Texas scientists have a dirty solution to AI data centers' growing water problem



- *Solution for the water problem strategies developed by University of Texas researchers utilize advanced desalination technologies to repurpose industrial wastewater for high performance computing facilities.*
- *Regulatory authorities in Texas halted new facility permits while investigating exponential freshwater consumption growth across digital infrastructure hubs.*
- *A novel metric called Saline Water Utilization Intensity demonstrates that high recovery desalination methods reduce local water stress scores by 40%.*

Faculty members from the Cockrell School of Engineering and geoscientists from the Jackson School of Geosciences evaluated advanced desalination systems capable of transforming saline liquids and industrial wastewater into high-quality cooling streams, thereby

establishing a reliable thermal management framework for energy-intensive AI data centers operating in arid regions.

On the other hand, rapid technological expansion threatens local freshwater reserves as national facility demands could quadruple by 2028 to reach between 150B and 270B liters annually; nevertheless, Governor Greg Abbott paused new facility construction permits in September 2026, while state attorney general investigators initiated comprehensive audits into regional industrial consumption.

Desalination technologies as a solution for the water problem in AI data centers

Mechanical engineering professor Vaibhav Bahadur confirmed that existing filtration systems offer an immediate solution for the water problem without waiting for futuristic technology, allowing facility operators to cool processing hardware using established methods despite associated operational costs.

Subsequent testing published in the journal Water Research evaluated reverse osmosis for brackish water with 5k parts per million of dissolved salts alongside seawater containing 35k parts per million; furthermore, hybrid systems using mechanical vapor compression treated oilfield wastewater exceeding 50k parts per million to achieve purities under 500 parts per million, recovering 736 liters of clean water per 1k kilograms of seawater at $3.20 per cubic meter while oilfield water recovery quadrupled energy demands and tripled operational costs.

Environmental metrics and regional watershed stress reduction

Geoscientists introduced the Saline Water Utilization Intensity metric to quantify environmental impacts across surrounding communities between 2023 and 2030, demonstrating that high recovery desalination strategies decrease regional water stress indicators by 40% in vulnerable ecosystems even though zero liquid discharge schemes increase energy usage over 12% to boost recovery between 4% and 220%

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However, a representative project in Longview yielded the lowest environmental impact scores by treating underground brackish streams with two stage reverse osmosis; additionally, this approach provided a highly efficient solution for the water problem with low operational costs and moderate energy expenditures across eastern Texas regions.

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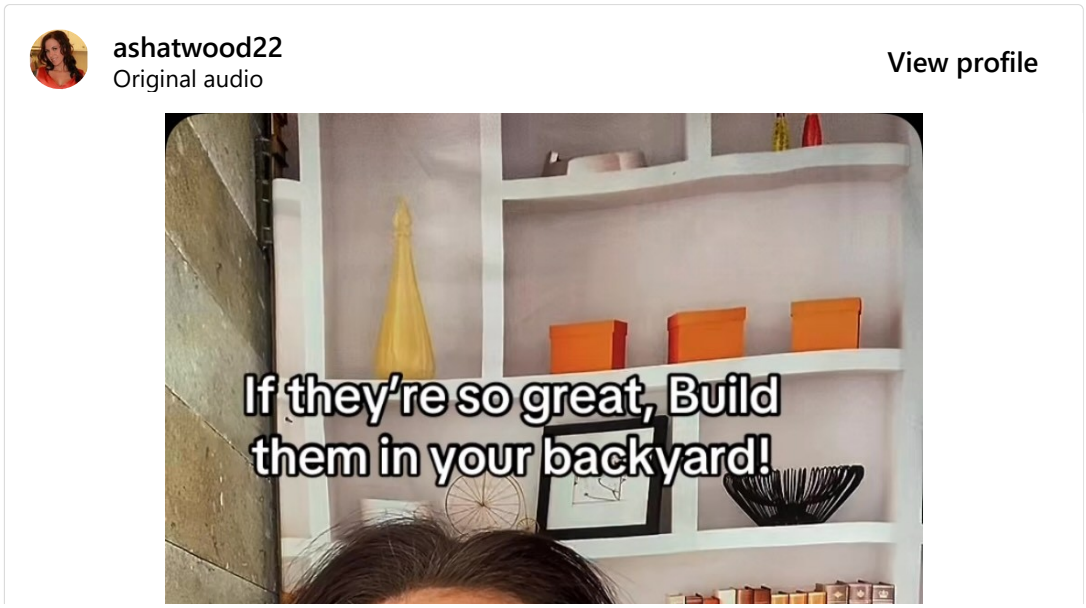
Reclaiming oilfield wastewater as a solution for the water problem in tech development

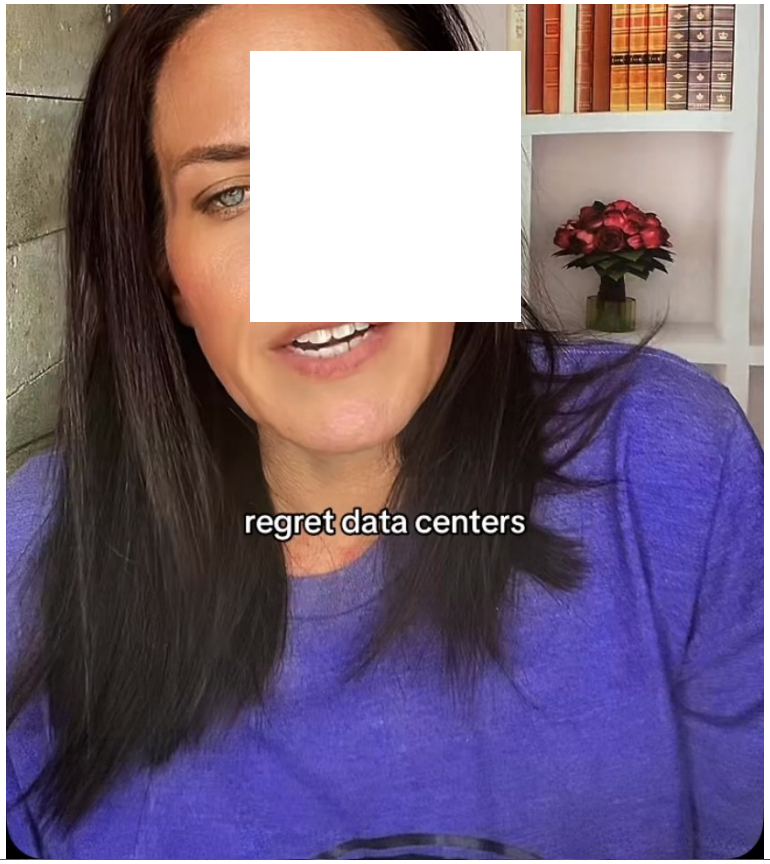
- **Direct capitalization of industrial waste:** Oil producers in the Permian Basin discharge an enormous volume of industrial byproduct daily, equivalent to 1.8k Olympic swimming pools ready for industrial reuse

equivalent to 1.2k Olympic swimming pools ready for industrial reuse.

- **Mitigation of underground injection risks:** Professor Vaibhav Bahadur warned that subsurface wastewater injection increases seismic hazards, emphasizing that underground disposal capacity will run out by 2030.
- **Comprehensive fiscal and energy efficiency:** Deploying advanced vapor compression methods for hypersaline fluids quadruples energy consumption, yet represents a minor fraction of overall computing energy demands.
- **Targeted solution for the water problem relief:** Implementing minimal liquid discharge strategies increases freshwater recovery rates, offering a proven environmental strategy in drought prone counties.
- **Policy support for infrastructure in AI data centers:** Bureau of Economic Geology chief economist Ning Lin and COMPASS consortium researchers testified before the Texas Senate Committee on Water, Agriculture and Rural Affairs, noting that local officials require objective environmental data when evaluating tech proposals.

Justly, integrating specialized desalination infrastructure with industrial waste streams preserves vital municipal freshwater, delivering a long term solution for the water problem that supports sustainable technological growth in AI data centers.





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