



Gatorade Water Use Optimization



Formed in 1965 by the merger of the Pepsi-Cola Company and Frito-Lay, Inc., PepsiCo, Inc. is the second-largest food and beverage business in the world, with roots going back to 1898.

Headquartered in Harrison, New York, PepsiCo has operations all around the world and its products are distributed in more than 200 countries, resulting in annual net revenues of more than \$70 billion. The company has approximately 267,000 employees.

PepsiCo's vast catalog of major food and beverage brands include Pepsi Cola, Lay's potato chips, Gatorade, Tropicana beverages, 7UP®, Doritos, Lipton teas, Quaker foods and snacks, Cheetos, Sabra, Starbucks ready to drink beverages, and many more.

PepsiCo has publicly committed to 2025 Sustainability Goals, one of which includes significantly reducing the amount of non-product water used in the Gatorade production process. These goals are particularly important in water-stressed locations such as Dallas, Texas where water usage will be reduced by 30 percent.

In order to develop a path for the Gatorade plant in Dallas to achieve PepsiCo's 2025 water usage sustainability goals, the company brought in a student team from the Tauber Institute for Global Operations at the University of Michigan, consisting of **Katie Cameron**, working on a Master of Business Administration degree, and **Wes Davis**, seeking Master of Business Administration and Master of Science in Environment and Sustainability degrees.

The Tauber team was tasked with evaluating the full extent of the Dallas Gatorade plant's current water usage, reviewing proposed initiatives, recommending new water saving initiatives, and implementing approved projects.

"The goal of the project was to save water during Gatorade production, particularly in water-stressed sites like the plant we worked out of in Texas," said Cameron and Davis in a joint statement. "PepsiCo recognized both the moral imperative to conserve water as a life-giving resource and the opportunity to reduce wasted water at its site. That's why it made a public

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Katie Cameron & Wes Davis

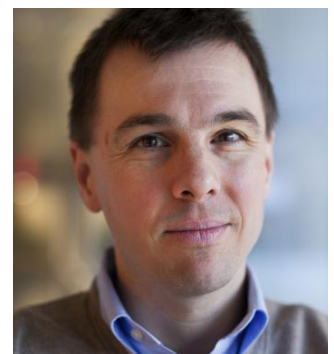
commitment to reducing water intensity by 2025. At this site, many of the quick wins had already been capitalized on and there was a question whether this ambitious goal could even be achieved."

To understand the plant's current water requirements, the Tauber team updated water usage data by taking measurements of flow, analyzing existing data, and confirming the accuracy of data already being recorded.

"Over the course of the summer, we measured flows of water at a more granular level than had ever been possible and methodically tracked flows of water," said Cameron and Davis. "This way we identified where waste was happening and assembled a comprehensive playbook of areas for improvement."



Dr. Lennart Baardman
Ross School of Business



Dr. Steven Skerlos
College of Engineering

Above: Cameron and Davis in the plant.



The Tauber team collected and reviewed water-savings initiatives to evaluate the potential savings of future projects. These estimates were used to create a phased plan that will lead the plant to its water use goals. Forecasted changes in production were also modeled and the resulting change in water use can be employed to build flexibility into the plant's pathway to achieving its sustainability goals.

"The majority of our water savings solutions were relatively straightforward in that we could adjust processes in minor ways and resolve ongoing issues to reduce the amount of water needed in production," said Cameron and Davis.

"We were able to estimate the savings for these improvements by creating a model to predict future water use based on the time, temperature, and flow of the water throughout these processes," they continued. "This was a unique aspect to the product and is now in a tool with variables that update calculations once changes are made. For example, if the target length of time is five minutes but it is reduced to three, the additional savings will reflect in the model and will show the new costs."

The Tauber team then began implementing water savings projects to ensure the site remains on target to achieve annual goals and jump start the plant's water saving initiatives. The targeted efforts included optimizing water use during flavor changeover, reducing wasted water in the steam system, and reclaiming water during weekly cleaning processes.

"Our team conducted an experiment to test optimizing the flavor changeover process," said Cameron and Davis. "This testing involved many late nights, constant supervision, flavor testing with quality technicians, and approval from operations and quality. These 30 tests were successful and when we left the plant, the reduced time was approved and will save around 6 million gallons of water per year.

"One of our ideas was that some water that goes down the drain is actually still very pure and there are some processes used in the plant, such as cooling towers, which never make contact with the product and therefore don't require the very purest water," they continued. "We explored the feasibility of collecting this water and using it again to really optimize water efficiency across the whole site. This involved collecting water samples at intervals and repeatedly testing it in the lab to measure precisely how 'dirty' the water was after a single use. The results were very promising and we don't think a lot of other projects found themselves in a lab with a pipette taking readings on something no one had ever comprehensively measured before."

The water savings from the implemented projects account for an estimated 6.5 million gallons of the estimated 60 million gallons that need to be saved by 2025.

"At the end of the day, all of our recommendations were cost reduction strategies," said Cameron and Davis. "The most obvious was spending less on utilities as less water is brought in from the city,



but we also were able to find savings in natural gas with less water needing to be heated in the boilers and yield loss. Not only could we save the site hundreds of thousands of dollars each year but using less natural gas also reduces the plant's carbon emissions. The result was a real win/win for the site and the environment."

"Our solutions are changes that can be made and maintained," they continued. "Many of these changes will affect people's day-to-day jobs, so we wanted to be sure that we were not adding complications or time to what employees have to do. The people side of the equation had to be considered throughout to determine if a project was feasible.

"Additionally, the project plan we developed outlined some initiatives that can be implemented between now and 2025 to reach the water plans. We oversaw some smaller changes, but overall, that will be up to the Dallas plant to continue with in the future, based on funding, ability to test the changes, and pending other progress that is made."



About Tauber Team Projects

The 2020 Tauber Team Projects resulted in \$433.8 million in savings according to sponsoring company calculations, an average of \$31 million per project over three years.

Each two to three person Tauber Team consists of graduate engineering and/or graduate business students. Along with receiving high-level corporate support from the sponsoring company, each team is advised by a College of Engineering and a Ross School of Business faculty member and overseen by a Tauber Institute Co-Director. The projects begin on-site in May and continue for 14 weeks. Students present the results of their projects and compete for over \$40,000 in scholarships at the U-M Tauber Institute's annual Spotlight! Team Project Showcase and Scholarship event, held each September in Ann Arbor, Michigan. Spotlight! provides outstanding opportunities for students and corporate partners to establish relationships while exploring innovations in operations and manufacturing.

To learn more about the Tauber Institute for Global Operations, visit tauber.umich.edu or contact us at 734-647-1333.



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