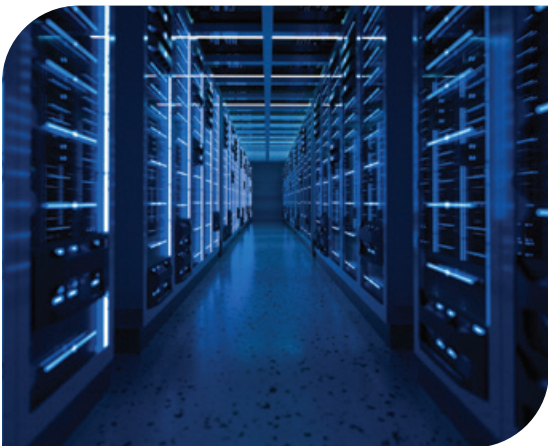


High-Performance Data Center reduces cooling risk with phased water treatment strategy



How Xylem supported aggressive commissioning timelines by deploying a temporary treatment bridge while delivering a permanent cooling makeup solution

A global leader in data center infrastructure set out to build a large-scale, high-performance computing campus in South Central U.S. Built for extreme performance—with redundant electrical topologies, full uninterruptible power supply (UPS) and battery backup, and high rack densities—the facility required an equally resilient water filtration system to support primary chilled water and adiabatic chiller cooling.

The challenge

To support artificial intelligence and high performance computing at scale, the remote campus had to operate continuously under extreme thermal loads. AI workloads drive unprecedented rack densities and heat rejection requirements, placing intense demands on cooling systems and the infrastructure behind them. With multi gigawatt power capacity and strict uptime guarantees, every system had to be designed for uninterrupted operation. Any cooling disruption would not only threaten performance but also expose the operator to financial penalties and contractual risk.

Compounding this challenge, the site operates without municipal water. Instead, it relies on on site wells feeding a lined storage pond, from which water is conveyed to treatment and then distributed across multiple cooling loops. The site’s location and scale introduced several challenges:

- **Water quality constraints:** Well water required conditioning to meet hardness targets, enable reuse and prevent scaling.
- **Construction risk:** Cooling systems had to be commissioned before a permanent solution could be installed.
- **Isolated location:** The operator needed a solution that could perform in a remote environment without municipal pressure/flow and without plant compressed air to reduce downtime risk.

Customer

Global data center infrastructure operator

Challenge

Treating remote well water for cooling makeup while supporting aggressive commissioning timelines and minimizing operational risk

Keys to success

Delivered a scalable, resilient cooling makeup water solution designed for long term reliability

Solution

Phased deployment combining a temporary mobile treatment bridge with a permanent multimedia filtration and nanofiltration system, supported by self priming pumping and electric actuation

Xylem's solution

Xylem partnered with the project team to deliver a phased water treatment strategy, providing a temporary bridge solution to protect the construction schedule alongside a permanent treatment system engineered for long term reliability and scalability.

Phase 1: temporary treatment bridge

To support early commissioning and protect critical milestones, Xylem rapidly mobilized a temporary water treatment system from its mobile asset fleet. The temporary system was designed to deliver treated cooling makeup water while the permanent equipment was under fabrication.

By assuming operational responsibility for the temporary system, Xylem transferred execution and water quality risk away from the owner—allowing the site team to focus on construction, electrical energization, and cooling system commissioning.

Phase 2: permanent treatment system

In parallel, Xylem engineered and delivered a fixed, long term treatment solution designed around the site's hydrogeology, cooling requirements, and reliability objectives.

The permanent system includes:

- Self priming intake pumping to move water from the storage pond to treatment without reliance on plant compressed air
- Triplex multimedia filtration for suspended solids removal and pretreatment stability
- Nanofiltration (NF) treatment to selectively reduce hardness and divalent ions
- Electric actuated valves and PLC based controls, eliminating dependence on centralized pneumatic infrastructure

- Integrated chemical feed and instrumentation for consistent performance monitoring

The system was designed to reliably produce cooling makeup water with hardness levels below 30 ppm (as CaCO₃)—supporting higher cycles of concentration and reduced overall water consumption within the cooling systems.

Xylem differentiated itself by combining temporary and permanent solutions under a unified execution strategy. Close collaboration with the project engineering team ensured the solution could be integrated cleanly into overall facility designs while maintaining flexibility for future growth.

Results

The bridge solution protected the project schedule, maintaining continuous cooling operations while the permanent system was manufactured and installed. This enabled the operator to avoid liquidated damages, protecting against penalties that could reach \$20,000 per day, and keeping commissioning milestones intact. Additional benefits include:

- **Operational continuity:** Smooth transition from temporary to permanent systems without interrupting cooling operations.
- **Improved cooling efficiency:** consistent water quality supports higher cycles of concentration and more sustainable water reuse.
- **Reduced complexity:** The system design minimizes reliance on centralized compressed air, removing common failure points in remote installations.

Backed by Xylem's ongoing service and support capabilities, the completed system provides a robust foundation for long term cooling reliability as the campus continues to scale.