

Citizens Energy Group optimizes efficiency, reduces costs with real-time total chlorine monitoring

Endress+Hauser's total chlorine sensor cuts maintenance time and improves system reliability



Benefits at a glance

- Reduced maintenance
- Lower operational costs
- Improved system reliability
- Enhanced customer experience
- Scalable, future-ready technology
- Local responsive, expert support from Endress+Hauser and George E. Booth Co.
- Service capabilities

[Learn more](#) about Endress+Hauser's Memosens CCS53E



Citizens Energy Group, located in downtown Indianapolis, Indiana

Summary: Located in Indianapolis, Indiana, Citizens Energy Group operates as a charitable public trust, delivering essential services such as natural gas, water/wastewater treatment and thermal energy to residents and businesses across the region.

With a strong focus on community impact and long-term sustainability, the organization manages critical infrastructure while reinvesting in system improvements and environmental stewardship. Its district energy systems, including chilled and steam services, support downtown Indianapolis and surrounding areas, making it a cornerstone of the city's utility landscape.

Recently, Citizens Energy Group sought to modernize its water treatment monitoring

to improve reliability, reduce maintenance and lower operational costs for its closed-loop chilled water system.

Maintaining consistent water quality is essential, as millions of gallons circulate through customer buildings and back to the plant. By partnering with Endress+Hauser and its sales and service representative partner, George E. Booth Co., the utility transitioned from a reagent-based analyzer to a sensor-driven instrumentation solution that delivers real-time data, simplifies operations and enhances service delivery.

"The word is efficiency," said Stephen Botkin, Operations Supervisor at Citizens Energy Group. "We all wear different hats here. When we have an idea, we need experts who can say, 'Yes, we can do that,'



Citizens Energy Group Operations Supervisor Stephen Botkin provides a tour of their downtown Indianapolis facility



Citizens Energy Group's process consists of numerous 5,000-ton chiller systems (left)

or 'No, here's a better way.' Endress+Hauser and George E. Booth Co. have always been responsive and honest. That's what makes the collaboration work."

Challenge: Citizens Energy Group had long relied on another manufacturer's analyzers to monitor total chlorine levels, which were used to estimate bromine concentrations for microbial control. While effective, the units required monthly reagent changes, biannual service visits and frequent part replacements.

"Sometimes, they're challenging to get back up and going," Botkin said. "If we run into challenges, we have to wait for parts. If they don't show up in time, the unit's down."



Endress+Hauser and George E. Booth Co. worked with Citizens Energy Group to provide a total chlorine panel, comprised of the digital total chlorine sensor Memosens CCS53E, digital pH sensor Memosens CPS11E, Liquiline CM44X transmitter and the Flowfit CYA27 assembly

Instances of downtime pushed operators to fall back on ORP control, a less accurate method that introduced variability into the system. Seasonal transitions, such as spring warm-ups, add complexity when stagnant water from customer buildings re-entered the loop, often causing microbial spikes. The team had to rely on a costly secondary biocide to manage these.

Solution: The utility team engaged Endress+Hauser and George E. Booth Co. to explore advanced alternatives for chlorine monitoring. Following a productive consultation with George E. Booth Co., a new digital total chlorine sensor Memosens CCS53E, demonstration unit was installed.

This amperometric sensor delivers real-time, reagent-free monitoring and maintains high accuracy even at continuous low or zero chlorine levels, an improvement compared to legacy systems. Traditional sensors often become dormant during periods of low chlorine, but the Memosens CCS53E overcomes this with a small current that keeps the chemical reaction active. This innovation ensures continuous measurement, enabling rapid response to process changes, during spring warm-ups, for example, and eliminating the need for frequent recalibration or manual intervention.

The Memosens CCS53E is designed to measure total chlorine, including free and bound chlorine components. This makes it an indicator of residual disinfectants in discharge and process water. Its ability to detect even the absence of chlorine ensures compliance with stringent water quality regulations.

With the new generation of Memosens technology, the sensor offers maximum process and data integrity, simplified operation and a strong foundation for predictive maintenance. It also supports pre-calibration, plug-and-play sensor exchange and fast polarization, minimizing downtime and reducing maintenance costs, especially compared to traditional colorimetric systems.

Citizens Energy Group has also deployed Endress+Hauser's digital pH sensor Memosens CPS11E, Liquiline CM44X transmitter and Flowfit CYA27 assembly, with plans to expand to free chlorine probes for tower systems.

The Liquiline CM44X transmitter is a powerful, modular transmitter designed for seamless integration and future scalability. It supports up to eight Memosens sensors, selected from more than 12 measurement parameters, making it ideal for customers who need a single measurement today but want the flexibility to expand their monitoring capabilities over time.

Furthermore, the Flowfit CYA27 assembly complements this system as a compact, high-performance assembly that enables simultaneous monitoring of up to six key parameters. With its low sample flow requirements and integrated modules, it ensures precise process control with minimal water loss.

Results: The transition has delivered measurable improvements. Maintenance has been drastically reduced; sensor caps and electrolyte are replaced only every 6-12 months and there are no reagents to manage.

"It started with our crew saying, 'Hey, these machines go down and we can't get them back up,'" said Botkin. "Now, we don't have that problem."

At first, the goal was to create an environment that is more maintenance-friendly for operators. Cost savings have followed. The utility is compiling a full cost



Digital total chlorine sensor Memosens CCS53E (left), digital pH sensor Memosens CPS11E and Flowfit CYA27 assembly

comparison between the other manufacturer's device and the new system, factoring in equipment, service fees and chemical usage, but substantial savings are expected.

From a customer perspective, the improvements are seamless but significant.

"We're selling chilled water. That's our product," said Botkin. "We want to deliver a product that's reliable. Our customers don't have to worry about chemical treatment or system monitoring. They just open their valves and take the cooling. Now, more efficiently, we take care of the rest."



Chilled water tower system on Citizens Energy Group's Indianapolis campus

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