DATA CENTRES

Hardness out of the cooling loop at a hyperscale data center

Variable hardness in the municipal make-up water was scaling the adiabatic coolers, and the permanent dosing plant was delayed. Five HydroPURE units worked in rotation to maintain total hardness below 1 ppm — with no downtime and N+1 redundancy intact.



CLIENT	LOCATION	SERVICE	DURATION
Hyperscale data center	Northern Europe	Temporary: Ion exchange softening	18 months

<1 ppm	180 GPM	5
PRODUCT WATER HARDNESS	PRODUCTION FLOW	HYDROPURE UNITS ON PROJECT

THE CHALLENGE

Hard water, hot servers, a dosing plant still months away

A hyperscale data center relied on adiabatic cooling for its servers, using municipal make-up water with variable seasonal hardness up to 310 ppm as $CaCO_3$. Without pretreatment, the hard water caused $CaCO_3$ and $Mg(OH)_2$ scale on heat-exchange surfaces, reducing efficiency and increasing overheating risk during high temperatures and peak IT loads.

A permanent pH-control dosing system was planned but months away, so an urgent temporary treatment solution was needed to sustain cooling, protect servers from thermal stress, and achieve the required cycles of

KEY DATA

Application	Seasonal cooling and softening water service
Industry	Data centers
Feed water source	Potable water
Feed quality	TH up to 310 ppm

concentration (COC).

At high ambient temperatures and IT loads, stable cooling is critical. Conductivity bleed control maintains the target COC, but operating at a low COC to limit scale increases the need for scale inhibitors, corrosion protection, and biocides, including Legionella control.

THE SOLUTION

Remove the hardness, not just inhibit the scale

Ion exchange softening removed hardness at the point of entry, addressing the root cause of scale rather than relying on chemical inhibition. This supported the required cycles of concentration, reduced chemical demand, and minimized scale, maintenance, and descaling.

The solution also accommodated different adiabatic cooler designs and specifications, which vary by manufacturer in efficiency, water use, and maintenance needs.

HydroPURE units provide a rapidly deployable, modular system with PLC control, instrumentation, pressure regulation, safety relief, alarms, and remote telemetry — supporting reliable operation, real-time monitoring, and assurance in mission-critical data centers.

- ✓ Resin regenerated off-site at Ecolutia's Regeneration Facility — customer site operates under a Zero Liquid Discharge permit
- ✓ Multiple HydroPURE units running continuously with another on rotation, so a unit reaching capacity never interrupts supply
- ✓ Field service engineers on site for installation, monitoring and change-out, with back-office technical support team

TREATMENT FLOW PATH



THE RESULTS

Below 1 ppm, with no derating and N+1 intact

The results of the temporary solution were rapidly realized, maintaining water hardness below 1 ppm as $CaCO_3$, compared with fluctuating seasonal feed reaching up to 310 ppm. With the rapid deployment of the Ecolutia HydroPURE temporary ion-exchange softening systems, the data center was able to:

- Maintain optimal cooling performance without downtime or server load derating
- Prevent scale-related fouling and efficiency losses

Production flow rate
180 GPM

Product water quality
TH <1 ppm

Treatment flow path
Ion exchange softening

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- Operate their adiabatic cooling systems reliably
- Maintain N+1 operational redundancy during treatment operations

The interim solution maintained cooling system efficiency, eliminated the risk of temperature excursions, and avoided the operational disruption and high remediation costs associated with descaling critical cooling infrastructure, ensuring uninterrupted hyperscale data center operation.

Supporting seasonal cooling demands

Data center cooling demand is higher during elevated ambient temperatures and peak IT load. As a result, on-site softeners or reverse osmosis (RO) plants may operate intermittently or remain idle when cooling demand is lower.

Inactivity introduces operational risks such as biological growth, resin fouling, membrane degradation, or control system faults when brought into service at short notice during higher demand conditions.

Ecolutia's temporary mobile water treatment fleet provides a flexible support for seasonal needs. Our HydroPURE Series units are rapidly deployed to supplement or bypass on-site treatment systems during peak demand periods, maintenance activities, or unexpected operational challenges.

PLANNING FOR PEAK COOLING SEASON?

Keep your cooling water in spec.

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