

New Trends On Tap For The Urban Water Industry

Tools such as automatic self-cleaning screen filters and other elements in multistage water treatment systems help the urban water industry meet challenges of increased demand.

by Jim Lauria



Figure 1: The Bank of America's LEED Platinum headquarters in New York City features rainwater harvesting technology. The concept can be adopted for buildings ranging from luxury high-rises to humble urban apartments to reduce pressure on both drinking water and wastewater systems.

For the first time in history, more than half of the world's population lives in urban areas, and the United Nations Population Fund projects that in 20 years, 60% of the mushrooming global population will live in cities. That puts unprecedented pressure on urban water supplies — both clean and wastewater — to operate efficiently and with as small an environmen-

tal footprint as possible. In short, overstretched budgets in 21st-century cities will have to show a high return on investment, while water treatment systems operating in strained urban ecosystems will need to consider a positive return on environment.

Some outstanding projects offer a peek into the future of urban water. At the top of the list is Singapore's NEWater treatment system, which processes wastewater for reuse throughout the bustling city-state. The water is treated to exceptionally high quality — in fact, not only is a portion of the treated effluent blended with fresh water for toilet-to-tap use, but NEWater's treated water is also prized by silicon chip fabricators, which recognize the value of water that does not require extensive (and expensive) additional treatment for some of industry's most delicate applications.

Efficient, Decentralized Treatment

The NEWater system reflects an additional trend — the establishment of decentralized water treatment systems. The megalopolis of today and tomorrow sprawls for miles in every direction. Retrofitting cities with massive delivery systems from central systems is unfeasible, so regional treatment plants will become increasingly important.

Those compact treatment plants will have to operate with great energy efficiency, as they will be competing for increasingly expensive power with swelling populations and their improving, energy-intensive standards of living. The plants scattered throughout urban environments will also need to minimize their use of chemicals — not just to lower operating costs and minimize pollution through wastewater, but also to minimize the amount of chemical that must be moved,



Figure 2: This drinking water treatment plant uses automatic self-cleaning screen filters to remove suspended solids to improve the efficiency of membrane purification, for a compact physical footprint as well as a lighter environmental footprint.

stored, and handled in crowded urban environments.

Multistage treatment systems, designed so each step is optimized to make the others more efficient and effective, will become increasingly refined and increasingly popular. Linking the elements with smart controllers allows information to flow through sensing, feedback, and feed-forward systems. The result is greater efficiency throughout the water treatment system, better quality control throughout the process, and peace of mind for operators and downstream water users.



Figure 3: Removing suspended solids at the point of entry of domestic water reduces plugged aerators, showers, and toilets in high-rises, and protects delicate medical machinery and patients in healthcare facilities.

Minimal Wastewater

Reducing wastewater is also vital to safeguard the environment and protect cities' wastewater treatment capabilities from being overwhelmed. Conservation efforts will be absolutely vital to the survival of cities, and steps such as reducing blow-down in industrial cooling towers or minimizing backflush water in water treatment plants will play important roles in reducing water use.

At the Beijing Olympic Village, more than 28 million gallons of wastewater per day are treated and applied to landscaping for cost-effective urban beautification that also reduces pressure on the massive city's wastewater treatment and conveyance infrastructure.

Harvesting Rainwater

Rainwater harvesting will play a pivotal role in tomorrow's cities. Rain currently provides an obvious but underused source of water — it literally falls from the heavens to the point of use, without costly conveyance and management.

water.

On a grand scale, the Bank of America LEED (Lead In Energy And Environmental Design) Platinum building, in New York City, has installed a rainwater harvesting system that supplies water to irrigate rooftop and indoor gardens and flush toilets throughout the 58-story building. Filtration and disinfection stations on four levels and a 298,000-gallon rainwater storage system in the basement not only dramatically reduce the building's draw on the New York City domestic water supply but also eliminate the discharge of millions of gallons of storm water into the city's sewer system.

Minimizing storm water discharge is a huge benefit of rainwater capture. As cities grow, so do impermeable surfaces, and in turn, so does the pressure on storm drain and sewer systems to safely handle even relatively minor storm events. Combined sewer overflows sweep untold amounts of pollution to rivers, lakes, and oceans when volumes overwhelm treatment



Figure 4: Filtering solids before ultraviolet (UV) purification keeps lenses clear, aids transmission of UV light, and minimizes shadowing, helping UV purification systems operate more efficaciously and cost-effectively.

plants — and growing populations will only make those events more commonplace.

Point-Of-Entry Filtration

The push to install new water delivery systems to follow spreading urban boundaries will also stretch maintenance budgets beyond their limits, helping ensure that billions of urban dwellers will be forced to rely on aging water mains. Expect point-of-entry and point-of-use filtration to gain prominence as urbanites treat water carrying sediment from pipes that date back years or even centuries.

Such point-of-entry systems have been proven in cities across the United States, where they are fast becoming a standard in luxury high-rises as well as in hospitals and healthcare facilities, where the quality of domestic water supplies can be a matter of life or death. For example, automatic self-cleaning screen filters at the domestic water supply's point of entry remove suspended solids and regularly remove filter cake, preventing the buildup of sediment that can become a breeding ground for pathogens such as Legionella.

Urban water treatment is not only a matter of survival — it is also a factor in helping keep cities vibrant, fun places to live, work, and play. New York City's new Yankee Stadium is a case in point. The old stadium faced continual challenges with sediment-laden water that plugged toilet flushometers and caused fail-



Figure 5: Automatic self-cleaning screen filters allow this Arizona city to improve yield and reduce operating costs while treating a brackish well to supply drinking water to its growing population.

ures in the restrooms, ruining the ballgame experience for even the most loyal fans. Point-of-entry filtration has eliminated those problems, making Yankee games a delight for fans and maintenance staff alike.

From penthouses to tenements, from

entertainment to survival, from ultrapure water to wastewater, urban water systems will be under extraordinary pressure as the world's cities continue to

grow. Using ingenuity and tools like automatic self-cleaning screen filters and other elements in multi-stage water treatment systems, the urban water industry will be up to the challenges posed by skyrocketing demand in close quarters. ■



Figure 6: Wastewater treatment will be a vital element in supplying water for growing cities.



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