

Better Ways to Fill the Bottle

Water and beverage sectors collaborate to satisfy industry's thirst for reuse

By Justin Jacques

More than 300,000 Olympic-sized swimming pools. Enough to grow approximately 7.5 billion ears

of corn. Roughly 375 full glasses for each of Earth's 8 billion people. More than 720 billion L (190 billion gal) of water.

That is the ballpark

estimate for the beverage industry's water consumption in 2022, according to the latest global benchmarks from the Beverage Industry Environmental Roundtable

(BIER; St. Paul, Minnesota), a global coalition of beverage producers focusing on ways to make the industry eco-friendlier. This estimate notably represents only



In a market increasingly shaped by consumers' preference for environmental sustainability, better ways to conserve water are in high demand throughout the notoriously thirsty beverage industry. As part of the U.S. Environmental Protection Agency's National Water Reuse Action Plan, a broad coalition of water professionals, beverage manufacturers, and regulators are working to address obstacles to water reuse in the beverage sector. Getty

those processes that occur inside the fence of beverage manufactories such as ingredient processing, cleaning bottles and equipment, and machinery cooling — it does not cover the water used to produce ingredients such as sugar, hops, or other crops critical to the industry’s daily operations.

As the world’s freshwater resources face increasing stress, fostering water reuse practices in the beverage industry is becoming an existential imperative. To that end, new collaboration among the water sector, beverage manufacturers, and regulators is attempting to develop a path forward for water reuse in the beverage industry. Their work, spearheaded by the U.S. Environmental Protection Agency (EPA) and coordinated by global engineering firm GHD (Phoenix), has the potential to make the world’s favorite libations more sustainable in an increasingly water-conscious world.

“There are many opportunities for water reuse across the board in industrial sectors, but what makes the beverage industry unique is that without sufficient water, beverage companies cannot produce their products,” said Holly Churman, GHD Water Treatment and Desalination Service Line Leader and one of the lead authors of a new white paper presenting the partnership’s preliminary findings. “What we were trying to accomplish in this paper was to see what practical and actionable steps we could take to really move the needle in the next couple of years.”

An Industry Ripe for Reuse

Representatives from

10 organizations, including EPA, GHD, BIER, PepsiCo (Harrison, New York), Brown-Forman (Louisville, Kentucky), the WaterReuse Association (Alexandria, Virginia), and the Water Environment Federation (WEF; Alexandria, Virginia) Industrial Water Community, worked together for approximately 18 months to study obstacles inhibiting reuse in the beverage industry. Two important takeaways quickly emerged as the knowledge-sharing process began.

First, the business case for pursuing reuse is perhaps just as persuasive as the environmental case. Regulatory compliance costs related to discharge quality often represent a considerable expense at industrial facilities of all kinds, which can be downsized with proper reuse infrastructure in place. Particularly in water-scarce areas, costs for local water withdrawals also are increasing consistently. Authors also note that the composition and volume of beverage-industry wastewater often is more predictable — and thus, more easily treatable — than other types of industrial wastewater because it results from processes that use tightly controlled quantities of ingredients and chemicals. Finally, a growing body of market research suggests that when customers perceive a company as wasteful with water, profits tend to suffer — particularly in the age of social media.

Second, the main barriers on the road to reuse are not strictly technical, but rather, related to gaps in information. Considering biological treatment tactics such as biofilters and membrane

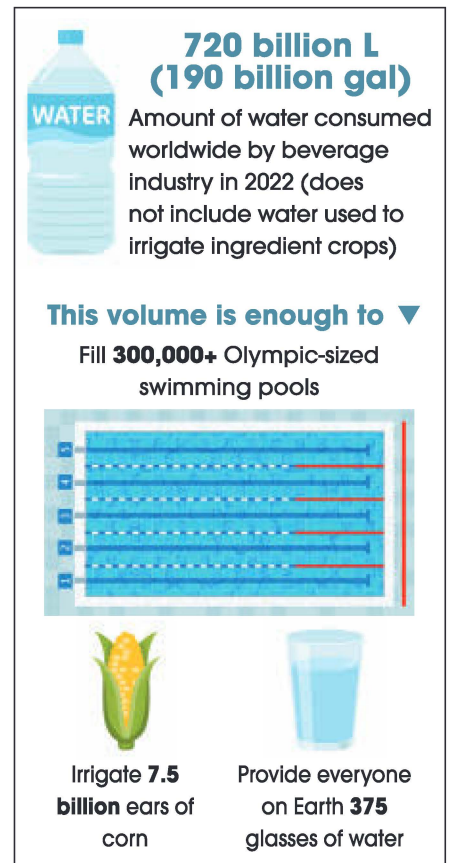
bioreactors, physicochemical approaches such as ultrafiltration and electrodialysis, and adsorptive and oxidative methods, options to custom-build a system according to specific wastestream constituents are numerous for reuse-minded facilities. However, in absence of U.S. federal regulations and guidelines for industrial wastewater reuse, the industry has little knowledge regarding the lowest-risk ways to construct these systems — and even more importantly, whether both food-safety and environmental regulators will accept them once constructed.

Churman said that this basis for the group’s work inspired passion among participants.

“It’s been so encouraging to have this well-rounded group of stakeholders willing and able to come together to talk about these important topics; to really dive deep into these different pieces of the problem and try to find ways to address them,” Churman said. “The level of interest we got for this project among our partners really demonstrates how important this issue is to people and the industry.”

Speaking in a Common Language

Ask five different beverage manufacturers which terms they use to distinguish among



Source: Beverage Industry Environmental Roundtable, “2023 Benchmarking Study: Trends and Observations,” January 2024

the types of water featured in their processes, and you might get five different answers.

In absence of authoritative, sectorwide guidance, both beverage producers and regulators often are hard-pressed to express the differences among commonly used terms that may or may not be synonyms: for example, “potable water,” “ingredient water,” “water fit for purpose,” and “first-use water.” The sector’s unclear terminology complicates efforts to compare notes on successful reuse schemes within the industry as well as efforts to develop broadly applicable regulations. For this reason, one of the first steps white paper authors recommend is to develop a glossary of common water-reuse concepts specifically

relevant to the beverage industry, drawing on popular terminology used in other reuse-minded sectors.

“Such an effort is the keystone to future successes in this space, setting the stage to address the most critical hurdles: perception and reputational risk,” said David Pierce, BIER Executive Director.

While the scope of this white paper extends only to nonpotable reuse, such as repurposing water that otherwise would be discharged for sanitation and landscaping, developing a common lexicon also represents an important step for the possibility of enabling potable reuse in the future. Similar confusion exists, for example, regarding the safety of waters labeled

“recycled,” “reclaimed,” or “recirculated” — knowledge that can guide permitting and communications, particularly if these water streams eventually are used as beverage ingredients.

“The idea with the glossary is if we can have a kind of Rosetta Stone where we can really understand what specifically we’re talking about, then we can do things like get a permit for a certain project and actually go build something that can enable water reuse,” Churman said.

Working Beyond Regulations

Authors remained cognizant that while new federal guidance and regulations around beverage-sector reuse would be helpful, they are not a silver-bullet

solution. Many of the beverage sector’s largest water users are global in the scope of their operations, meaning that standards and protocols implemented by one government only affect one piece of their business.

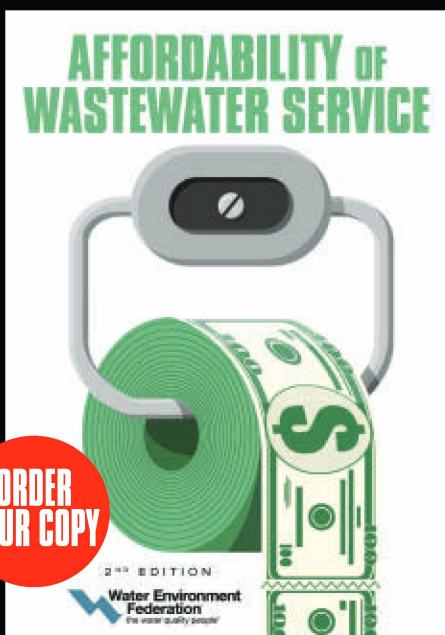
“A lot of global beverage manufacturers — the PepsiCos and Coca-Colas of the world — have an interest in having some consistency of process that they can apply across their operations in different countries,” Churman said. “That’s one reason why simply calling for new regulations is too simple.”

Working with regulatory bodies such as EPA and the U.S. Food and Drug Administration — which also participated in the white paper’s development — in each country on case-by-case

permits for reuse likely is a more practical option, the authors of the paper suggest. While a common glossary of reuse terminology can aid these permitting processes, the beverage sector also can leverage existing tools and resources to help manage risks, communicate safety, and win regulatory approvals.

For example, a framework called Hazard Analysis and Critical Control Points (HACCP) is a system used by food and beverage manufacturers worldwide to identify potential health-and-safety risks during the production process. HACCP, while commonly used during permitting negotiations when implementing new or modified treatment systems, has not seen significant use for water-reclamation projects. By using

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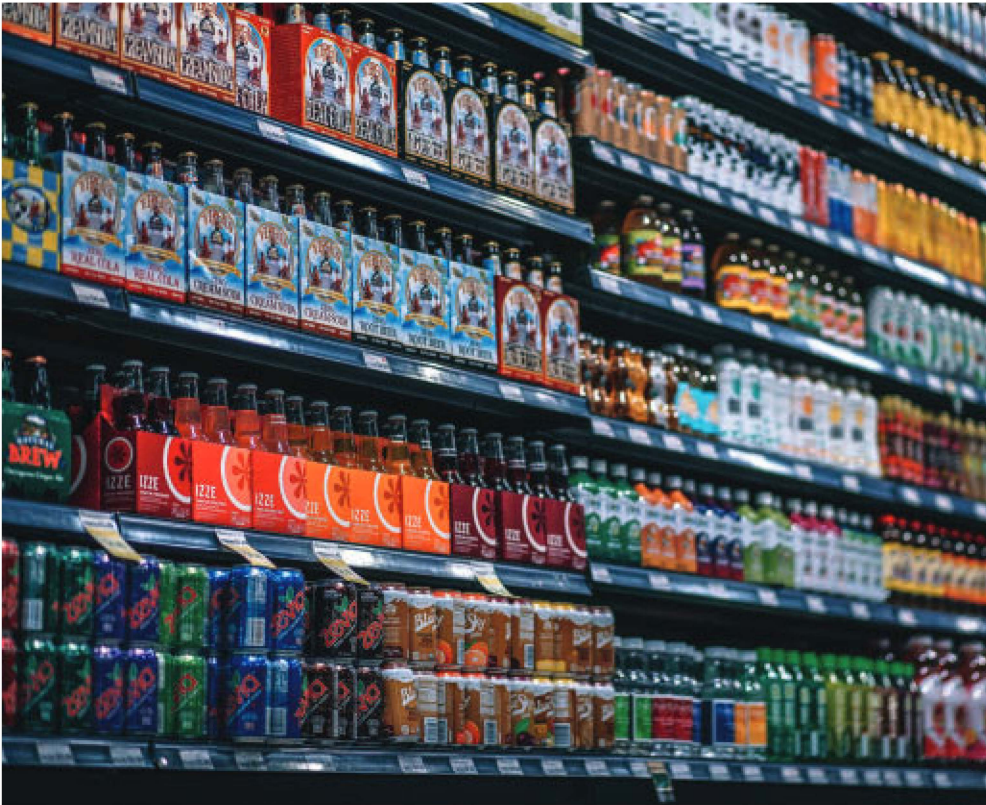
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Such simple actions as standardizing the terminology that underpins reuse practices in the beverage sector and providing guidance on using existing risk assessment frameworks to inform reuse projects can help move the needle on sustainability in the beverage sector, according to authors of a new white paper. Igor Ovsyannykov/Pixabay

HACCP to identify low-risk water streams for specific reuse applications as well as potential sources of risk, beverage manufacturers can demonstrate due diligence to regulators that will facilitate the design of safer treatment systems and earn support from permitting authorities. Paper authors intend to develop new guidance within the next 3 years to convey how beverage manufacturers can use HACCP to stimulate reuse projects.

No Need for ‘Grand Gestures’

While organized guidance on beverage-industry water reuse has been threadbare, a growing number of individual facilities are demonstrating the value of onsite water recycling by example.

In 2021, for instance, San Francisco Public Utilities

Commission (SFPUC) introduced a grant program that incentivizes local breweries to implement onsite water reuse systems, as well as technical guidance on how to construct them. Several breweries already have taken advantage of SFPUC’s resources and progressive stance toward reuse to build game-changing water-recycling capabilities. Among the most successful examples is Seismic Brewing Company (Santa Rosa, California), which worked with technology provider Cambrian Innovation (Watertown, Massachusetts) to develop sufficient reclamation and treatment systems to recycle about 95% of process water generated onsite. They now use this water for such applications as cleaning and feeding boilers, achieving an impressive three-

to-one ratio of water used to beer produced. The industry-standard ratio for brewery water use is approximately eight to one.

White paper authors contend that sharing the success stories of Seismic Brewing Company and other reuse pioneers throughout the beverage industry can serve as a powerful tactic for demonstrating the potential of reuse to save money and enhance sustainability without sacrificing the product. Such forums as WEF’s 2024 Circular Water Economy Summit — which takes place July 15–17 in Dallas — are ideal venues for this type of discourse. (Get details on this event at www.wef.org/cwesummit.)

In the longer term, the working group behind the white paper hopes to facilitate the commissioning of reuse

demonstration facilities unique to the beverage industry, where beverage professionals can study how reuse technology works and experiment with new ideas in a controlled environment. The goal of these facilities would be to test emerging technologies, which could help combat perceptions of safety risks and inform industrywide best practices.

Churman notes that none of the recommendations outlined in the white paper are “grand gestures” — rather, they are simple actions that aim to create a sturdy foundation for reuse in the beverage industry. Their work, which aligns with the broader goals of EPA’s National Water Reuse Action Plan, endeavors to highlight “low-hanging fruits” that create new momentum behind reuse without the need for far-reaching legislation or excessive funding.

“If the intent is to conserve water and to use water more sustainably, little stuff matters,” Churman said. “It doesn’t take a grand gesture to do something that moves the needle. It all adds up.”

Read the team’s full white paper, “Advancing Water Reuse Within the Beverage Industry,” at <https://bit.ly/WET-bev-reuse>. 🐙

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