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Viewpoint – Water Efficiency Gains Won't Resolve Datacentres' Contested Future

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ABSTRACT: Datacentres are increasingly being built to service artificial intelligence (AI) – and large volumes of water are often required to power and cool these facilities. Today, public opposition against new datacentre development is sharply increasing in the United States, with local water insecurity concerns – including institutional distrust, ecosystem risks, and escalating utility rates – featuring prominently. The scientific community participates in these debates by quantifying datacentres' volumetric water use – what we call "assessment-driven" research. Our viewpoint argues that such assessments can inadvertently produce an information ecosystem in which water overuse becomes framed as a resource management problem to be solved with more efficient water-use technology. To us, this will not be sufficient to overcome opposition – and could, paradoxically, inflame existing tensions. This is because the "water problem" is an existential one for local communities, not a techno-managerial one. Water access shapes the futures of local communities, their perceived character, and the lives people want for themselves – and water use, including more efficient use, by these industrial facilities can enable the very kinds of existential changes that are often the bases of local resistance movements. Assessing who (if anyone) benefits from the water used for AI can challenge existing managerial approaches that often separate co-constitutive water-society relationships and assume efficiency improvements will, at least partly, quell public opposition.

KEYWORDS: Datacentres, artificial intelligence, resistance, water security, United States of America

INTRODUCTION

Datacentres are increasingly being built to service current and future demands for artificial intelligence (AI) – and large volumes of water are required to power and cool them (Li et al., 2025; de Vries-Gao, 2026). "AI" is shorthand for the computational approaches that perform routine and complex human tasks associated with creativity, problem-solving, and decision-making. Content creation now extensively uses "generative" AI models such as ChatGPT, Copilot, and Gemini. As of July 2025, ChatGPT was used by approximately 10% of the global adult population (Chatterji et al., 2025).

In the USA, datacentre facilities directly consumed 21.2 billion litres of water in 2014 to prevent their computing hardware from overheating (Shehabi et al., 2024). American datacentre construction has increased significantly since then. Data from the US Census Bureau and the US Bureau of Labor Statistics reveals private monthly spending on datacentre construction jumped from ~US\$158M to US\$932M

between January 2014 and January 2023 (in 2021 dollars), a near-500% increase (Our World in Data, 2026).¹ Water use grew correspondingly. By 2023, on-site water use had increased by 211%, and US facilities consumed 66 billion litres of water (Shehabi et al., 2024). This estimate does not include the estimated ~800 billion litres "indirectly" consumed when generating the electricity used by US datacentres in 2023 (Shehabi et al., 2024).²

Recent analysis from the Pew Research Center reports American cities and towns now host over 3000 operational datacentres with more than 1500 under construction (Pew Research Center, 2026). Other estimates are higher. The Stanford Institute for Human-Centered Artificial Intelligence, using data from Cloudscene, reported that the USA hosts more than 5400 datacentres – over ten times that of any other country (Sajadieh et al., 2026).

This growth is far from conflict-free. A recent Gallup poll (March 02-18, 2026) reported that seven out of ten Americans oppose the development of datacentres for AI in their locale, with almost half (48%) strongly opposed to such a prospect (Gallup, 2026).³ In an April online survey, Gallup included an open-ended question to investigate reasons for supporting or opposing local datacentre construction. Among respondents in opposition, half (50%) mentioned the potential impacts on natural resources, with excess power (18%), water use (18%), and general environmental impacts (14%) representing frequently mentioned reasons. Quality of life (22%) and potential effects on living costs (20%) were separately mentioned at least one-fifth of the time (Gallup, 2026). Surveys conducted by the Annenberg Public Policy Center at the University of Pennsylvania in February-March (n = 1330), and again in June-July (n = 1320) found that opposition to local datacentres in the USA is rapidly growing. In February-March, 49% of respondents somewhat or strongly opposed the construction of new datacentres in their area, compared to 61% in the June-July survey wave (Annenberg Public Policy Center, 2026).⁴ Opposition is also now shared across political lines: 69% of Democrats, 54% of Republicans, and 53% of independents opposed new local datacentres in the Annenberg Public Policy Center's June-July survey wave.

This has turned datacentre development into a hot-button political issue. Lawmakers in 15 US states have already considered moratoriums on new datacentres, according to the National Conference of State Legislatures – and New York, by way of gubernatorial Executive Order, became the first state in the country to place a temporary moratorium on datacentres exceeding 50 MW (State of New York, 2026). Beyond state legislatures and Executive Orders, a whopping 211 moratoriums are currently active across multiple, smaller levels of government (Interconnected Capital LLC, 2026). Active moratoriums currently range from the small borough of Brookville, Pennsylvania, to the city of Seattle, Washington, to the Cherokee Nation, which recently announced a ban on hyperscale datacentres on tribally owned and trust lands (Cherokee Nation, 2026).

If datacentre growth continues, by 2028, conservative estimates project that direct water consumption in the US will approach 150 billion litres, extending to as high as 280 billion litres – and, again, not including the water indirectly consumed for generating the massive amounts of electricity required for datacentre operation (Shehabi et al., 2024).

¹ This is the inflation-adjusted amount spent in the USA by private entities, including labor and material costs but excluding hardware costs (Our World in Data, 2026). A five-fold increase (~400% rise) in these expenditures occurred between the end of 2022, corresponding with ChatGPT's public release, and June 2026, when US\$4.36 *billion* was spent (ibid).

² On a global scale, one study estimated that water consumption by datacentres could have ranged between 312.5 and 764.6 billion litres in 2025, most of which would have represented the water used in generating electricity for datacentres (~280-686 billion litres; de Vries-Gao, 2026).

³ Gallup's poll asked, "Overall, would you strongly favor, somewhat favor, somewhat oppose or strongly oppose the construction of a data center in your area to support artificial intelligence, or AI, technology in the US?" (Gallup, 2026).

⁴ Annenberg Public Policy Center's (2026) poll asked, "Overall, would you (oppose) or (support) the construction of new data centers in your area?"

The range of AI applications is, importantly, far broader than content creation. Advancements in machine and deep learning hold promise for the water sector so long as they are well-regulated, trustworthy, and have validated outputs (Richards et al., 2023; Wang et al., 2026). Deep learning algorithms can identify crop and soil features in remotely sensed data and learn their dynamic changes over time to predict on-farm water demand (Ye et al., 2024). Other valued use cases include downscaling hydrological data such as satellite gravimetry data from NASA's Gravity Recovery and Climate Experiment product suite (Sun, 2024) and assessing the presence of water contaminants (Zhang et al., 2023). Nevertheless, the computing infrastructure these applications rely on has provoked important questions and criticisms about water use.

UNPACKING THE "WATER QUESTION"

The "water question" has attracted significant attention, perhaps second only to the vast amounts of electricity datacentres require. It asks whether datacentres will overuse water to the detriment of local ecosystems and communities – a concern now front and centre in debates around whether datacentres should or should not be developed. On one side of the aisle are those who argue that water use is a problem of the past. Sam Altman, OpenAI's CEO, recently disputed water consumption concerns related to the use of ChatGPT, claiming, "Water is totally fake. It used to be true. We used to do evaporative cooling in data centres, but now (...) we don't do that" (The Guardian, 2026). On the other side, as previewed above, media contributions and public demonstrations point to the growing concerns about datacentres' water use. A scan of US news headlines, some more recent than others, read, "Little Rock protesters rally over Google data center, citing water and wetland risks", "Drought-stricken communities push back against data centers", and "Data centers rapidly transforming small-town America".

Recent court filings across the USA further nuance the "water problem". Filings in all corners of the country, from South Carolina to Minnesota, Oregon, Colorado, and Wisconsin, are testament to the complex on-the-ground contestations involving water use. Publicised filings make note of whether datacentres' water use is subject to disclosure under state public records law. Filings have come from concerned residents eager to secure such data (Frank Heindel v. Dorchester County, 2024), as well as from cities and water utilities who wish to prevent its release (City of The Dalles v. Michael Rogoway and Advance Local Media LLC, 2021; City of Colorado Springs v. Hannah Beckler and Businessinsider.com, 2025). Legal challenges involving residents, non-profits, and investigative reporters have drawn concern to secretive water management, as well as to the potential for unsustainable local water use, rising residential costs, environmental contamination, and habitat degradation (see Shah, 2026; Pearson et al. v. Amazon Data Services, Inc. 2026). Some of these concerns are shared by the American Water Works Association (AWWA, 2025), which has recognised local water demand, infrastructure permitting and planning, water quality degradation, and consumer costs as potential future-facing risks for governing authorities and communities.

"Water-related" trade-offs and risks can also be difficult to anticipate – not only because of their context-specificity, but because they can emerge from how other resource systems are enrolled in the operation of datacentres. Washington State House Bill 2515 (which did not ultimately pass) is evidence of this. HB2515 originally contained a provision to "curtail the use of electricity provided to (...) [datacentres or other large energy use] facilit[ies] from the electric utility during an energy emergency event at the request of the electric utility" (Washington State Legislature, 2026a). This provision had important public interest implications at the agriculture-energy-ecology nexus, especially where datacentres are supplied by electricity from utilities that manage hydropower facilities. An amendment later removed the curtailment requirement (Washington State Legislature, 2026b). Subsequent public testimony in the House and Senate Bill Reports demonstrated support for restoring curtailment provisions out of concern that salmon spill protections may be traded off to prioritise hydroelectricity generation during power production crises, increasing the risk of salmon mortality (Washington State

Legislature, 2026c, 2026d). Trading off spill protections for salmon could present significant risks for ecosystems, marine mammals, fisheries, tribal cultures, and treaty obligations (Washington State Legislature, 2026c, 2026d). From this example alone, one can conclude that the "water question" is not as simple as asking how much water datacentres directly consume for cooling. Multiple "water questions" are now evident, related both to the governance of shared public resources and to what it means, on a relational level, to live with and share water with these large, industrial facilities.

Most of the current science, even at this early stage, estimates the water consumed by datacentres at regional or national scales and evaluates the operational risk exposure such facilities may face, including whether they exist in watershed-stressed basins. Researchers have hardly engaged with public contestations, which are perhaps best understood as demonstrations of dissensus or "agonistic disagreement[s] over alternative socio-ecological futures" (Swyngedouw, 2015). To overlook those worried about water use marginalises their concerns about potential water access and use impacts from datacentres – and, at a more fundamental level, ignores how water is part of a larger set of concerns that collectively resist unwanted datacentre development. It appears instead that current scientific studies are more concerned with how water should be used appropriately by datacentres – and not whether it should be used for the interests that these technologies advance. This extends into professional bodies. The American Water Works Association (AWWA, 2025), for example, has emphasised strategies such as siting datacentres near recycled water facilities, installing on-site water storage to reduce the impacts of peak demands on municipal water systems, considering the appropriateness of specific cooling technologies, and planning projects based on existing or future power capacity.

As scientists, we have a responsibility to conduct independent, rigorous, and ethical research that serves the public – and the current direction of "assessment-driven" research, we believe, is too narrow to achieve this objective.

WHAT DO ASSESSMENTS DO?

We use the word "assessments" as shorthand for scientific studies, particularly peer-reviewed studies, that quantify water use. These assessments comprise most scientific studies about water, datacentres, and AI. But why should we be concerned about this? After all, they are informative and their value has proven important in public critiques around datacentre development.

While not opposed to assessment-driven research inherently, we argue for the need to be attuned to what this research does. Assessments involve acts of measurement that may seem neutral, "apolitical", and objective. But these acts of measurement, whether we admit it or not, are value laden (Molle et al., 2024): They require making explicit decisions about what should be measured – and crucially, what should be managed. "What should be managed" presupposes an end use that is often left unquestioned.

Consequently, assessments unintentionally participate in and co-produce an information ecosystem in which water overuse becomes framed as the principal problem, to be overcome with efficient technological innovations. They "do important political work" in re-configuring hydro-social territories by professing authoritative facts at the cost of concealing complex and experiential risks (Molle et al., 2024: 340). Water is treated as a hydrological property – an object – to be managed as efficiently as possible within a larger techno-industrial system barrelling towards an unquestioned future. Thus, assessing impacts holistically requires us to account for what remains uncounted.

Below, we elaborate two processes by which water use assessments can, paradoxically, give steam to datacentre development, even if their intentions are to draw concern to such development.

First, passionate criticisms and defences of how much water datacentres consume become foregrounded by assessments, be they from scientific actors or corporate ones. This has the risk of resulting in a stalemate, with one actor's technoscience squaring up against the other's. For example, Google's datacentre operations in the city of The Dalles, Oregon, consumed 361.4 million gallons of water

[~1.37 million m³] in 2024 (Google, 2025). The case of The Dalles has attracted significant media attention nation-wide. Google equates their water consumption there to 2.4 "golf course equivalents" – a seemingly meagre number when abstracted from the local socio-ecological context. In sharp contrast, public media reporting and peer-reviewed scholarship have reported Google's use as amounting to somewhere near 30% of the city's total water demand (Shah, 2026). Recently, Google's water use for 2025 was reported to be even higher, pinned at around 550 million gallons [~2.1 million m³] – reportedly around 40% of the water consumed in The Dalles (The Oregonian, 2026).

Debating "which" statistics represent the "correct" interpretation of the data can suck all of the oxygen out of the room – and it can have the knock-on effect of sidelining the larger questions at play, such as those related to water use allocation, capital investment and potential cost burdens, and the futures of these kinds of places. We further hold that debates around annual water consumption should reflect more nuance, including the risks to consumers and ecosystems during peak water demand periods or emergency storage periods. In short, a narrow focus on aggregate volumetric water use glosses over critical conversations about water governance and rights to water, which have everything to do with enabling desirable and equitable futures.

Figure 1. A flyer in Seattle, Washington, USA, challenging how artificial intelligence is being rolled out by Amazon.



Credit: Authors' photograph (April, 2026).

Second, and relatedly, scientific assessments that treat the "water problem" as a volumetric one actually require water efficiency responses be implemented. This point cannot be overstated. The science quickly slides into how to operate datacentres as water-efficiently as possible. This science is thus "political" because it inadvertently helps advance a particular future – and not because it is somehow compromised by "bad apples". In other words, assessment-driven approaches constitute a particular way of representing the "water problem" – and this construction naturalises one response: efficiency.

The naturalisation of efficiency is dangerous because it can serve as a social and environmental "license" to ignore water overuse. Therefore, scientific assessments bound up in the abstract quantification of water use can co-produce a future in which datacentres continue unabated. After all, if datacentres can use water "efficiently", all other factors being equal, what problems do they pose for water-related uses and ecosystems? The larger acceptance of this logic hardly engages with how water, as a shared public good, should be distributed and for what ends. It implies that, if water can be used efficiently, the hydrological risks and related societal discontents should approach zero.

This statement, in our view, is flawed. In fact, we predict that public opposition and demonstration are here to stay, even with the advent of new, more water-efficient technologies. Helpful here are contributions from anthropology and political ecology, which position water as a "total social fact" (Orlove and Caton, 2010). Water is as much a material and physical substance as it is one that produces and gives meaning to our social lives (Orlove and Caton, 2010). As research elsewhere demonstrates (Workman and Shah, 2022), water access matters precisely because it shapes the futures of local communities, their perceived character, and the lives people want for themselves. Water access by large-scale datacentre facilities, in our view, enables the very kinds of existential change that communities are resisting. If the water problem is mischaracterised as a simple issue of overuse to be solved with technology, instead of a social problem associated with community disruption, why would water efficiency improvements quell public opposition?

We argue that the above processes, by obscuring and de-politicising water use, help enable the significant societal risks posed by AI "advancements" (see Berlinski et al., 2024, for broader discussion). Efficient practices may very well mean little in the context of larger societal disruptions. A recent Massachusetts Institute of Technology study found the capabilities of AI span nearly 12% of the U.S. labour market, amounting to \$1.2T in wage value (Chopra et al., 2025). Concerns of cognitive decline from certain human-AI interactions are growing (Rossi et al., 2026). And increasingly sophisticated AI analytics can exploit the commercial data bought and sold by "data brokers" related to online behaviour, locations, and spending habits, heightening capacity to surveil the population, analyse behavioural choices, and manipulate the content online users receive. Thus, as our title states, mere water efficiency gains won't resolve datacentres' contested futures.

A NEW "WATER QUESTION"

The future of AI is not pre-destined. Critical conversations are needed to determine whether, if, and under what conditions its future applications will create net societal, environmental, and economic benefits – and vitally, whom these benefits will serve. This should comprise the "new water question": exploring whether and how water use contributes to futures worth living. In this article, we have argued that much of the opposite is happening in the water space. Water use is, by and large, framed as an obstacle to be overcome with more efficient technologies. This position risks accepting a future that is not yet decided – one in which AI poses significant, even unprecedented, risks to labour markets, wealth equality, job creation, and cognitive health.

In other words, emerging water efficiency innovations could precipitate datacentre development, with many destabilising socio-ecological effects. The unintended consequence of "solving" the datacentre water problem is a gross failure to interrogate who benefits from AI and datacentre demand in the first place. Inclusive and participatory governance can advance a holistic debate over what water should be used for, and whose interests it serves – and can even invite exploration for transformative alternatives around existing water ownership, allocation, and management practices.

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