

Municipal Water Solutions: Efficiency Through Data-Driven Insight

Comprehensive, scalable solutions for today's
global water management challenges



Cover image: View of Long Island, New York, USA. A case study of Bethpage Water District appears on page 26.



Milwaukee, Wisconsin, USA.

CONTENTS

About Badger Meter	1
Meet BlueEdge™ by Badger Meter	2
The Future Is Now	3
Your Goals	
• Decrease Non-Revenue Water	4
• Safeguard Water Quality	8
• Provide Exceptional Customer Service	12
• Maximize Staff Resources	16
• Improve Utility Management	20
• Strengthen Resilience and Emergency Preparedness	24
• Aid Sustainability and Water Conservation	28
Finding Their Edge: BlueEdge in Action	32
Discover Your Edge With Badger Meter	35
Badger Meter Locations	36

About Badger Meter

Badger Meter has been a water technology leader for over a century. Founded in 1905 and headquartered in Milwaukee, Wisconsin, USA, we employ more than 2,000 people worldwide across our global network of manufacturing facilities, innovation centers, sales offices and distribution warehouses.

Our mission is to measure and protect the world's most precious resource. With that goal in mind, we've redefined smart water management with BlueEdge: a customizable suite of products, software and services that span the complete water cycle, including network monitoring, environmental monitoring, customer water usage and the treatment of drinking water and wastewater.

The solutions that comprise BlueEdge help capture revenue, reduce costs, mitigate risk, improve customer satisfaction, enhance sustainability and optimize asset management. From flow meters and proven meter reading technologies to powerful analytics software and pressure, leak and water quality monitoring, we're ideally positioned to be a key partner in helping public and private utilities and municipalities with their water management initiatives.

Our innovative measurement, connectivity and communication solutions provide the data and insights that empower utilities to optimize the efficiency of their entire operations, from planning to distribution and beyond—because every drop counts.



Meet BlueEdge by Badger Meter

Badger Meter has been an innovator in the global water industry since the company's inception. In recent years, our growth has focused on bringing more value to customers through complementary products and software, resulting in an extensive portfolio of end-to-end solutions for water management challenges. BlueEdge unifies this comprehensive suite of offerings. It's not a single product; instead, BlueEdge is an umbrella under which a broad set of tools combining advanced technology with actionable data are available to optimize water management.

BlueEdge is scalable and customizable to meet a utility's unique needs and to grow with its operations. No two versions of BlueEdge are the same; it's a build-as-you-go journey that offers a different set of solutions for each customer.

For example, one water utility may use BlueEdge to gain insight into customer water usage with E-Series® Ultrasonic meters, ORION® Cellular endpoints, BEACON® SaaS and the EyeOnWater® consumer engagement tool, while another utility may use a micro::station equipped with a spectro::lyser spectrometer probe for real-time monitoring, analysis and detection of specific contaminants. Yet another utility may use PIPEMINDER and RADAR® to track pressure transients in the distribution network to detect and locate pipe bursts.

BlueEdge can be leveraged to address virtually every application within a water utility network, including:



Environmental Monitoring:

Designed to protect the world's most precious resource, the BlueEdge suite of groundwater and source water monitoring instruments are deployable throughout the network. They measure a variety of parameters, collect baseline data and deliver a deeper understanding of trends that enable early event detection and response.



Drinking Water Treatment:

Complex operational processes demand accuracy and reliability. The water treatment solutions available under BlueEdge answer that challenge, assisting utility customers with meeting compliance levels, protecting treatment assets and providing opportunities for process optimization using predictive analytics.



Network Monitoring:

Residential and commercial water networks must be monitored and maintained to reduce the risk of contamination and safeguard public health. An innovative range of monitors and measurement devices is available with BlueEdge, including probes and sensors to provide complete, engineered, reagent-free solutions for monitoring the entire network—and, in turn, reduce the risk of contamination and optimize efficiency.



Customer Water Usage:

Utilities are responsible for sourcing, treating and distributing water while adhering to stringent quality standards.

BlueEdge includes water meters and flow monitoring technologies, coupled with powerful analytics software, which provide end-to-end solutions for generating revenue, conserving water and improving customer service.

Regardless of the application, BlueEdge empowers decision-making by providing visibility through data. Near real-time insights into water usage, water quality, asset performance and network health give our customers the information they need to make informed decisions.



Wastewater Treatment:

From individual monitors to multiparameter measurement, the versatile solutions under BlueEdge

deliver continuous and proactive monitoring for early event detection, odor control, pollution prevention, chemical management and toxic gas detection.

The Future is Now

The idea that water utilities could collect and holistically analyze water management data throughout their networks was once considered a futuristic endeavor. That's no longer the case. Today, utilities around the world are implementing smart water technologies to improve system intelligence, visibility, automation and control.

Every utility has its own unique needs and challenges that must be carefully considered when selecting and deploying a smart water solution. Whether your utility serves a few hundred customers or millions, the BlueEdge suite has a solution that is right for you.

Water utilities share many common objectives, regardless of size or location. On the following pages, you will learn about the unique benefits our BlueEdge water technology portfolio offers to address these goals.



Decreases
Non-Revenue
Water

YOUR GOAL

Decrease Non-Revenue Water

Treating and distributing clean drinking water is expensive, which is why it's discouraging to lose even a small percentage of such a precious resource. Given that globally, 10–30% of treated water is lost before it has been billed, finding and eliminating sources of non-revenue water, such as leaks in the distribution system, is essential for efficient water management.

The BlueEdge portfolio includes several technologies to help decrease water loss. Smart water metering systems, for example, allow utilities to better monitor their infrastructure down to individual components. Certain smart water meters even provide data on temperature, pressure and alarms, giving utilities access to additional critical network performance information in near real time. This helps prevent leaks and decrease non-revenue water to protect the world's most precious resource.

Real-time pressure monitoring is another strategy that can alert water utilities to critical events, pinpoint the location of bursts and inform personnel about unusual pressure spikes in the distribution and collection networks. Intelligent analysis of pressure waveforms can even classify similar and repeated events together, helping to distinguish normal operations from unexpected anomalies. These insights help water utilities calm their networks, which reduces water-wasting pipe breaks and helps achieve water loss reduction targets.



“When we combined the data-monitoring capabilities of BEACON with our zoning strategy, we located leaks in just a few hours compared to the two or three days it had taken us in the past.”

**Jesse McChristian Jr.,
Manager, Highway 71 Water
District No. 1**

Highway 71 Water District No.1

Alma, Arkansas, USA | Population served: 2,500
Applications: Network Monitoring | Customer Water Usage

With a large, rural service area, Highway 71 Water District No. 1 had a difficult time detecting leaks, resulting in significant water loss. Highway 71 purchases its treated water, which meant it was likely losing water that it had paid for but wasn't using.

The utility found a solution that would meet its needs: BEACON and ORION Cellular endpoints. And, because BEACON is also compatible with fixed network and drive-by meter reading systems, it provided flexibility for deployment in areas where those were better options.

To further isolate the location of the leaks, Highway 71 implemented a district-metering solution with 10 zones. As a result, Highway 71 found numerous leaks throughout its system, amounting to a total water loss rate of approximately 125 gallons of water a minute. With the new solution in place, Highway 71 easily located the leaks and repaired the damage, saving the utility \$260,000 a year in non-revenue water.

Thames Water

London, England, UK | Population served: 9 million
Application: Network Monitoring

Trunk main bursts are a major problem for large, urban water systems. Detecting, locating and repairing pipe or joint failures rapidly are crucial to limit damage and mitigate economic impact. Detecting bursts and reducing leakage are particularly important for Thames Water, which serves nine million customers and manages more than 3,602 kilometers (2,238 miles) of trunk main.

Of particular concern to Thames Water are aging mains and the impact that pressure spikes may have over time, including weakening of pipe walls that can lead to bursts and leaks. To monitor pressure transients, Thames Water uses PIPEMINDER-ONE monitors, which combine acoustic pressure monitoring at 128 samples per second with high-accuracy, network-synced time stamped data. Major pressure events can be traced back to the source via a triangulation algorithm in the corresponding software platform, RADAR.

The network calming approach has helped reduce the incidence of bursts. However, when they do occur, Thames Water stands ready to respond. One such burst happened in a 24-inch trunk main at 860 liters (227 gallons) per second—a significant asset failure. At 3:30 a.m., the control team received a burst alert and engineers were dispatched. Data from the devices indicated that the pipe had burst upstream from the monitor, helping engineers to pinpoint the location and isolate the main for repair within a short time frame.

Without the visibility from real-time pressure monitoring, Thames Water would have risked losing large amounts of water until it was alerted by other means, including customers calling because of a drop in pressure, visibly spotting a leak or through other telemetry systems. Instead, the ability to mobilize a rapid response helped Thames Water minimize damage to the surrounding area and allowed the teams to determine the impact to the water supply and mitigate the consequences.





Safeguard Water Quality

YOUR GOAL

Safeguard Water Quality

Drinking water treatment facilities have the critical job of producing a safe, reliable supply of high-quality drinking water. This means reducing the risk of waterborne diseases and other health hazards in wells, reservoirs or intakes, ensuring the disinfection processes are performing as expected and verifying that water leaving a treatment facility meets regulatory standards and is safe for consumption.

Before water is released back to the environment, the municipal wastewater treatment process removes unwanted odors and ensures compliance with air quality regulations. It also converts the wastewater into a treated liquid that can be safely returned to the environment. To comply with regulations and avoid discharge fees or penalties for exceeding limit values, wastewater quality must be carefully monitored.

The BlueEdge portfolio includes water quality monitoring technologies that provide visibility from source to tap and beyond, helping to prevent risk to human health and the environment, as well as comply with regulations. Treatment facilities can monitor pH, dissolved oxygen (DO), conductivity, turbidity, total organic carbon (TOC), nitrate (NO₃) and more parameters for rapid and efficient intake protection, process control, disinfection and event detection.



“Our lab uses [these] units as another tool in our toolbox to identify and forecast water quality issues in order to protect public health.”

Ben Ellsesser, Water Research Analyst, WQAL

Columbus Division of Water

Columbus, Ohio, USA | Population served: 1.1 million
Application: Environmental Monitoring

The Columbus Division of Water operates three drinking water treatment plants. One of them, the Dublin Road Water Plant (DRWP), treats surface water from the Scioto River, which can become compromised by high nitrate levels during storm events.

To ensure accurate predictive modeling, spectro::lyser submersible probes were installed at three critical surface water locations to monitor nitrate, total organic carbon (TOC), dissolved organic carbon (DOC), turbidity, UV254 and UV436. The spectro::lyser was combined with the moni::tool, an advanced event detection system that can alert the user to abnormal changes in surface water.

In June 2015, thanks to continuous monitoring of the source water, the city’s Water Quality Assurance Lab (WQAL) saw indications of a nitrate event, which they confirmed through subsequent lab testing. WQAL was able to issue a public health advisory and prepare for the event over the course of seven days, a timeframe that would have been exponentially longer if not for the online monitoring capabilities.

IRETI

Parma, Italy | Population served: 2.8 million
Application: Environmental Monitoring

IRETI, a major water service operator in Italy, faced challenges with nitrate contamination in Parma's groundwater due to agricultural fertilizers. Occasionally, nitrate concentrations would exceed the maximum values of 50 mg/L allowed by Council Directive 91/676/EEC. To address this, a long-term monitoring solution that included spectro::lyser, chlodi::lyser, and con::cube was implemented. This system ensures continuous 24/7-monitoring of not only nitrate but chlorine dioxide and temperature levels. It allows for real-time detection of anomalies, enabling immediate corrective actions. Furthermore, the solution's high measurement frequency and minimal maintenance provide reliable and cost-effective water quality management, integrating seamlessly into the Water Safety Plan as per regulations.

“The spectro::lyser probe has positively amazed us for its accuracy and stability. This has granted such a dependable and safe online measurement, which makes the frequent discrepancies we used to have by comparing instruments data to lab values dissolve.”

Valentino Piramide, Manager of Emilia Region at IRETI S.p.A.





Provide
Exceptional
Customer
Service

YOUR GOAL

Provide Exceptional Customer Service

A water utility's relationship with its customers transcends a monthly or quarterly transaction; it's a partnership. Some utilities, in the U.K. for example, are even rewarded or penalized based on feedback from customers. When utilities have frequent, positive interactions with their end users, it results in a customer base that feels valued and satisfied—and a satisfied customer is a supportive one.

One way to ensure customers are happy with their service is by proactively informing them of their water usage and billing details, which is nearly impossible without accurate data. With the smart metering technologies available through BlueEdge, utilities can collect and reference detailed usage data to notify customers as they approach water consumption limits or if leaks are present. They can show customers how and where water is used within their homes and suggest ways to reduce their consumption—and in turn, lower their water bills. This increases consumer awareness, which can reduce calls to the utility.

When customers do call, having detailed system data available equips customer service representatives with the information they need to address the issue quickly and efficiently. This results in a positive experience that the customer will appreciate and remember.



Beaufort-Jasper Water & Sewer Authority

Okatie, South Carolina, USA | Population served: 150,000 | Application: Customer Water Usage

The Beaufort-Jasper Water & Sewer Authority (BJWSA) serves a fast-growing area in South Carolina. One of BJWSA's two drinking water treatment plants was struggling to keep up with demand, resulting in pipe-scouring that caused discolored water. Although the discoloration did not pose any immediate health threat, it raised concerns—and complaints—from customers. BJWSA had plans to upgrade the plant, but it would not be completed for two years. Something had to be done in the meantime.

BJWSA installed E-Series G2® Ultrasonic meters with ORION Cellular endpoints to gather near real-time insights into how and when customers were using water. Upon analyzing the data in BEACON, the utility discovered particularly high consumption on Mondays between 4 a.m. and 9 a.m., largely caused by residential irrigation.

Subsequently, BJWSA developed an awareness campaign to educate customers about how adjusting their irrigation schedules would help the utility manage peak demand and address the discoloration issues. BJWSA further encouraged its customers to sign up for the EyeOnWater app so they could monitor their own water usage.

By the time the campaign ended, BJWSA had 13,000 customers signed up for EyeOnWater. Water demand on Mondays was reduced by 1.1 million gallons (4,163,510 liters) and complaints about discolored water dropped dramatically. In addition, with near real-time data at its fingertips, BJWSA has transformed customer service, enabling staff to quickly respond to customers' calls and resolve billing disputes. BJWSA can also spot anomalies and proactively alert customers when an unusual spike in consumption occurs, which helps the utility decrease leaks and save customers money.

“Calls don't last 30–40 minutes anymore. You can go online, see what's happening, and tell the customer, 'I see your irrigation is coming on at 5 a.m., three times a week for three hours. You might want to check into that.' End of conversation.”

Linda Tillery, Chief of Customer Care, BJWSA

City of Avon

Avon, Ohio, USA | Population served: 24,000

Application: Customer Water Usage

The water utility team for Avon, Ohio, previously used meter reading technologies that weren't efficient at determining customers' water consumption. Utility technicians spent more than 160 hours per month monitoring the water system and manually reading meters. By implementing BEACON and automating meter reading data, Avon cut that time down nearly 88% to about 20 hours per month.

EyeOnWater has also helped the customer service team reduce time spent on billing disputes. What used to take office and field staff at least 2–3 hours to identify a resolution now only takes a 5–10-minute phone call with a customer—without having to send a technician into the field.

“This solution has been transformative for us. We now know that we receive timely, accurate data every day. It has also helped us improve accountability with our customers and ratepayers.”

Anthony Lorenzo, Utilities Superintendent, City of Avon



Maximize Staff Resources



YOUR GOAL

Maximize Staff Resources

With manual processes like reading meters, searching for leaks and pulling grab samples for water quality tests, utilities spend countless hours monitoring, managing and maintaining their infrastructure. Not only is this expensive, but it often pulls individuals away from focusing on other priorities.

BlueEdge comprises several technologies to help utilities streamline staffing for field services. Cellular AMI, for example, incorporates a Network as a Service (NaaS) model whereby infrastructure is monitored, managed and maintained for the utility. Continuous, real-time pressure monitoring takes the guesswork out of finding leaks and bursts. And online water quality data provides immediate visibility into potential contamination incidents, eliminating not only the collection of samples but the wasted time waiting for lab results.

Instead of worrying about maintaining infrastructure, utilities can leverage the BlueEdge tools to focus resources on top priorities, like providing safe drinking water and improving customer service processes.



“We have a commitment to our customers to be proactive and explore new technology that helps us operate the system to the best of our abilities.”

Dustin Albrecht, Environmental Specialist, Ames Water and Pollution Control

Ames Public Works

Ames, Iowa, USA | Population served: 65,000

Application: Network Monitoring

For years, Ames Public Works managed water main emergencies by relying on individual team member expertise and availability to detect and repair the leaks. Without technologies to support water pressure monitoring, the water distribution staff often had difficulty identifying the right course of action when problems arose. Locating water main breaks was time-consuming and imprecise because the process depended on individual crew members to painstakingly test for individual leaks.

Ames Public Works, in conjunction with the Water and Pollution Control Department, installed Telog® Ru-32imA, Ru-32mA, PR-32iA and HPR-32-iA units, along with the necessary sensors and antennas, to capture real-time data using IoT technology. These wireless multi-channel recording telemetry units perform underground and above-ground water-system pressure, pressure transients and water-level monitoring as well as pressure-reducing valve monitoring.

The City of Ames is now able to respond quickly to fluctuations in water pressure and make data-driven decisions. Shortly after installing the new monitoring system, a water main break caused pressure to drop below 20 psi in areas of the distribution system. With data from the Telog units, utility staff were able to better define the boil water advisory area, limiting it to three specific businesses and sparing the rest of the community. The city plans to further expand its network monitoring capabilities by adding sensors to its wastewater collection system in the future.

Union Water Supply System

Leamington, Ontario, Canada | Population served: 68,000

Application: Network Monitoring

Union Water Supply System (UWSS), an Ontario Clean Water Agency (OCWA)-managed facility, provides its customers with water sourced from Lake Erie. UWSS installed pipe::scan at two key locations—a water tower and booster station—to monitor crucial parameters, including pressure, turbidity, free chlorine, pH, UV254, TOC, DOC, temperature, color and SUVA.

The devices have revolutionized UWSS’s distribution water quality monitoring practices, enabling the utility to reduce maintenance by 66%, along with saving 1,300 cubic Liters (3,434,236 gallons) of water annually. UWSS has also improved drinking water safety through pipe::scan’s real-time alarm capabilities and enhanced event detection software.

66%

reduced maintenance

1,300

cubic Liters of water saved annually



“We transitioned from monthly to quarterly calibrations, resulting in fewer operator interactions, reduced consumable parts, and comprehensive monitoring of a greater number of parameters, while also eliminating water waste.”

Dale Dillen, Senior Operations Manager, UWSS, OCWA Essex East Hub



Improve Utility Management

YOUR GOAL

Improve Utility Management

With BlueEdge, utilities have access to a greater amount of data to make informed decisions and efficiently manage their operations. This insight helps to extend the life of water infrastructure and ensures the efficient and sustainable treatment of their wastewater effluent. Sensors and monitors within the treatment plant and distribution and collection networks can identify key areas of improvement, helping to save on energy costs, chemical usage and maintenance activities. Additional tools, like customized dashboards and user-defined alerts, enable the utility to proactively monitor exceptions and mobilize a rapid response in the case of a hazardous event. Automatic software updates ensure accuracy is always maintained.

Punta Gorda Water Treatment Division

Punta Gorda, Florida, USA | Population served: 37,000 | Applications: Drinking Water Treatment | Wastewater Treatment

In southwest Florida, the City of Punta Gorda Water Treatment Division operates and maintains the 10 MGD Shell Creek Water Treatment Facility, which treats and supplies potable water to Punta Gorda utility customers. Looking to optimize plant efficiency, the utility conducted a field trial of the FilterSmart backwash monitor. Unlike the traditional approach of using flow rate and time to manage the backwash process, FilterSmart directly measures two key parameters: media expansion and turbidity.

During the field trial, it was noted that the loading in the filters was very light. As a result, plant staff switched from a time-based schedule to one based on head loss value. This adjustment led to increased filter run times, which resulted in a 42% decrease in backwash water consumption annually at a value of approximately \$65,000.

“We love these instruments. They’ve given us data that we can use to make decisions that have saved us a lot of money.”

**Brian Fuller, Utilities Director,
City of Punta Gorda**

Punta Gorda subsequently purchased the equipment and realized further savings. After discovering that the high-rate portion of the backwash was longer than necessary, plant staff decreased the process time by four minutes. That small adjustment resulted in savings of approximately 22,100 gallons (83,657 liters) of wash water per wash, at a value of \$21,000 annually. Managing sludge blanket depth allows sludge extraction pumps to be used efficiently for effective automation, process control and optimization. As a form of preventive maintenance, monitoring gravity filter backwashes is equally important as it can optimize cleaning protocols with water quality information, preventing water loss.

An EchoSmart sludge blanket monitor was installed in each of the plant’s four sludge troughs. Signals from the monitor were used to control the sludge pumps, a process that previously had been done manually with inconsistent results. Using the EchoSmart blanket level to control the pumps eliminated these inconsistencies and greatly reduced the hydraulic loading to the sludge drying train. Furthermore, with the reduced hydraulic loading, the plant only had to utilize one or two of its sand-lined drying cells (instead of 12 cells), dramatically reducing the amount of sand required.

The instruments also enabled several other secondary efficiencies, including freeing up the driver of the front-end loader to resume other maintenance activities; reducing fuel requirements for the front-end loader; and reducing polymer use prior to the sludge press. Tipping fees to haul the sludge to the dump have also been greatly reduced.





EMIVASA Global Omnium

Valencia, Spain | Population served: 2 million
Applications: Environmental Monitoring | Network Monitoring

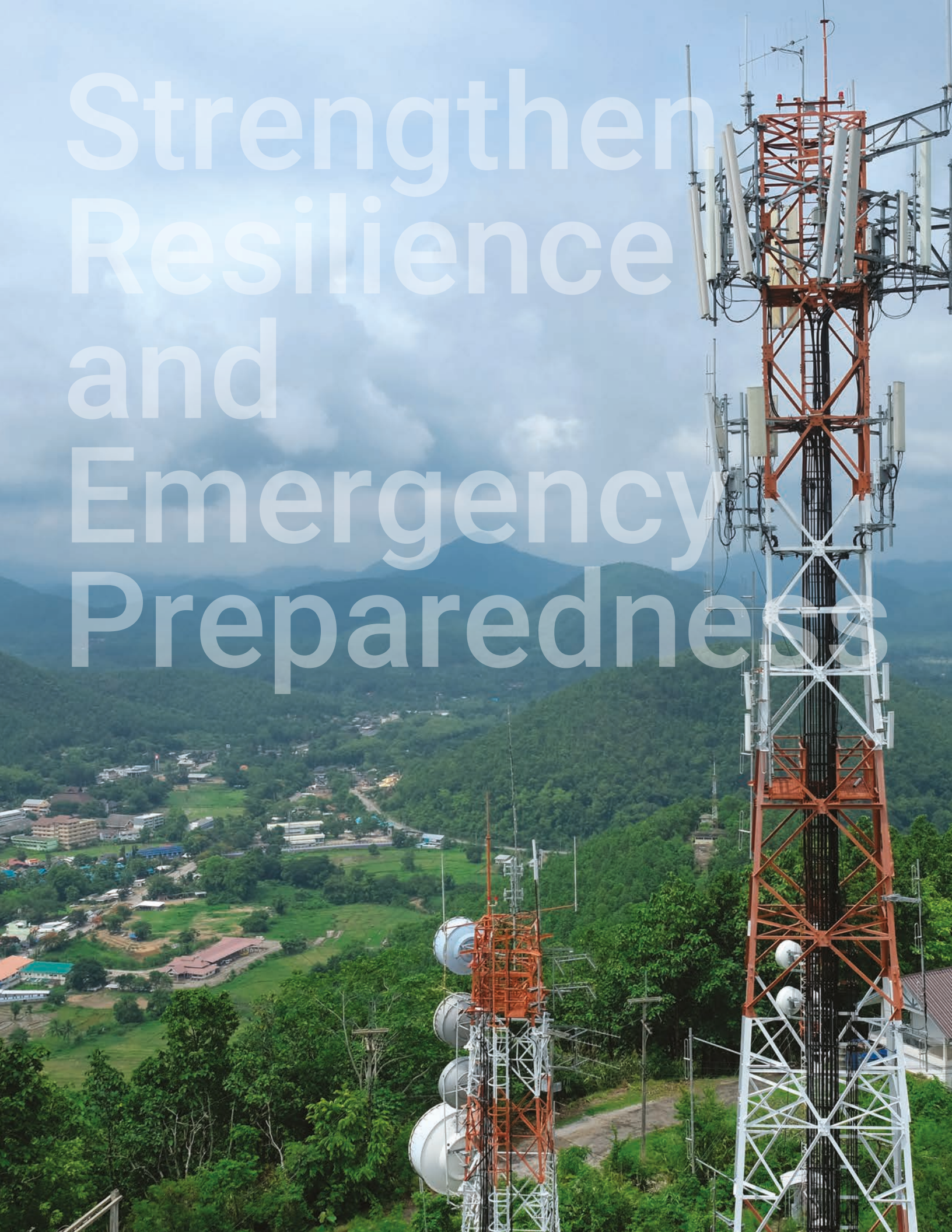
EMIVASA Global Omnium sought to enhance the drinking water quality in Valencia, Spain, by addressing challenges such as real-time monitoring and rapid response to water quality changes. The city and surrounding municipalities required a robust system to detect and manage any water quality event promptly, especially given the mixed sources of their water supply (surface and groundwater). The comprehensive solution, developed over the course of several years, comprises micro::station, nano::station and pipe::scan systems installed at drinking water treatment plants and within the distribution network. The modular micro::station monitors water quality in raw and treated water, while the pipe::scan system measures up to 10 parameters directly in pressurized pipes.

The resulting continuous, multiparameter monitoring (e.g., nitrates, pH, TOC, DOC, chlorine, turbidity and more) ensures immediate detection of quality issues, thereby optimizing the water treatment process and distribution network. This setup provides robust, maintenance-free data, enhancing the operational efficiency and safety of Valencia's drinking water supply.

“We are very proud about the collaborative project we share with EMIVASA in the matter of water quality during the last years. Our joint effort provides insights for a smart operation of their assets.”

Jordi Raich Montiu,
Senior Manager, Analytical
Solutions, Badger Meter

Strengthen Resilience and Emergency Preparedness



YOUR GOAL

Strengthen Resilience and Emergency Preparedness

With the frequency of severe weather and natural disasters on the rise—and the possibility of security attacks and source water contamination issues always present—municipalities are under more pressure than ever to prioritize resiliency within their water systems.

The BlueEdge portfolio offers numerous advantages for boosting preparedness and resilience. Smart metering systems, for example, leverage the advantages of cellular networks, which are one of the first services to be restored after a storm or disaster, to ensure water systems remain online, safe and secure following an unexpected event. Online water quality monitoring tools provide remote access, optimal process control, alarms and support. And real-time pressure monitoring and advanced flow meters running with battery power and transmitting signals through wireless networks allow remote monitoring of distribution systems.

With up-to-the-minute water quality, flow, temperature and pressure readings, water utility managers gain significant insight into system issues that need immediate action during an emergency to safeguard water supplies.



“We have taken a proactive role in preparing for a hurricane or other natural disaster. Our number one priority, as always, is to ensure our customers will receive the cleanest water without interruption.”

**Mike Boufis,
Superintendent, Bethpage
Water District**

Bethpage Water District

Long Island, New York, USA | Population served: 34,000
Application: Customer Water Usage

Bethpage Water District (BWD), established in 1923, is one of the oldest water districts on Long Island, and serves an area of five square miles (12.95 square kilometers).

The district was operating with a combination of traditional fixed AMI systems in some areas and cellular-backed AMI in others.

When Hurricane Sandy hit in 2012, BWD’s water system was directly impacted. The areas supported by the traditional fixed-network gateways went dark for a significant length of time—the utility lost all system visibility into those areas. However, the sections of the region served by cellular solutions remained online and were much easier to manage.

BWD had an emergency response plan in effect prior to Hurricane Sandy, which ensured an efficient and effective response to the natural disaster. And, once the utility recovered from the storm, it replaced the fixed-network AMI systems with cellular solutions.



City of Iqaluit

Nunavut, Canada | Population served: 7,500

Application: Environmental Monitoring

In October 2021, residents of Iqaluit, the capital city of the Canadian territory of Nunavut, reported taste and odor issues with their drinking water. While initial testing of the city’s water supply found no evidence of contaminants, complaints continued to pour in. A second round of testing was performed, and a fuel-like compound was detected in the water supply.

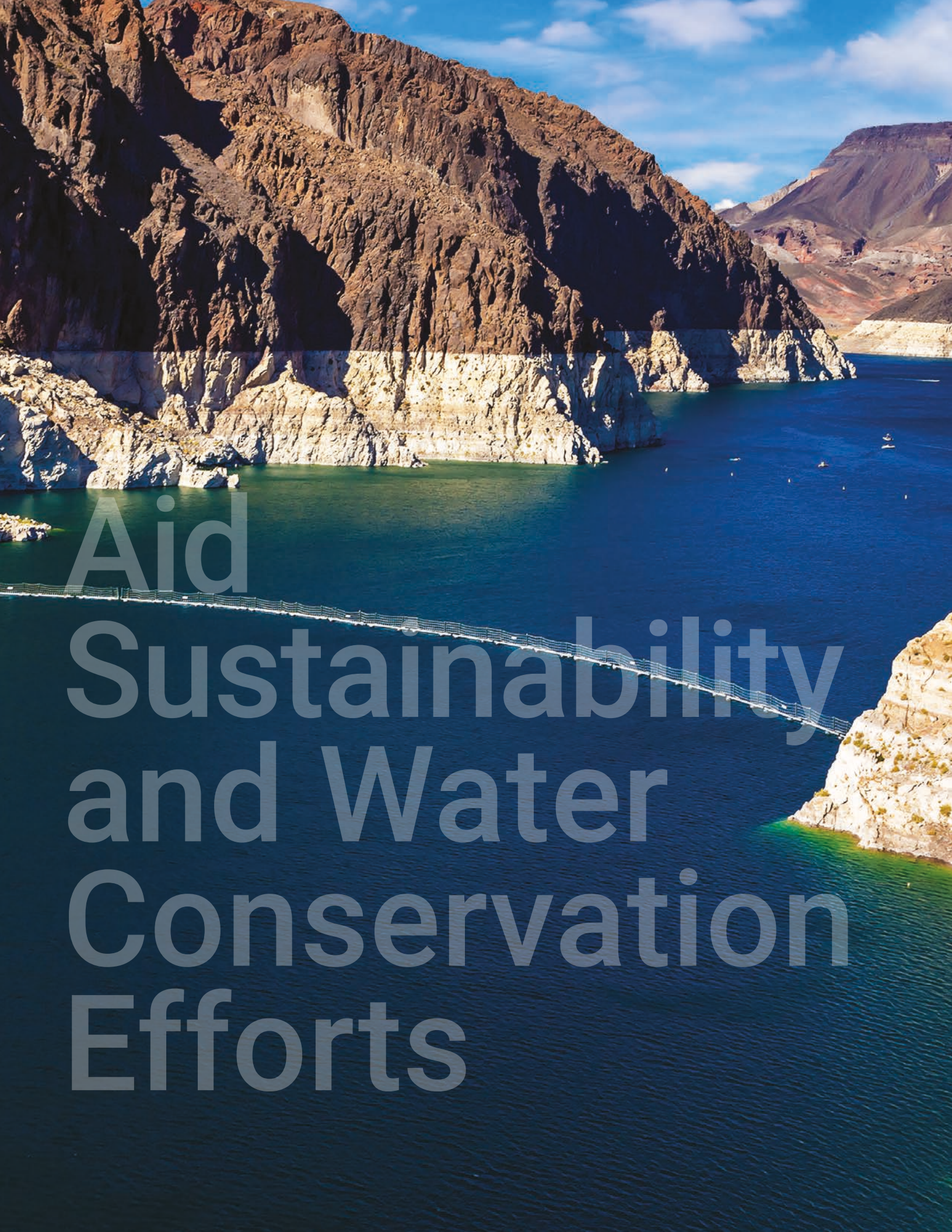
Identifying the source was complicated by several challenges—including the remote location of the community, the ongoing effects of the pandemic, and heavy winter storms that threatened to shut down key operations for days at a time. The solution was a micro::station, equipped with an online spectrometer (spectro::lyser V3) calibrated to measure petroleum hydrocarbons. Real-time monitoring data from custom calibrations delivered precise analysis and detection of the contaminants, leading to the source: a leaking underground fuel tank in the Iqaluit Water Treatment Plant that had compromised the water tanks.

Thanks to real-time data, staff were able to respond quickly to the public health crisis by bypassing the tanks and flushing the entire system.

“There were a lot of unknowns at the beginning of the crisis. The spectro::lyser gave us real-time decision-making information to restore the water supply and protect the plant moving forward.”

Steven Simpson, Head of Projects and Solutions, Aquatic Life Ltd.





Aid Sustainability and Water Conservation Efforts

YOUR GOAL

Aid Sustainability and Water Conservation Efforts

It is estimated that global water use will continue to grow at a rate of about 1% annually.¹ By 2050, usage rates are likely to increase 20–30% above today's levels.² Consequently, national and local governments are mandating strict water conservation measures. To meet the urgent demand for accountability and water conservation, water utilities need more data—intelligent data—and they need it delivered quickly.

Smart water solutions in the BlueEdge suite, such as flow measurement dashboards and cloud-based analytics coupled with network-calming pressure monitoring, provide the means to ensure proactive leak detection and detailed consumption information, conserve resources, reduce lost water and improve operational efficiencies.

¹ Boretti, A., Rosa, L. Reassessing the Projections of the World Water Development Report. *npj Clean Water* (2019). <https://doi.org/10.1038/s41545-019-0039-9>

² Burek, P. et al. *Water Futures and Solution: Fast Track Initiative*. International Institute for Applied Systems Analysis (2016). <http://pure.iiasa.ac.at/id/eprint/13008>



Photo courtesy of Las Vegas Valley Water District.

“[The] technology helped us understand why line breaks were occurring, enabling us to make changes on the line to ensure it didn’t keep happening. High resolution monitoring gave us greater visibility, meaning we could confidently plan specific operational repairs focused on the root of the problem.”

Kevin Fisher, Director of Water Quality and Treatment, LVVWD

Las Vegas Valley Water District

Las Vegas, Nevada, USA | Population served: 1.5 million
Application: Network Monitoring

Managing water resources in the desert—where every drop counts—presents considerable challenges. That’s why the Las Vegas Valley Water District (LVVWD) has made its mission to “provide world class water service in a sustainable, adaptive and responsible manner ... through reliable, cost-effective systems.”

When LVVWD experienced three line breaks in close proximity, the utility installed PIPEMINDER-ONE devices to understand why. Data was collected from PIPEMINDER sensors and analyzed in the RADAR cloud platform, revealing that LVVWD was experiencing harmful transients with ranges exceeding 300 psi—twice that of the PVC pipeline’s maximum pressure rating of 150 psi. When this transient data was overlaid with SCADA system data, it was clear that the transient activity correlated with valve operation activity within the network.

The visibility of this information meant LVVWD could make changes to its valve operations, which calmed the network, mitigated the risk of further breaks, saved water and prolonged the life of their main.

Columbia Water

Columbia, South Carolina, USA | Population served: 400,000

Application: Customer Water Usage

As part of its smart city initiative, the City of Columbia, S.C., decided to upgrade to a smart water metering system. The project is one of the largest cellular AMI installations in the United States and is a cornerstone of the city's strategy to build its AMI infrastructure in a way that's not only focused on the present but on the future as well.

Since upgrading its smart water infrastructure, Columbia Water has realized a host of impressive benefits, including a 96% reduction in monthly field service calls; a 21% decrease in the number of inactive accounts that were consuming water; a \$750,000 credit for recycling old metering equipment—including meter and lid scrap; and industry recognition with a Smart50 Award, which recognizes the 50 most transformative smart projects annually.

96%

reduction in monthly field service calls

21%

decrease of inactive accounts



“We’re excited ... to not only improve the quality of service we provide to our residents but also to improve the efficiency and accuracy with which we deliver those services. Columbia is one of many cities across our nation implementing smart city measures that allow us to become the city we desire to be.”

Stephen Benjamin, Former Mayor, City of Columbia



FINDING THEIR EDGE BlueEdge in Action

Smart water systems shouldn't just address the challenges utilities are currently facing. The right solution should meet their future goals and objectives, too. With the BlueEdge suite, utilities can choose what they need now—and upgrade and expand as they grow, preserving the possibility of interoperability with other smart systems that may be added in the future to support efficient city management.

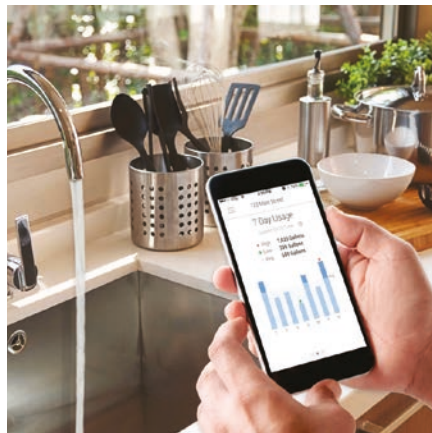
Limestone County Water and Sewer Authority (LCWSA)

Limestone County, Alabama, USA | Population served: 32,000
Applications: Drinking Water Treatment | Network Monitoring | Wastewater Treatment

Limestone County has experienced explosive growth in recent years, placing strain on its water and wastewater system. In 2015, the area's water and wastewater utility, LCWSA, decided to install an AMI system; however, by the time the system was fully deployed in 2018, it had already begun to fail.

Eager to resolve the issue, LCWSA issued a new RFP. With so much already invested, the utility sought a partner that could deliver accurate data about consumption and water quality that would stand the test of time. Working with Badger Meter, LCWSA selected several technologies from the BlueEdge suite, including E-Series G2 Ultrasonic meters, PIPEMINDER pressure monitors and in-network water quality monitoring stations. To manage and analyze meter data, BEACON offers powerful real-time information through a simple dashboard for quick access.

These solutions provide LCWSA utility staff with greater visibility, control and insights into their water utility and metering system performance. With 15-minute interval data, LCWSA can quickly see any issues within their network. The utility can set alerts, run custom reports and track down potential leaks, enabling them to make informed decisions, address water loss and increase operational efficiency.



“Out of all the meter systems that I’ve worked with in different deployments, I have to say that BEACON, far and away, is the easiest meter data management-type system that I’ve worked with.”

LCWSA CEO Daryl Williamson



When winter weather caused burst pipes and low pressure, LCWSA used water quality monitoring data to respond swiftly, issuing a boil water notice to safeguard public health. While neighboring systems struggled for weeks after the unprecedented cold weather, LCWSA was able to recover its system in a day using BEACON data.

Looking ahead, LCWSA will expand its BlueEdge toolset with the addition of more water quality monitoring stations and large meter sizes to its system, while continuing to leverage the insights provided by BEACON to streamline and optimize network operations.

Powerful
15-minute
interval data



City of Galveston

Galveston, Texas, USA | Population served:
53,000 (up to 500,000 seasonally)

Applications: Network Monitoring | Customer
Water Usage | Wastewater Treatment

As part of an ongoing effort to deliver best-in-class service to its customers, the City of Galveston has taken a multi-pronged approach to optimizing its water system and is an excellent example of leveraging the BlueEdge suite.

The city's Sustainable Interactive Customer Connections (SICC) project included an upgrade to E-Series Ultrasonic meters, which utilize the cellular network to deliver meter reads as well as pressure data to the BEACON software platform for a holistic view of the water network. In areas where the E-Series® Ultrasonic Plus meters are installed, an integrated valve allows the water utility to remotely connect and disconnect service using the AMI platform. This is an important feature that will make the City of Galveston more resilient in the face of extreme weather events—like freezes or hurricanes—allowing the city to preserve or conserve water supplies.

Simultaneously, the City of Galveston uses pipe::scan devices in the distribution system to

capture the chemistry, clarity and disinfection levels of the water supply. Additional water quality information is derived from the low-power, compact MetriNet devices that are deployed in specific locations. All this information is fed directly to BEACON and is viewable alongside pressure and consumption data from the meters for a holistic view of the water network.

In addition to near real-time water consumption data, Galveston now has access to timely, low-maintenance and cloud-connected insights from online monitoring solutions that allow the city to manage chlorine residual levels, address discoloration and right-size its flushing program to limit water loss due to blind spots and dead ends. Galveston's modernization of its water system with an eye toward the future has increased operational efficiency, bolstered system resiliency and redundancy, enhanced customer service and improved response to events and customer inquiries.

Wastewater treatment is also an essential part of environmental stewardship on the island. Water quality monitoring devices and software are the eyes and ears of the system, providing essential biological process information for real-time monitoring and adjustments—which ensures the best quality effluent is released back to the environment.

“Billing software upgrades have improved billing accuracy, better managed leaks and helped monitor our systems closely ... Managing pressure and water quality in the distribution network has improved emergency response times and allowed the utility to be more proactive in managing water supply, even during extreme weather events. These measures will transform water management in the years to come.”

Trino Pedraza, Executive Director, Public Works & Utilities, City of Galveston

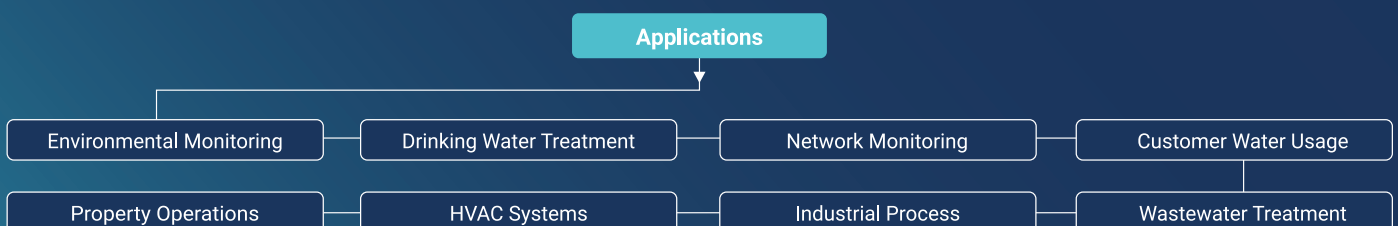
Discover Your Edge With Badger Meter

We believe in providing smart water solutions for any and every municipality, no matter their size, budget or location. If you're looking to improve measurement and control, boost connectivity and communication and obtain actionable insights, BlueEdge has you covered with customizable solutions to help you drive visibility, manage assets and gain clarity with confidence.

Collaboration and support are key components of the BlueEdge suite. As your trusted partner, we're committed to your success and available at every point of your smart water journey, from training, maintenance and project management to customer service and technical assistance.

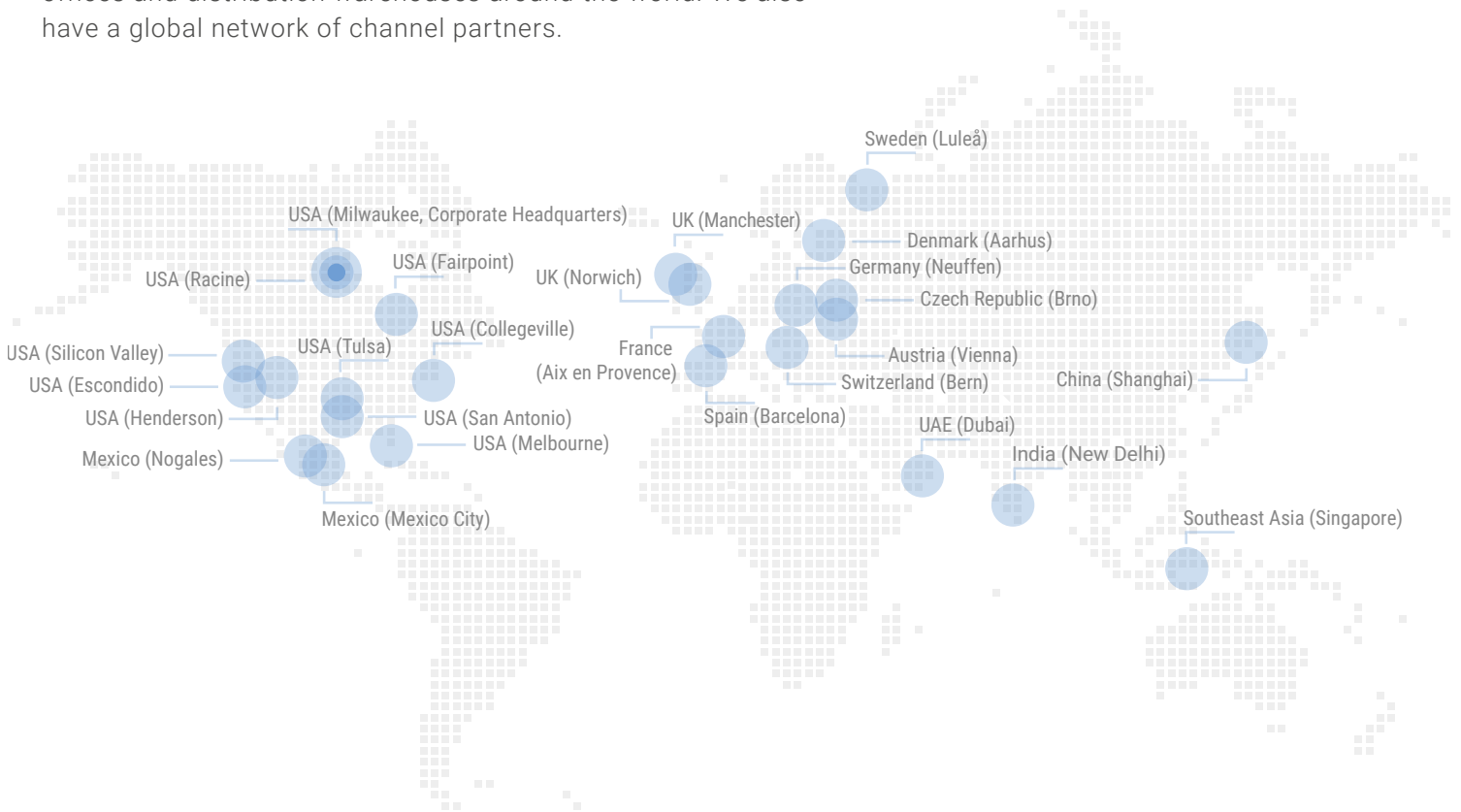
With over a century of experience, a presence in more than 50 countries and five global research and development centers, Badger Meter has the expertise to help you build a BlueEdge solution that's perfectly tailored to your needs. Learn more at badgermeter.com.

A suite of solutions tailored to your exact needs



Badger Meter Locations

Founded in 1905 and headquartered in Milwaukee, Wisconsin, USA, Badger Meter employs more than 2,000 people worldwide. We have manufacturing facilities, innovation centers, sales offices and distribution warehouses around the world. We also have a global network of channel partners.





Tower Bridge, London, England, UK. A case study from Thames Water appears on page 7.

[badgermeter.com](https://www.badgermeter.com)

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