

The Water Bill for the Cloud

Data centers run on water and power, and the fight over them is really a fight about who carries the cost. What the cooling actually does, what the numbers actually say, and who pays, in plain words.

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The short version

Every search, every streamed film, and every question put to an AI model runs on computers in a building somewhere, and those computers turn nearly all of their electricity into heat. A large data center is, in physical terms, a machine for moving heat out of a building. The argument now running in town councils across the country is about the two currencies that machine accepts. Heat can be carried away by evaporating water, which is cheap and efficient and consumes the water. Or it can be carried away by fans, chillers, and compressors, which saves the water and spends more electricity. There is no third option in which the heat simply vanishes. So the honest question is never whether a data center uses resources. It is how much of each resource, in which place, and who ends up paying for it.

Five ways to cool a building full of computers

The industry sheds heat five ways, and most large sites mix several of them. **Air cooling** blows chilled air through the server halls and dumps the heat outside, the same principle as a home air conditioner at warehouse scale. It uses almost no water on site and the most electricity. **Evaporative cooling** runs water over pads or through cooling towers and lets the heat leave as the water evaporates, like a swamp cooler. It is the cheapest and most effective method in hot weather, and it is where the water goes. **Liquid cooling at the chip** puts metal cold plates directly on the processors, with coolant lines carrying the heat away; it has become standard for AI hardware because the newest chips run too hot for air alone. **Immersion cooling** submerges the servers in a engineered fluid that does not conduct electricity. **Free cooling** uses cold outside air, or a cold river or lake, whenever the weather allows, and rests the machines. The pattern to notice: liquid cooling moves heat efficiently inside the building, but at the end of the line the heat still leaves through air or evaporation. That last step is the whole public argument.

The numbers, with their limits printed on them

Water use is a design decision, so the range is wide. A mid sized data center on evaporative cooling uses roughly 300,000 gallons a day, about the daily use of a thousand households. A large hyperscale campus in a hot climate can use 1 million to 5 million gallons a day, the daily water of a small town. Of the water an evaporative system takes in, roughly 70 to 85 percent evaporates and is gone from the local supply; the rest returns as wastewater. Lawrence Berkeley National Laboratory put the direct water use of all United States data centers at about 17 billion gallons in 2023, and that figure counts only the water on site, not the much larger amount used by the power plants that supply the electricity.

Two scorecards let a reader compare buildings fairly. PUE, power usage effectiveness, measures how much extra electricity the building spends beyond the computers themselves: 1.0 would be perfect, the industry average sits near 1.58 by the Uptime Institute's survey, and Google reports a fleet average of about 1.10. WUE, water usage effectiveness, measures liters of water per kilowatt hour of computing: the industry average is about 1.9, and Google reports a global

average of about 1.10. Read those two numbers together and the tradeoff is visible at a glance. The most efficient operators are genuinely good on both measures at once, and the totals still rise, because the buildout is growing faster than the efficiency. Better machines, more of them, bigger bill.

Where the water goes

Start with the simplest fact in this whole argument: the water does not leave the Earth. What evaporates off a cooling tower rises into the air, joins the weather, and falls as rain somewhere else. Nothing is destroyed. What changes is the address. Water that was sitting in one town's supply becomes water in the general circulation, and it can come down a county away or an ocean away, on ground that does not feed the source it was pulled from. The stored water is the sharper loss. Groundwater in a deep aquifer can sit out of the weather for centuries. Pump it up and spend it on cooling, and it joins the fast cycle for good: it will rain down somewhere, in its own time, but not back into that aquifer on any schedule a town can plan around. The share that does not evaporate returns as wastewater to the local system, still local and still usable.

Measured against the whole country, the take is small. All the data centers in the United States together used about 17 billion gallons directly in 2023, and set against the country's total withdrawals, and against what farming withdraws, that is a small share. But no town drinks from a national average. The bite is local. It lands on one aquifer, or one small town system, and it lands hardest in a dry season, which is exactly the shape of the fight in The Dalles told in the next section. The water is not gone from the world. It is gone from the place that was counting on it, and that is the loss the neighbors are actually arguing about.

Why the numbers were so hard to get

For years, a community often could not learn how much water its own data center used, because the figures were treated as a trade secret. The clearest case is The Dalles, Oregon. In 2021, The Oregonian asked the city for Google's water records. The city refused, calling the numbers a trade secret. The county district attorney ordered the records released, and the city then sued the

newspaper to keep them private. The case settled in December 2022, after thirteen months. The released records showed Google's data centers used about 355 million gallons in 2021, roughly 29 percent of all the water used in the city, and about triple the company's 2017 use. Google covered the city's legal costs and the fees owed to the newspaper's lawyers. To the company's credit, the story did not end there: Google has since published site level water figures in its environmental reports, and it says it has put more than 28 million dollars into The Dalles' water and wastewater systems, including an aquifer storage project it built and handed to the city. The lesson travels well. The numbers existed the whole time. What was missing was a rule that the public could see them.

The South Carolina chapter

This state has run the same argument twice, in two different forms. Google's campus in Berkeley County, outside Moncks Corner, has operated since 2008, with about 2.4 billion dollars invested and more than 400 people working on site. In 2016 the company applied to triple its groundwater withdrawal to 1.5 million gallons a day from the aquifer under the Lowcountry. The state granted the permit in 2019, the Coastal Conservation League appealed, and the December 2019 settlement that followed is one of the better outcomes on record anywhere: groundwater became a last resort rather than a first supply, Google committed to developing alternative sources, and the company agreed to report its groundwater use publicly every quarter. Google's own environmental reporting put the Berkeley County campus at about 763 million gallons of water used in 2023, up from about 662 million the year before, which makes it one of the most water intensive sites in the company's United States fleet.

The argument is not finished here. In September 2024 Google announced a further 3.3 billion dollars in South Carolina, including two new campuses in Dorchester County, now under construction. A public records suit over the Dorchester project's water data settled in 2025 with the county agreeing to disclose the figures. And in Aiken County, Meta is building an 800 million dollar AI data center in the Sage Mill Industrial Park near Graniteville, announced in August 2024, with 100 permanent jobs, its electricity use matched with 100 percent renewable energy, and an opening expected in spring 2027. Officials told the county council the site is expected to draw about 200 megawatts of power, more than the city of Aiken uses. No

comparable public figure for the Aiken campus's water use has been published. Meta says it aims to be water positive by 2030, funding restoration projects that return more water than it consumes. Whether that arithmetic works for Aiken County depends on numbers that, today, are not public.

Who pays, line by line

The operator pays its own water and power bills. That sentence is true and incomplete, in four specific ways. First, rates: large users commonly negotiate industrial rates well below what a household pays per gallon or per kilowatt hour, so the building's consumption is priced cheaper than the neighbors'. Second, the grid: a single campus can need as much power as a mid sized city, which means substations, transmission lines, and new generation. Unless a deal assigns those costs to the company, they are spread across every customer in the utility's territory, and a share of the building's true cost arrives in other people's power bills. Third, water works: bigger mains, more treatment capacity, and new supply are often funded by the town or county up front, against a tax base that arrives years later. Fourth, taxes: data center deals commonly include long running abatements, so during the very years the community is carrying the most cost, it is collecting the least revenue. And under all of it sits the risk line. If the aquifer drops or the reservoir runs low in a dry year, that cost does not appear on the operator's ledger at all. It stays with the town.

The other side deserves its full weight. These campuses bring large construction payrolls, then a permanent tax base once abatements lapse. Some operators now fund new power generation themselves rather than drawing on what exists, and some fund water restoration beyond their own use. Google's Berkeley County settlement and its work in The Dalles both show what a negotiated outcome can look like when a community has leverage and uses it. The fight in most towns is not really whether a data center should exist. It is whether the deal on paper makes the company carry its full share, or quietly hands part of the bill to the neighbors.

The standard we publish by

Agentic Armor builds verification systems, and our standing rule for our own work is simple: a claim the public cannot check is a claim the public should not have to take on trust. The same standard fits here, and it is not a partisan one. A data center deal asks a community to supply real water, real power, and real money. In return, the community is owed real numbers, published on a schedule, in a form a resident can read: how much water the site takes and how much it returns, what it pays per unit against what households pay, what grid and water construction the public is funding, and what the tax terms are, year by year. Berkeley County got part of that in 2019 because people organized, appealed, and negotiated. It should not take a lawsuit or a settlement to reach the starting line. Publish the numbers with the announcement, and let every town judge the deal with the figures on the table. That is the whole of our position, and it is the standard we hold our own publications to, this one included: every figure above names its source, and the sources are listed below.

Sources

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- The Aiken Standard, August 2024: the expected draw of about 200 megawatts reported to Aiken County Council.
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