

the NEWS

Exploring Water Reuse, Reconsidering Water Filtration

Making maximum use of a finite resource



PACKAGED SYSTEM: The Aquanomix packaged rainwater reuse system provides a customizable, pre-engineered solution that integrates all the necessary mechanical equipment, sensors, water treatment, and controls to make rainwater fit for reuse.



Greg Mazurkiewicz

The recent severe drought in California that led to water rationing, followed by the Flint, Michigan, water crisis due to lead in the water supply, has emphasized the vital importance of water as a natural resource. When considering energy and water conservation, the U.S. can develop alternative energy sources but not alternative water sources.

In light of this, rainwater reuse systems and water filtration are two subjects that deserve a closer look. Richard Gerbe and Anthony Sannazzaro, cofounders of [HIGHMARK](#), New York City, which operates multiple divisions focusing on HVAC, energy services, and water management, discussed these issues with The NEWS.

USING WATER WISELY

“Just 2.5 percent of the world’s water is fresh, and only 1 percent of that fresh water is accessible,” said Gerbe. “It’s very important for us to conserve this resource. It’s important to design systems not only as energy efficiently as possible but also as water efficiently as possible.”

“From a macroscopic view, this resource is limited,” said Sannazzaro, and the population is increasing. “We need water for life,” he said. “Without water, life is unsustainable.”

As Americans we’ve become somewhat spoiled, said Gerbe. “Water use per capita in the U.S. is considerably higher than anywhere else in the world.”

However, at present, what’s driving water reuse and water conservation in the U.S. is Leadership in Energy and Environmental Design (LEED) and sustainability goals, Gerbe noted.

“In California they’re looking at it differently because they just don’t have enough water,” said Sannazzaro. “They’re looking at water efficiency.”

But, a factor that could change the outlook in the U.S. is that the cost of water is going up. “Here in the Northeast we’re seeing year over year increases in the cost of water in the double digits,” said Gerbe. “The cost of water is outpacing inflation”

So, in the not too distant future, “the cost of water will come into economic play,” Sannazzaro stated. In the Southeast and the Southwest, “the cost of water is growing at an even faster rate, considerably faster than electrical costs. So I think there’s going to be a shift in the next few years to put even more emphasis on conserving water and using it in a more thoughtful manner.”

When implementing a rainwater reuse system, the first concern is what’s inside the water, said Gerbe. You must analyze where the water is coming from and design a system to treat what is in that water.

At the basic level, you would have a system that does both filtering and disinfecting of the water, Sannazzaro said. “If you’re expecting fertilizers to be in the water, for instance, and you’re going to use the water in a cooling tower, it would be very important to make sure you’re not introducing biological contaminants into the cooling tower.”

In the past, rainwater reuse systems got a bad reputation because they were very simple, said Gerbe. They basically stored the rainwater in large tanks and the water was used without paying attention to water quality. If this water was fed into evaporative cooling systems, it would lead to scaling issues and biofouling.

“If we’re designing a rainwater reuse system, 90 percent of the time we’ll use filtration and UV for disinfection to maintain biological levels and ensure there’s no growth,” Gerbe said. “UV is the safest and most effective way to disinfect.”

A PACKAGED RAINWATER REUSE SYSTEM

Gerbe and Sannazzaro noted that [Aquanomix](#), Davidson, N.C., provides a packaged rainwater reuse system that provides a customizable, pre-engineered solution that includes the necessary mechanical equipment, sensors, water treatment, and controls to not only make rainwater fit for reuse but also intelligently control stormwater.

“The market we see as the most economical and the best payback for these systems is condenser water,” said Gerbe. “Second is landscape and third is sanitary water.” Other miscellaneous applications for rainwater reuse can include vehicle washing.

Sannazzaro also pointed out, “Combined sewer overflows and stormwater control is a major problem in many of the U.S.’s older cities, like New York City, Philadelphia, and Washington, D.C. Basically, the sewers that transport stormwater are combined with the sewers that transport waste. When it rains, the water treatment plants cannot handle the surge of water and they ‘overflow’ into rivers and lakes. This process dumps raw sewage into our lakes and rivers. It’s a health hazard and it’s also against the law, costing cities hundreds of millions per year. By capturing rainwater and using it in another process that releases it back into the sewers at a slower rate, or not at all, we can limit the occurrence of these combined sewer overflows.”

Installing a rainwater reuse system also provides the user with LEED Version 4 credits. Under the category of sustainable sites, there is a rainwater management subcategory that offers a possible three points. Under the water efficiency category, there is both an indoor water use reduction subcategory that offers a possible six points and a cooling tower water use subcategory that offers two points. Finally, there is an innovation category that offers one or two points.

NEED FOR BETTER FILTRATION

“Condenser water filtration needs to be improved across the board,” Gerbe said.

“Condenser water equipment in existing buildings tends to require a lot of maintenance and what we often find is the systems are somewhat ignored. Because maintenance is not kept up, water quality from a filtration perspective starts to decline. Generally, we feel that you need to improve the level of filtration and ensure the systems are kept up to date and they’re being maintained.”

Sannazzaro said, “There’s a lot of emphasis put on chemical treatment in these systems and filtration is overlooked because the impetus is on biological control, but without proper filtration, you’re offering up food to biologicals to let them grow and enabling sediment in the cooling tower basin, which provides the biologicals a place to hide and shield themselves from the chemicals. And once you have a biological or a biofilm, it’s very difficult to get rid of it.”

“You really need to look at the type of cooling tower, the style of cooling tower, the basin design, and use filtration systems that ensure you get no stagnation inside the cooling tower and that essentially kick up the dirt and get that dirt out of the system,” said Gerbe.

Summing up the need for water conservation, water reuse, and water purity, Gerbe said, “The trend of increasing water cost, increasing population and increasing water consumption, and drought across the U.S. is an important issue. And the resiliency of water systems needs to be considered and part of the conversation today.”

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