North American Bottled Water Industry Benchmarking Study Executive Summary

Prepared for

International Bottled Water Association

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Introduction

The bottled water industry strongly supports comprehensive environmental management and stewardship. International Bottled Water Association (IBWA) member companies incorporate water, energy, and emissions conservation and reduction initiatives throughout bottled water production and distribution processes. IBWA has prepared the following benchmarking study to provide an update on the North American bottled water industry's water and energy conservation initiatives and performance as well as its emissions footprint.

Key Benchmarking Study Findings

- Participating bottlers represent nearly 64% of total 2022 United States bottled water production.
- **Water use ratio remained relatively consistent** over the study period while the average water use and production increased by 18%.
- **Energy use ratio increased by 1%** over the study period.
- The first normalized **emissions ratio** was reported.
- Bottlers are driving **process efficiencies** while the industry experiences **continued growth in the production volume.**

To establish a robust, consistent dataset, each IBWA member was asked to provide three years (2017, 2020, and 2022) of facility-specific information over a five-year study period, including facility type, total water use, total energy use, total production, and supplemental process-related information (e.g., type of water treatment, use of refillable bottles). It is important to note that the 2024 study represents an **amended dataset**—facilities are added or removed based on acquisitions/divestitures and new participants in the study. Please note: the water and energy ratios reported for 2017 in previous studies have been revised in this report to reflect the current set of participating companies for the 2024 study.

The study was managed by Antea Group, a third-party consultant, who facilitated the data collection process and completed all reviews, analysis, and reporting.

The 2024 benchmarking report presents data and trends from the **101 North American bottled water facilities, representing three IBWA member companies** that contributed data for all or select reporting years (2017, 2020, and 2022) to the study. The study includes 43.2 billion liters of bottled water production in 2022, representing **nearly 64% of total 2022 United States bottled water consumption.**[1] Participation levels in this study demonstrate the bottled water industry is committed to improving their understanding of sustainability performance and more efficient management of resources.

Key Performance Metrics:

- **Water use ratio:** the average liters of water used in facility processes (including product water), to produce one liter of bottled water.
- **Energy use ratio:** the average amount of total energy consumed on site from all sources (purchased electricity, fuel, and steam—measured in megajoules [MJ]) used in facility processes, to produce one liter of bottled water.
- **Emissions ratio:** the average grams of carbon dioxide equivalent (CO_2e) emissions produced from facility processes, to produce one liter of bottled water.

[1] "Bottled Water in the U.S. Through 2027," Beverage Marketing Corporation, September 2023.

Industry Performance

IBWA members were asked to provide available facility-level data for reporting years (2017, 2020, and 2022). Figures 1 and 2 present available performance data in two ways—a **fixed dataset** (column graphs) representing the facilities that provided requested data for all of the specified reporting years, and a **dynamic dataset** (line graphs) representing all facilities that provided any data for the study period.[2] As seen in Figure 1, the normalized water use ratio remained relatively consistent from 2017 to 2022, while the average water use and production volume per facility increased by 18%, indicating the steady water efficiency at facilities even though product demand increased. In Figure 2, the normalized energy use ratio increased by 1% from 2017 to 2022, likely due to seven new participating facilities that reported an above-average energy use ratio for 2022, although data has been confirmed to be correct**.** These trends in water and energy use performance demonstrate investments in efficiency measures can lead to positive results in achieving optimized efficiencies while the industry experiences growth. This is the first North American Bottled Water Industry Benchmarking study where greenhouse gas (GHG) emissions data was requested from all participants. All facilities were able to report complete Scope 1 and Scope 2 emissions data for 2022, as reflected in a normalized emissions ratio of 21.97 g CO_2e/L for the reporting year.

Production volume increased by 41% from 2017 to 2022, which corresponded with a 19% increase in the number of participating facilities. The average facility production volume increased by 18% while water intensity remained the same, showcasing the industry's efforts in implementing measures to maintain optimized operational efficiency.

Figure 1:
Industry Water Use Ratio Performance
Fixed vs. Dynamic Dataset, 2017 vs. 2022

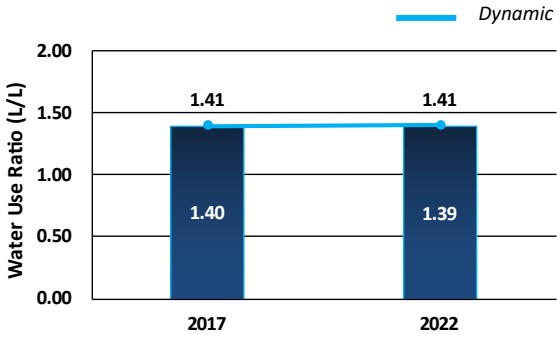
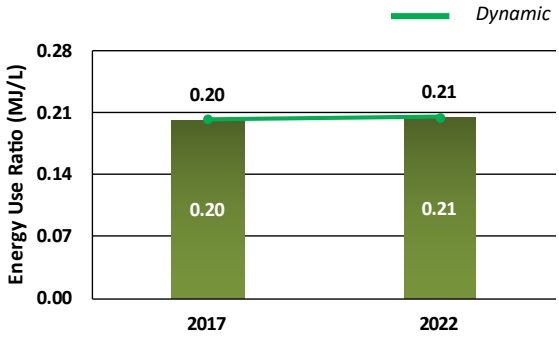


Figure 2:
Industry Energy Use Ratio Performance
Fixed vs. Dynamic Dataset, 2017 vs. 2022



The 2022 performance ratios of North American water bottlers demonstrate a higher level of performance compared to the global averages for bottled water facilities.[3] When comparing facilities that had a beverage mix of 100% water (i.e., only producing bottled water products compared to mixed production facilities), North American facilities reported a lower water intensity compared to the global dataset, with higher ratios reported for energy use and emissions compared to all other global bottled water facilities. This is likely due to better energy and emissions efficiency performance reported in the global dataset by facilities located in Europe or other regions

[2] Due to insufficient data (i.e., fewer than three companies contributing to the dataset), the 2020 performance summary is unavailable in this study.
[3] Beverage Industry Environmental Roundtable, 2023.

that had lower energy intensities attributed to jurisdictional sustainability and emissions-limiting related regulations or expectations.

In general, bottled water facilities have the lowest water use, energy use, and emissions ratios compared to other beverage sectors. In comparison, other beverage production facilities such as carbonated soft drink bottling and beer production have higher performance ratios on average,[4] which are driven by more resource-intensive processes unique to these other beverages such as flavor mixing, blending, carbonation, fermentation, cooking, distilling, etc.

Efficiencies vary in magnitude when compared across types of bottled water. In 2022, approximately 82% of participating facilities indicated that Other water[5] was their primary bottled product, accounting for 75% of total bottled water production. As seen in Table 1, Other water bottlers reported an overall higher water use ratio than Spring water bottlers,[6] as expected by the processes related to Other water production that may not be as prevalent in Spring water production (e.g., purification processes/reverse osmosis, startup/run time associated with product changeover, etc.). The water use ratio trend for Other water bottlers is likely influencing the overall industry water use trend; additional evaluations into specific process drivers to further explain these trends are recommended for future studies. Although Spring water bottlers reported a higher energy use ratio for 2022 compared to Other water bottlers, their normalized emissions ratio was lower due to a higher percentage of renewable sources in the electricity purchased from the grid.

Table 1: Spring Water vs. Other Water Performance Ratios, 2017 vs. 2022

	2017	2022
Water Use Ratio (L/L)		
Spring Water	1.29	1.25
Other Water	1.45	1.46
Energy Use Ratio (MJ/L)		
Spring Water	0.20	0.22
Other Water	0.20	0.20
Emissions Ratio (g CO_2e/L)		
Spring Water	--	18.41
Other Water	--	23.15

Note: Benchmarking studies are intended as a snapshot of the current industry status, and as such, we permit participating members to review previously submitted data and make amendments based on their most recent understanding of data—both historic and current. The amended dataset captured in the 2024 study accounts for changes like acquisitions, divestitures, and corrections to previously reported data. Historical performance ratios may differ from data reported in previous studies due to the aforementioned adjustments to the benchmarking dataset as well as changes in company participation.

[4] Ibid.
[5] For the purposes of this study, Other waters are defined as: all bottled waters other than mineral and spring water, with or without the addition of minerals for taste. Includes purified water (produced by distillation, deionization, reverse osmosis, or other processes), sparkling bottled water, or well water.
[6] All benchmarking study participants reported the production of Spring water and Other water products. However, Spring Water ratios were primarily relied on data from two companies that operated facilities producing predominately Spring water.

Facility-based Results

The study also evaluated water use, energy use, and emissions ratios for two bottled water facility types:

- **Small Pack:** Facilities that package bottled water in containers from 8 ounces to 2.5 gallons
- **Home and Office Delivery (HOD):** Facilities that package bottled water in reusable/refillable containers from 2.5 to 5 gallons

As seen in Table 2, water use ratios for each facility type varied over the study period. The water use ratio of Small Pack facilities remained the same from 2017 to 2022 despite a 13% increase in the average production volume. The water use ratio increased slightly for HOD facilities due to a 26% decrease in the reported average water use compared to a 28% reduction in the average production volume. As seen in Table 3, energy use ratios remained consistent for Small Pack facilities, while HOD facilities reported a slight decrease in the energy intensity that corresponded with a decrease in the production volume. In 2022, the normalized emissions ratio of HOD facilities was higher than Small Pack facilities, likely attributed to a lower renewable mix in the reported electricity procured from the grid (12% vs. 27%) as well as a higher percentage of natural gas usage in the energy mix of HOD facilities.

Table 2: Water Use Ratio Performance by Facility Type (L/L), 2017 vs. 2022

	2017	2022
ALL	**1.41**	**1.41**
Small Pack	1.40	1.40
HOD	1.44	1.47

Table 3: Energy Use Ratio Performance by Facility Type (MJ/L), 2017 vs. 2022

	2017	2022
ALL	**0.20**	**0.21**
Small Pack	0.21	0.21
HOD	0.11	0.10

Table 4: Emissions Ratio Performance by Facility Type (g CO_2e/L), 2022

	2022
ALL	**21.97**
Small Pack	20.28
HOD	46.89

The differences in ratio magnitude among the two facility types are also driven by the unique processes at the facilities, for example:

- HOD facilities bottle finished products in refillable containers, resulting in additional water use for sanitization processes that do not exist at facilities that use single-fill packaging (e.g., most North American Small Pack facilities).
- Some Small Pack facilities have bottle blow molding operations on site, resulting in additional energy use that is unnecessary for facilities that use off-site blow molding operations to supply bottles (e.g., no HOD facilities in this study operated on-site blow molding operations).

Industry Stewardship Efforts

The North American bottled water industry has worked to improve environmental stewardship in several ways. By improving data management and analysis at the facility level, bottlers can track and report their achievements in water savings, energy conservation, and emissions reduction. Comprehensive data analysis enables the industry to understand current performance and identify improvement opportunities, driving active implementation of efficiency improvements while still experiencing sustainable business growth. Participants in the study were asked to provide examples of their environmental stewardship efforts**. Water stewardship efforts include, but are not**

limited to: improving performance in the reverse osmosis process; verifying water stewardship practices; optimizing clean-in-place (CIP) frequency to maximize efficiency; improving data collection; and installing water-efficient bottling equipment. **Common energy efficiency measures and initiatives include, but are not limited to:**

Management Strategies:

- Dedicated personnel or teams to manage energy- and efficiency-related initiatives
- Regular data collection, monitoring, benchmarking, and goal-setting regarding energy performance
- Scheduled energy surveys or audits
- Energy awareness and training for employees

Energy Management Tools:

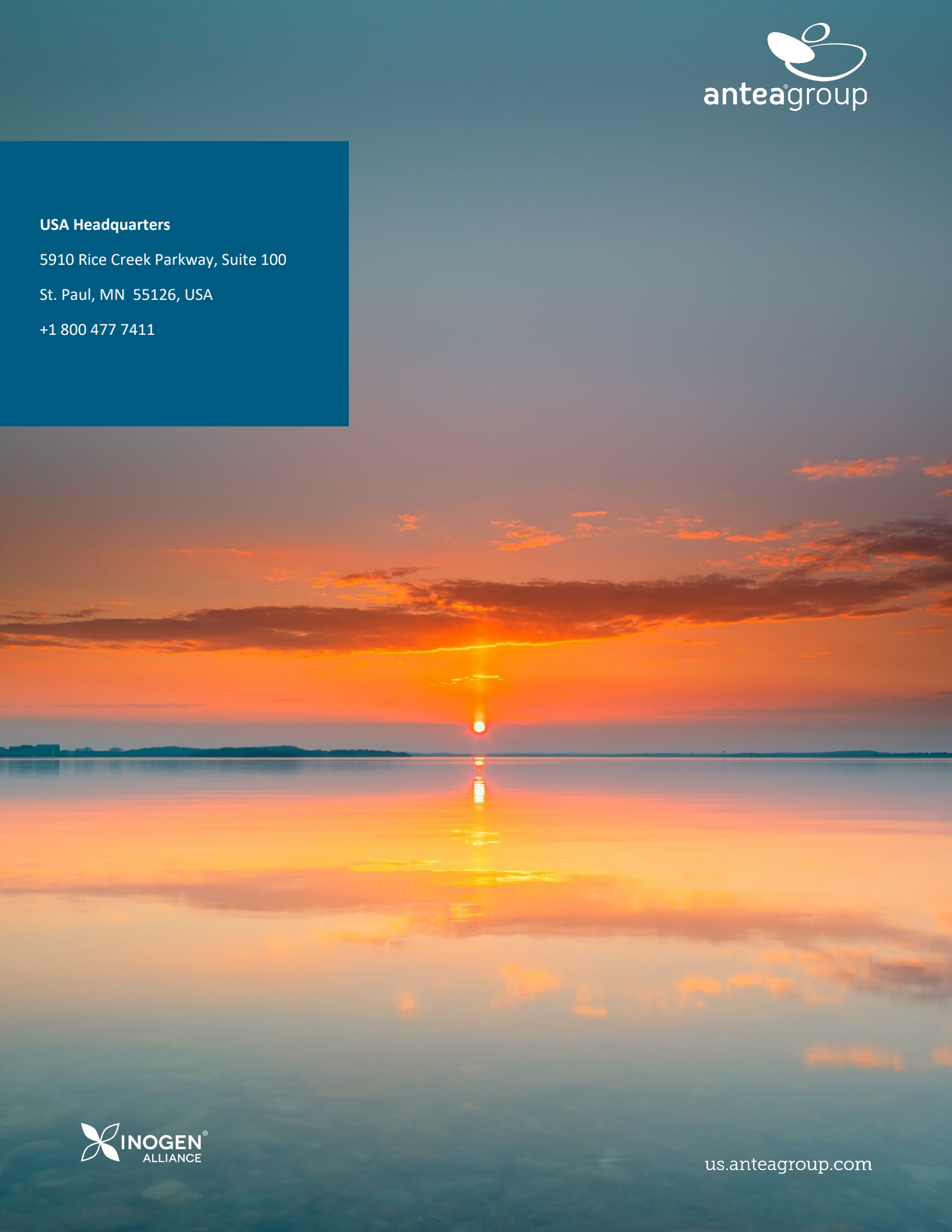
- Indoor and outdoor automatic light controls
- Use of energy-efficient light fixtures and natural light in lieu of traditional fixtures
- Energy conservation communication materials/signs
- Automatic/timed temperature controls

Process and Equipment Improvements:

- Leak testing and optimized settings for compressed air and steam systems
- Use of high-efficiency motors
- Optimized cleaning and fill processes and production schedule

Conclusion

In this fourth benchmarking report, the exemplary participation in the study and an impressive list of stewardship initiatives reported at North American bottled water facilities continue to demonstrate IBWA members' commitment to promoting an environmentally responsible and sustainable industry. Water and energy use ratios demonstrated consistent trends, despite a continued increase in production volume across the industry. The first reported normalized emissions intensity of North American water bottlers outperformed the global industry, showcasing efficiency at North American water bottling sites. The results of this study will aid in future performance monitoring and evaluations of sustainability trends and improvement efforts amongst North American water bottlers, promoting positive changes toward sustainable bottled water production.



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