

Greg Madden of H₂O Innovation: Innovative Solutions to Boost Global Water Sustainability



A water reuse and recycling advanced treatment system installed at Las Virgenes Municipal Water District in Calabasas, California.

H₂O Innovation is a global water treatment and reuse company that provides systems, products, and services for municipal and industrial water, wastewater, water reuse, and maple product and agricultural customers around the world. The innovative company creates, manufactures, and sells its own products, but also flexibly incorporates other companies' products into the systems it custom-designs for its customers. The company's technical excellence and agility have netted it numerous awards in recent years, and having recently gone private, the company is poised for another round of growth around the world. In this interview, we speak with Chief Strategy Officer (CSO) Greg Madden to learn more.

Municipal Water Leader: Please tell us about your background and how you came to be in your current position.

Greg Madden: I'm currently the CSO for H₂O Innovation. While I was finishing my bachelor's degree in chemical engineering at the Colorado School of Mines, I jumped right into the water industry in October 1994 with an internship at National Water Systems, designing and building water treatment systems, mostly for beverage plants. I accepted a full-time role with the company after graduation and lived through my first acquisition when the company was bought by Water & Power Technologies. In 1998, I took a job with BetzDearborn and experienced more mergers and acquisitions as the company first became a division of Hercules, then GE Betz, then GE Water. During this time, I earned my MBA, with an emphasis in marketing, and my Black Belt in Six Sigma.

I started with H₂O in 2009 in an equipment sales role, then led our aftermarket service team and supported our specialty chemicals global distributors before moving on to lead the company's Professional Water Technologies (PWT) business. In 2020, I was promoted to my current role. As CSO, I am the executive responsible for our operations and maintenance (O&M) business, our marketing team, the execution of strategy across the company, and some of our strategic partnerships with suppliers and customers.

Municipal Water Leader: Please introduce H₂O Innovation.

Greg Madden: H₂O Innovation started 23 years ago as a public company in Québec City, Canada. The company's cofounder and current president and CEO, Frédéric Dugré, was a young mechanical engineer when an *E. coli* outbreak in Walkerton, Ontario, sickened over 2,000 people and tragically killed 7. How could water be responsible for the deaths of people in Canada, one of the wealthiest countries in the world in terms of both GDP and freshwater resources? The event changed Mr. Dugré's course. He decided to go into the water treatment industry with the mission of trying to make water better.

The company started by building small water treatment systems and began to employ its strategy of growth through disciplined acquisition. After a few small acquisitions that gave H₂O a bigger footprint, the company looked for ways to grow beyond North America. H₂O Innovation now has

over 1,100 employees and offices in North America, Chile, Spain, and the UK.

The company is built on four pillars. Water Technologies and Services (WTS) builds and services water, wastewater, and water reuse systems, almost entirely in North America. Specialty Products (SP) manufactures and supplies a complete line of specialty chemicals, consumables, and engineered products for the global water treatment industry, with a particular focus on global desalination and water reuse. This pillar includes our PWT, Genesys, and Piedmont brands, which are sold through more than 125 distributors around the world. O&M provides contract operations and associated services for over 650 utilities' water and wastewater treatment systems in North America. Finally, Maple and Agri-Food (MAF) is focused on the water-food-energy nexus, which provides us many opportunities to bring sustainable water practices to a variety of industries.

Municipal Water Leader: Who are your customers, and where are they primarily located?

Greg Madden: That depends quite a bit on the pillar, but in general we serve a mix of municipal and industrial customers, providing solutions for membrane-based water, wastewater, and water reuse systems, services, and associated products. As I said, our WTS, O&M, and MAF businesses work almost entirely in North America, with customers ranging from municipalities to the renewable bioethanol, high-tech, power-generation, mining, and food and beverage industries. We sell our specialty products, including chemicals, consumables, and components, both directly in North America and globally through our network of distribution partners.

Municipal Water Leader: Please tell us about your water and wastewater treatment systems.

Greg Madden: In WTS, we design, build, and service membrane treatment systems for water, wastewater, and water reuse. Almost everything we do has a membrane at the heart of it—including reverse osmosis (RO), nanofiltration, ultrafiltration (UF), microfiltration (MF), and membrane bioreactors (MBRs)—and we can incorporate all the pre- and posttreatment necessary for a complete process. We have installed more than 750 systems, mostly in the United States and Canada. Our systems are custom-designed to best fit the customer's water quality and quantity requirements. As an open-source supplier, we are free to use the components (membranes, instruments, pumps, pressure vessels, and so on) that make the most sense based on technical requirements or customer preferences.

Our SP and MAF teams approach their customers with the water-food-energy nexus in mind, working to affect the environment positively, especially with the intelligent use

and reuse of water and the application of our sustainability-focused products.

Our O&M team works directly with its municipal and industrial customers to optimize their water, wastewater, or water reuse treatment processes. In one example, we helped a municipality reduce its energy consumption (and associated carbon dioxide footprint) through the implementation of some simple engineering and design changes to its existing membrane treatment system.

Municipal Water Leader: Please tell us about your WaterHub hydroponic water reuse system.

Greg Madden: The WaterHub is a novel approach to water reuse that reclaims wastewater for nonpotable demands, such as heating and cooling, irrigation, and toilet flushing. In North America, we've partnered with NextEra to build a handful of these systems, which combine membrane and conventional processes. In one case, the treatment scheme removes some of the contaminants from the wastewater stream with plants, which use the contaminants as nutrients. The wastewater also passes through an MBR, and a portion of it goes to an RO system; then, the streams are blended and the water is sent back to the industrial customer for beneficial reuse.

These plants employ H₂O Innovation's FlexMBR open-source MBR design, a pioneering technology that allows customers the discretion to switch from one manufacturer's module to another without having to redesign the entire plant. This gives the customer flexibility when it comes time to replace the modules as well as the ability to avoid obsolescence and keep their systems running optimally.

Municipal Water Leader: Would you tell us about your monitoring systems and how they stand to benefit water and wastewater customers?

Greg Madden: You're referring to the wireless sensors from our MAF business. By creating a mesh network, we can send signals across long distances without the need for line of sight and without having to run extensive wiring. That means you can go over mountains and through forests with virtually any data signal you need to transmit. Since being introduced, it has been widely adopted by maple producers.

A single maple farm can have thousands, even tens of thousands, of trees connected by plastic tubing to a mainline collecting sap during the maple season. Those taps often get disconnected during weather events or by animals walking through the forest. In the past, the farmer wouldn't find disconnected taps until the end of the season, when he'd already lost the sap and its associated revenue. With this technology, the farmer, sitting in his sugar shack, gets an alarm in real time indicating loss of vacuum and can make repairs to avoid losses.

Now, we're looking at our other business use cases to see where this technology might benefit other customers.

The real value of the solution is its ability to send secure signals across long distances without the need for extensive cabling. For example, it could greatly simplify SCADA upgrades in older water or wastewater treatment facilities. It could also significantly reduce the cost of municipal overflow studies and simplify the collection of real-time data from lift stations.

Municipal Water Leader: What awards has H₂O Innovation received in recent years?

Greg Madden: In recent years, Global Water Intelligence has twice recognized H₂O Innovation at its annual Global Water Summit. In 2016, we were named the water technology company of the year for bringing a new technology to the market, namely our pioneering FiberFlex flexible MF/UF design. In 2020, we were recognized as the water company of the year, which is the Global Water Summit's top award. That award spoke highly of our entire global team and team members' efforts to help our customers solve their water treatment needs.

In 2017, we received a Firebrand Award from Inductive Automation for a novel SCADA system that we developed for the city of Decatur, Arkansas. In that project, we upgraded a sequencing batch reactor to an MBR and expanded the capacity of the plant from 2.2 to 4.6 million gallons a day within the existing system footprint. That upgrade was done with the plant online.

In 2022, our laboratory in Madrid received the Research Center of the Year award from ALADYR, the Latin American Association of Desalination and Water Reuse. Our Madrid lab has likely completed more membrane autopsies—a series of laboratory tests to determine failure mode and process optimization—than any other lab in the world. This experience has allowed us to acquire a wealth of knowledge, which we freely share with the industry to help optimize the design, operation, and troubleshooting of membrane systems.

Municipal Water Leader: Have there been any recent meetings, conferences, or events that H₂O Innovation has participated in that you would like to touch on?

Greg Madden: We do a lot of our marketing efforts through trade shows, and we get a lot of value out of them because they provide opportunities for us to share technical knowledge and to learn what's going on with the industry. At Aquatech Amsterdam in November 2023, for example, our vice president of marketing and sustainability, Alejandro Sturniolo, led a panel on water positivity, an approach that encourages companies to return more water to water stressed basins around the world than they use from them. H₂O Innovation is at the forefront of this initiative, and we will be making commitments in the coming months to reduce our global water footprint.

Another highlight was the 2023 WaterReuse Symposium in Atlanta, where we shared our Revival Lager, a beer made from highly purified recycled water from Las Virgenes Municipal Water District in California, for which we built a system that treats its municipal wastewater to better-than-potable quality. We partnered with Fox Brewing to craft a refreshing lager with the primary objective of sparking lively discussion around the idea of potable water reuse. The technology already exists to do this safely, and potable reuse is essential to ensuring sustainable water treatment for the future.

Municipal Water Leader: Is there anything you would like to add?

Greg Madden: In December, we started an exciting new chapter. After 23 years as a public company, we have taken the company private by acquiring all outstanding shares, led by Ember Infrastructure, a New York-based private equity firm. Two long-term investors in H₂O Innovation, Investissement Québec and Caisse de dépôt et placement du Québec, and the executive team also participated. We had been considering this idea for a few years and felt it was the right time. We are also confident that we have found the right partner in Ember. We expect that this will give us more agility to execute our strategy and fresh energy to accelerate H₂O Innovation's growth over the coming years.

Municipal Water Leader: What is your vision for the future?

Greg Madden: For H₂O Innovation, the strategy stays the same. We want to simplify water for our customers. What that means to us is taking the complex systems and processes that we design and making them easy to use, finding ways to create sustainable treatment schemes, and developing products that make better use of our existing resources. We want to expand the discussion around water positivity, water reuse, and sustainable water treatment beyond the borders of the water industry. We want to get people thinking and talking about it, because water is our most vital resource, and too many people have taken it for granted for too long. We'll continue to contribute to that goal by bringing innovative water solutions to our customers. 



Greg Madden is the chief strategy officer at H₂O Innovation. For more on H₂O Innovation, visit www.h2oinnovation.com.