and enabling practices.

Smarter Urban Water Management

Water researchers and managers from various parts of the world are defining the principles of smarter or more sustainable urban water management and how these can be more widely adopted and integrated with conventional or legacy systems. Australian researchers have described the development

of urban water management as being in a series of stages ranging from the basic provision of water supply, to the development of sewer and drainage systems, to the protection of surface waterbodies. They also have described a vision for a future Water Sensitive City.¹ In such cities planning for water would be central to urban design; water management (potable water, wastewater, stormwater, and surface water) would be fully integrated and flexible, and the built environment would both support water conservation and mimic natural systems and processes. While the full execution of these principles at a city scale still is providing fodder for academic research, there already are real-life examples of cities that are applying them. The city-state of Singapore literally has reinvented its water future. Cities such as Philadelphia are investing in ambitious plans to use green infrastructure to manage stormwater and decrease combined sewer overflows. And in Hamburg, Germany, a housing development where water will be recycled and energy and heat recovered onsite already is under construction.

Insights from Early Adopters

Discussions with water leaders have taught me that there are several common attributes of water management in a Great Water City:

Vision – Leaders are defining an exciting future water vision that the public can understand and support. For Singapore the vision was to become water-independent by 2060. In the U.S., cities such as Philadelphia, Cleveland, and Milwaukee are “branding” their green infrastructure programs and promoting the benefits they will provide, such as more effective water quality management and flood control. In addition, the use of these practices also improves the urban environment and can enhance property values.

Leadership – Moving from great visions into action requires leaders who are willing to be champions. Credit for the installation of the Marina Barrage in Singapore is given to the former Prime Minister Lee Kuan Yew, who articulated a vision nearly two decades ago for creating a reservoir by damming the mouth of the Marina Channel to keep saltwater out and control flooding. This reservoir now can supply 10% of Singapore’s needs. In the U.S., water utility leaders often cite the presence a dynamic political leader, typically a mayor who “gets” water, as being a critical factor in groundbreaking investments or programs. These elected officials frequently champion long-term investment, for which the greatest beneficiaries will be future rather than current voters.

Innovation – Early adopters harness innovation. On a national level, countries such as Israel and Singapore have turned a water challenge into an opportunity by embracing innovation. In the U.S. some regions, cities, and entities are taking a similar approach and investing in research and ingenuity. Individual agencies and utilities literally are transforming their operations from waste management entities to managers of valuable resources that generate useful products such as energy, fertilizers, and recovered water. While these activities may not be new – biogas was used in Victorian times to power street lamps in Britain, and Thames Water in the U.K. reports that it has been generating electricity from wastewater for more than 50 years – their scale and integration into the philosophy of our sector represent a sea change.

Adaptability – Leaders are looking for ideas from other sectors and other parts of the world and adapting these in a flexible way. We also are seeing the integration of decentralized approaches into centralized systems. Great Water Cities are combining what at one time seemed almost philosophically different approaches in ways that save energy and water.

Community Engagement – Leading organizations’ engineers increasingly are engaging with their customers. As Sue Murphy, CEO of the Water Corporation of Western Australia, puts it, today’s water managers need to “listen more” rather than leading with the solutions first. By using this approach and working diligently in the community, the Water Corporation has been able to build support for water reuse and make great strides in conservation. With respect to the latter, Ms. Murphy credits the public with setting more aggressive goals than her agency would have proposed.

Reflect and Take the Long View – Knowing the life of their systems, sector leaders feel the responsibility of the decisions being made today. Christian Günner, Director of Planning for Hamburg Water, recently reflected on his organization’s practice of considering a system life of 77 years when making infrastructure decisions. Other utility leaders stress the need to develop flexible systems. Otherwise, given the pace of innovation, changing community needs, and uncertainty of climate change, we risk investing in costly “white elephants.” Henk Ovink, former director of the Netherlands Office of Spatial Planning and Water Management, recently urged U.S. water professionals to take the time to think before replacing disaster-damaged infrastructure and resist the urge to recreate what had existed before.

Resilient Thinking – In the face of more extreme weather events – from droughts to floods – leading cities are incorporating resilience into their water management approaches. With respect to flooding risk, there is intense interest in drawing on the experience of the Netherlands, which has learned that “build higher dykes” is an unsustainable strategy. The vocabulary of its new approach – “living with water” and “room for the river” readily evokes its philosophy. In the U.S., the ambitious and visionary Greater New Orleans Urban Water Plan draws on extensive consultations with Dutch urban planners and water managers and suggests a potential pathway forward for the city. As Cedric Grant, Executive Director of the Sewerage and Water Board of New Orleans noted recently, “We can’t build our way out of this.”

Investment – Investment in water infrastructure drives growth and creates jobs, but the cost of providing the improvements required in U.S. cities is enormous. In the Washington, D.C., for example, \$2.6 billion is being invested in combined sewer overflow control, \$950 million to achieve the nutrient reductions mandated to help restore the Chesapeake Bay, and \$400 million to upgrade solids management systems. The cost of implementing the ambitious New Orleans urban water plan has been estimated at \$6.3 billion. So we will be looking for innovative financing approaches and partnerships from our Great Water Cities. In a recent step, DC Water issued \$350 million in taxable, “certified” green century bonds. This is the first municipal century bond issued by a U.S. water or wastewater utility. The utility reports it is financing a portion of the construction costs of its combined sewer overflow infrastructure with a century bond to “better match the useful life of the tunnel systems – expected to perform for at least 100 years.”

I feel justified in my optimism that the water profession will develop the sustainable solutions to meet urban water needs. There certainly will be a continuing need for ingenuity and creativity. Based on predictions, 70% of the world’s population will be urban dwellers by 2050². Urban growth is most rapid in the developing world, where cities gain an average of 5 million residents each month.³ We must hope that there will be future Great Water Cities among these growing ranks.

¹ Brown, Rebekah; Keath, Nina; and Wong, Tony (2008). “Transitioning to Water Sensitive Cities: Historical, Current and Future Transition States,” *11th International Conference on Urban Drainage*. Madrid and London: International Association for Hydro-Environment Engineering and Research and the International Water Association.

² United Nations Human Settlements Programme (2010). *State of the World's Cities 2010/11: Cities for All: Bridging the Urban Divide*. London: Earthscan.

³ UN-Water Decade Programme on Advocacy and Communication. (2010). *Water and Cities Facts and Figures*. Zaragoza, Spain: UN-Water Decade Programme on Advocacy and Communication.