

The Water Footprint of Digital Infrastructure

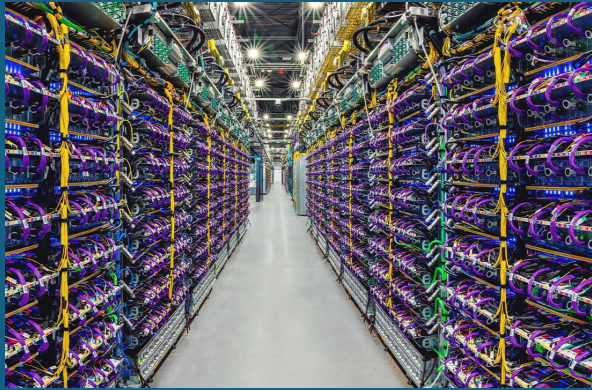
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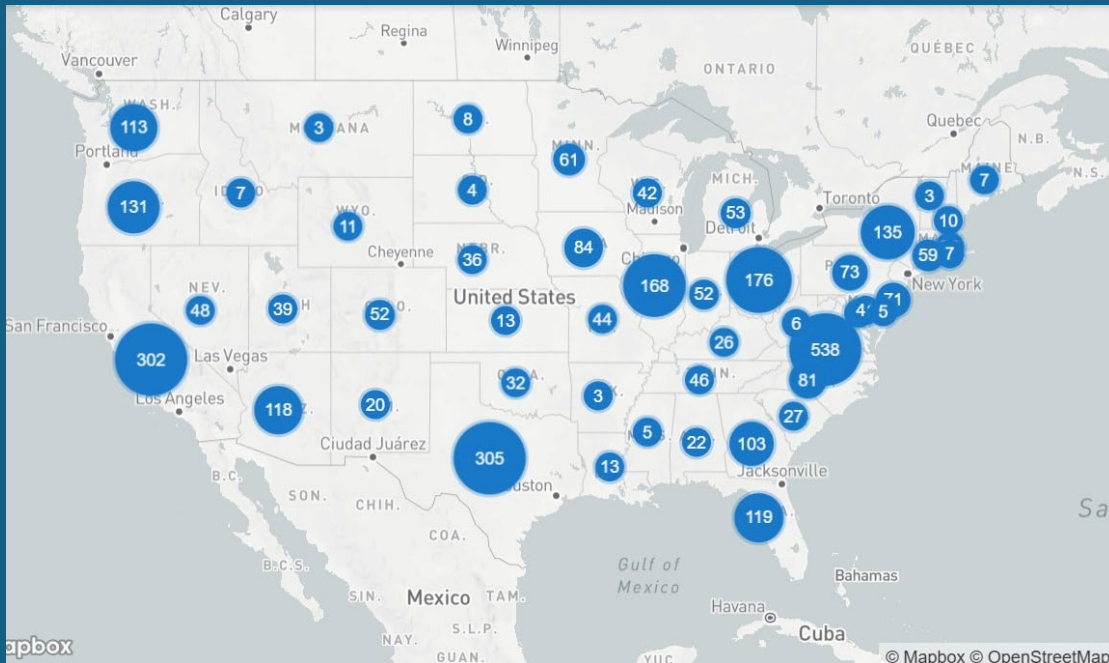
Data Centers



**~11,800
globally**



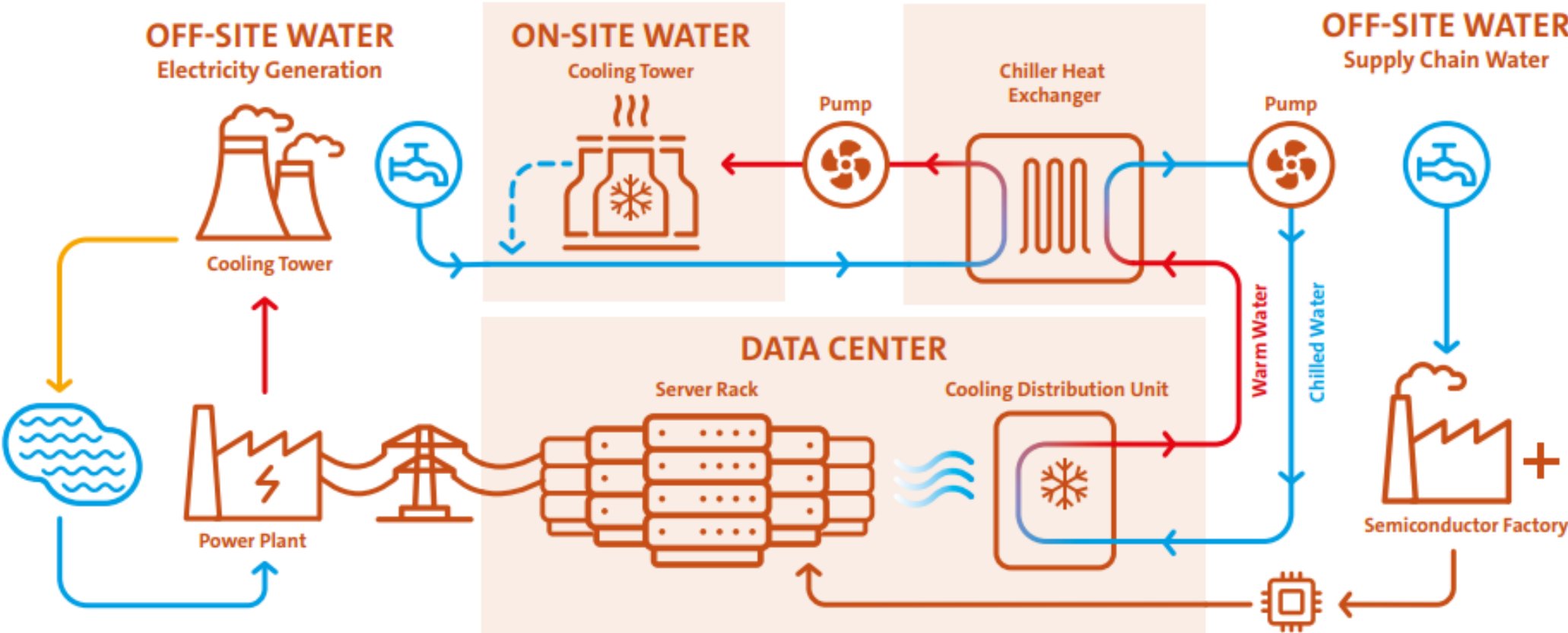
**~5,400
in the US**



- Have been around for decades
- The backbone of nearly everything digital
- Considered critical digital infrastructure
- Recent expansion is a response to AI adoption

The Water Footprint of Data Centers

Withdrawal vs Consumptive Use (70-80%)



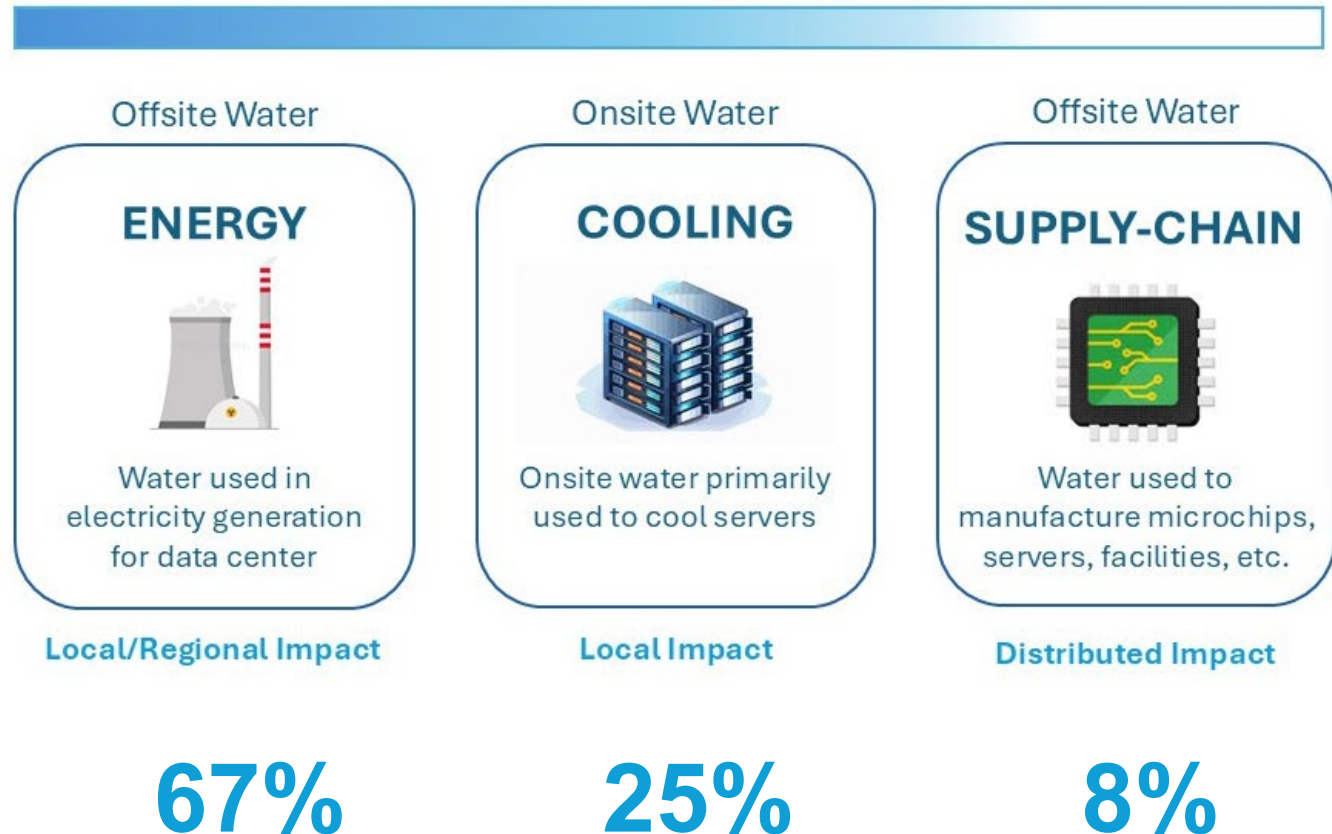
The Water Footprint of Data Centers

Cooling (scope-1): 0.26 - 2.4 gallons per kWh of server energy

Water-Intensive Electricity Generation (scope-2): 2.0 gal of evaporated water per kWh of electricity consumed.

Water Consumption Associated with AI Supply Chains (scope-3): 2.1 – 2.6 gallons of water per microchip

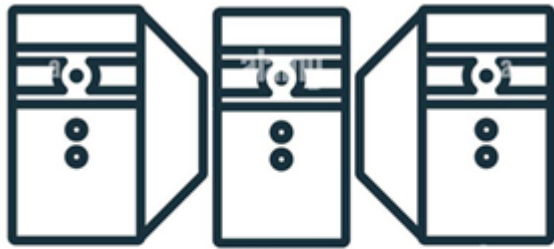
Data Center Water Footprint



* According to the IEA



Data center water use



DATA CENTER



Current Global
Withdrawal: **2.3**
trillion
gallons/year

** IEA estimates*



Current Global
Consumption: **148 billion**
gallons/year



Projected
Consumption by
2030: **317**
billions
gallons/year.



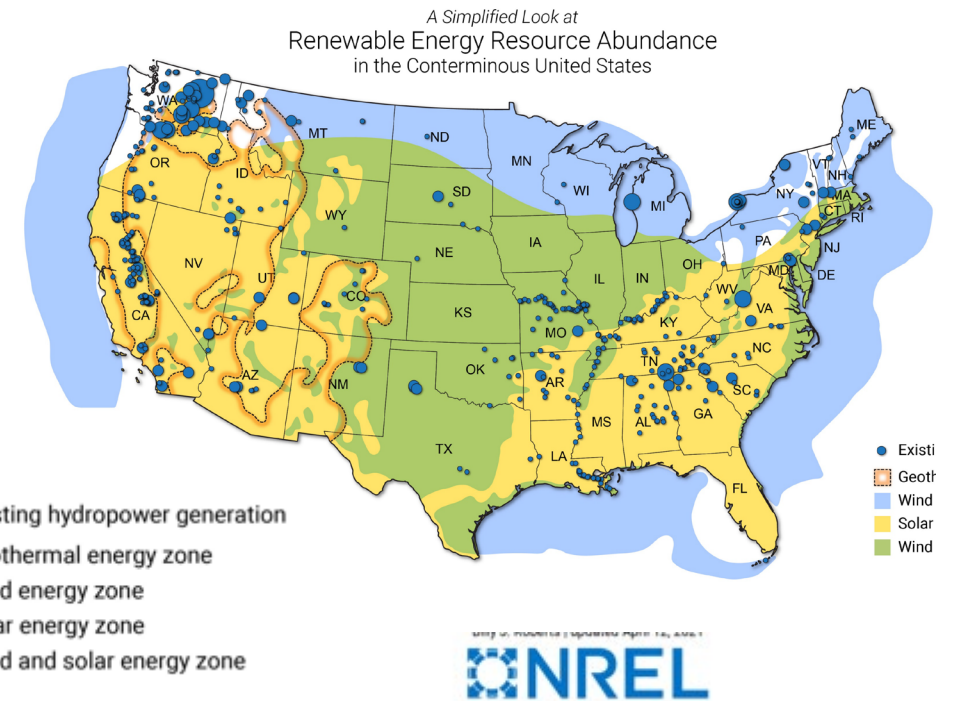
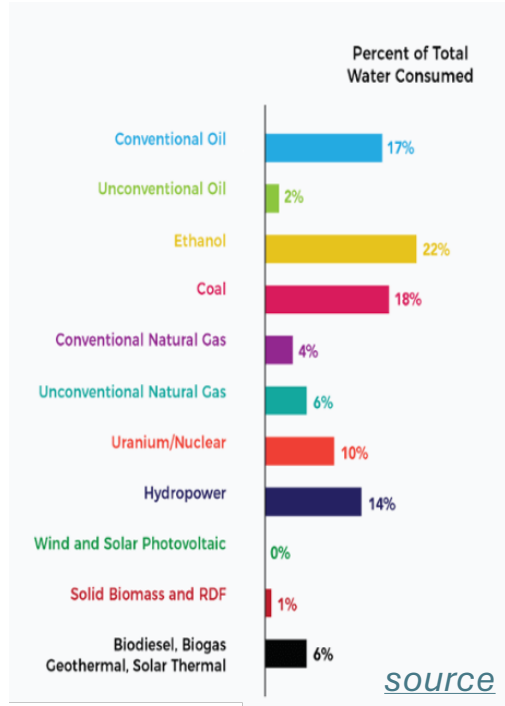
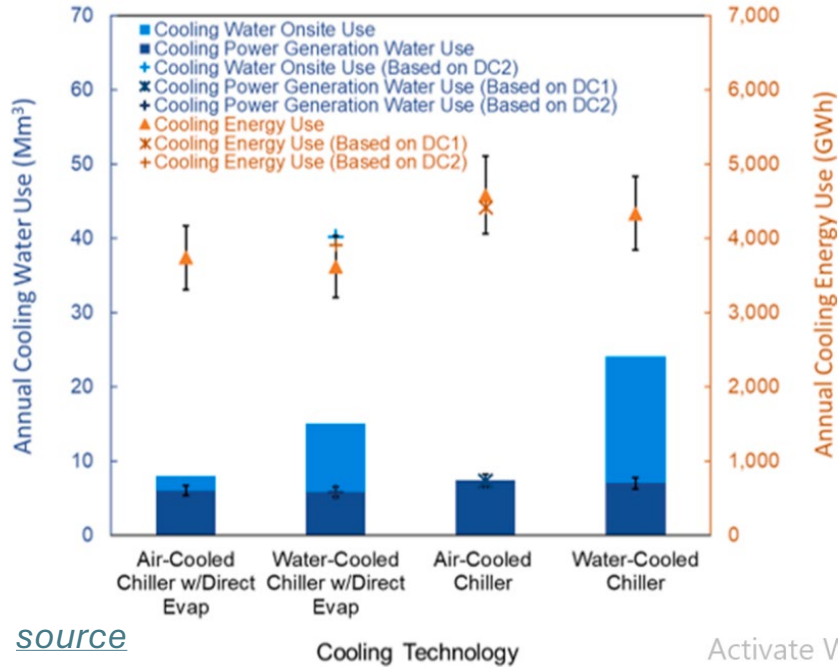
(2023): Used **813 million gallons** of water globally (95% consumed by data centers).



Google (2023): Used **6.4 billion gallons** of water worldwide ((6.1 billion gallons attributed to data centers).

In 2023, data centers in Virginia are estimated to have use **~2 B gallons** of water for cooling,

Cooling Data Centers : Trade-off Between Water and Energy



source

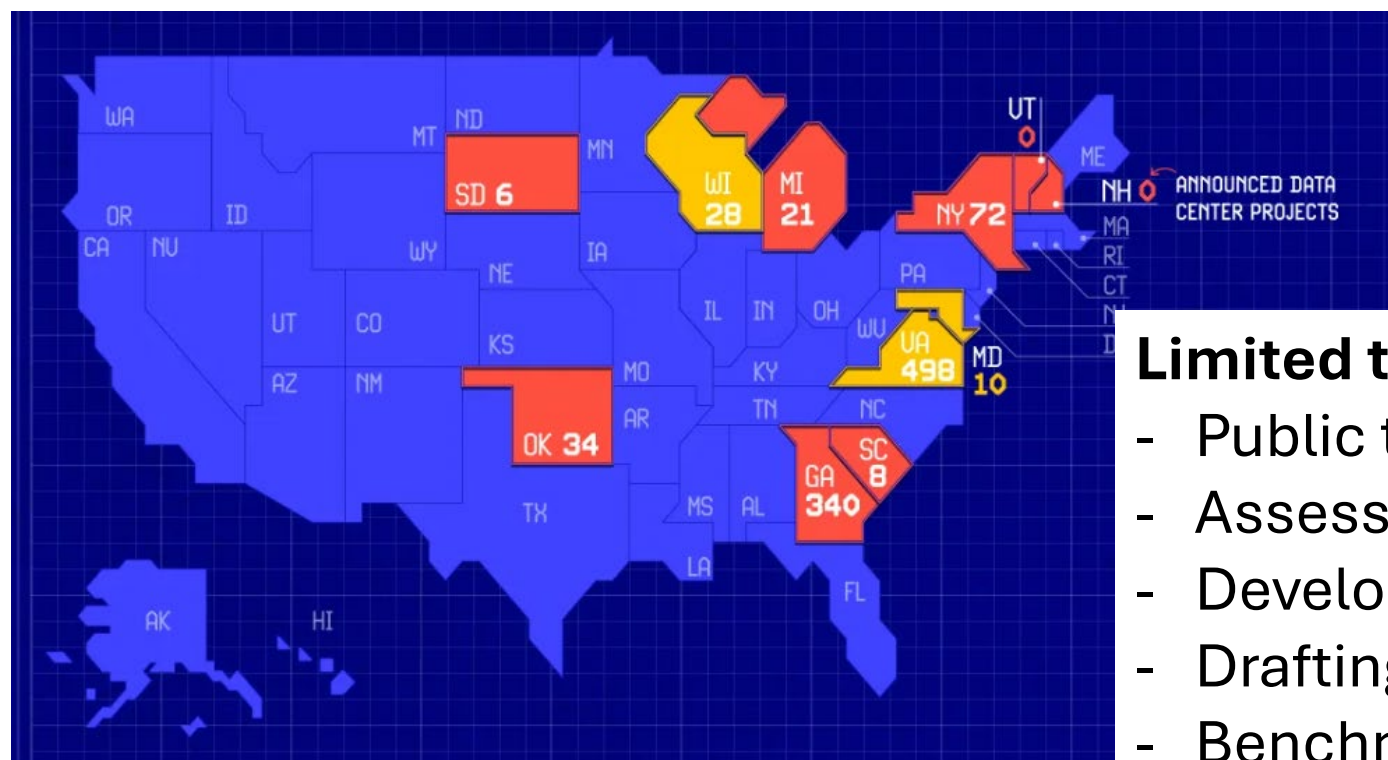
Activate Wind

source

Can Renewable Energy Solve the Water Problem for DC Cooling?

- Need:** Data centers require a reliable, continuous power supply to support cooling processes
- Limitation:** Solar and wind energy are inherently intermittent -- output depends on weather conditions and the time of day
- Limitation:** Current energy storage solutions are inadequate

Limited Transparency on Water Use Hinders Planning, Innovation and Public Trust



- temporary ban
- conditional restrictions

Limited transparency:

- Public trust
- Assessing cumulative impacts
- Developing effective planning strategy
- Drafting data supported policy
- Benchmarking and innovation

States with Passed Legislation (water-related)

In 2025 alone, **27 bills** were introduced across the U.S. to address data center water impacts

Kansas — SB 98 (Enacted 2025)

Provides **tax incentives for data centers** if they conserve water, reuse water and replace water usage with sustainable practices (uses **economic incentives instead of mandates**)

Minnesota — HF 16 (Enacted 2025)

Requires large data centers (as “large load customers”) to **consider water conservation measures during permitting and** account for environmental impacts, including water use.

Virginia — SB 553 + HB 2377 (Enacted 2025–2026)

SB 553: Requires **water usage data reporting by utilities supplying data centers**
HB 2377: Requires **local planning processes to address and minimize water use impacts**

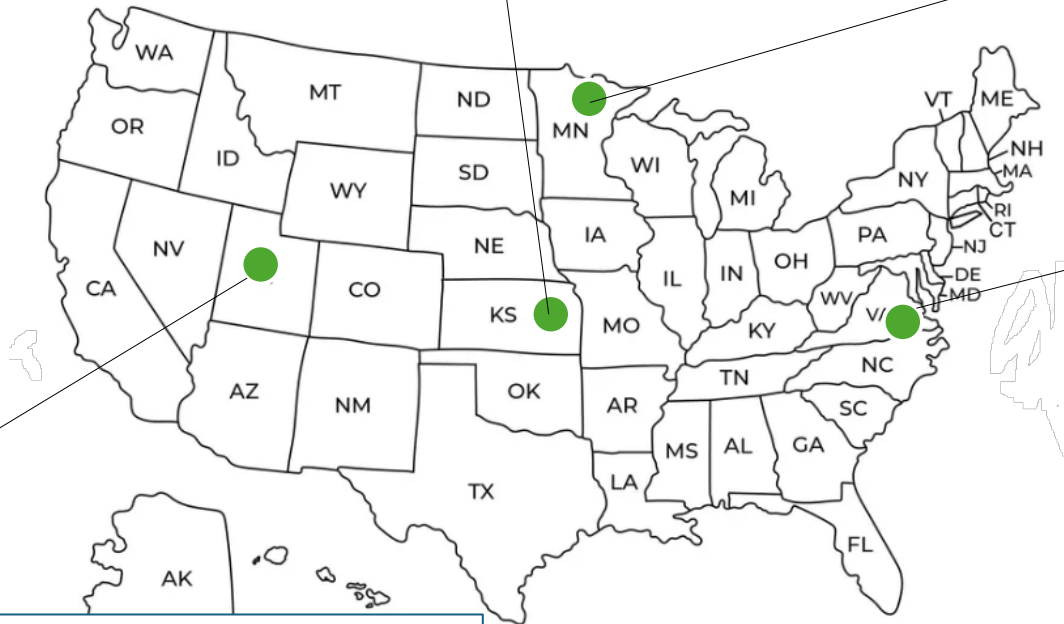
Utah — HB 76 (Enacted 2026)

Mandatory reporting of water use for consumers that use more than 75 acre-feet/year that data be shared publicly and issues heavy penalties for Failure to disclose.

Vetoed or still moving:

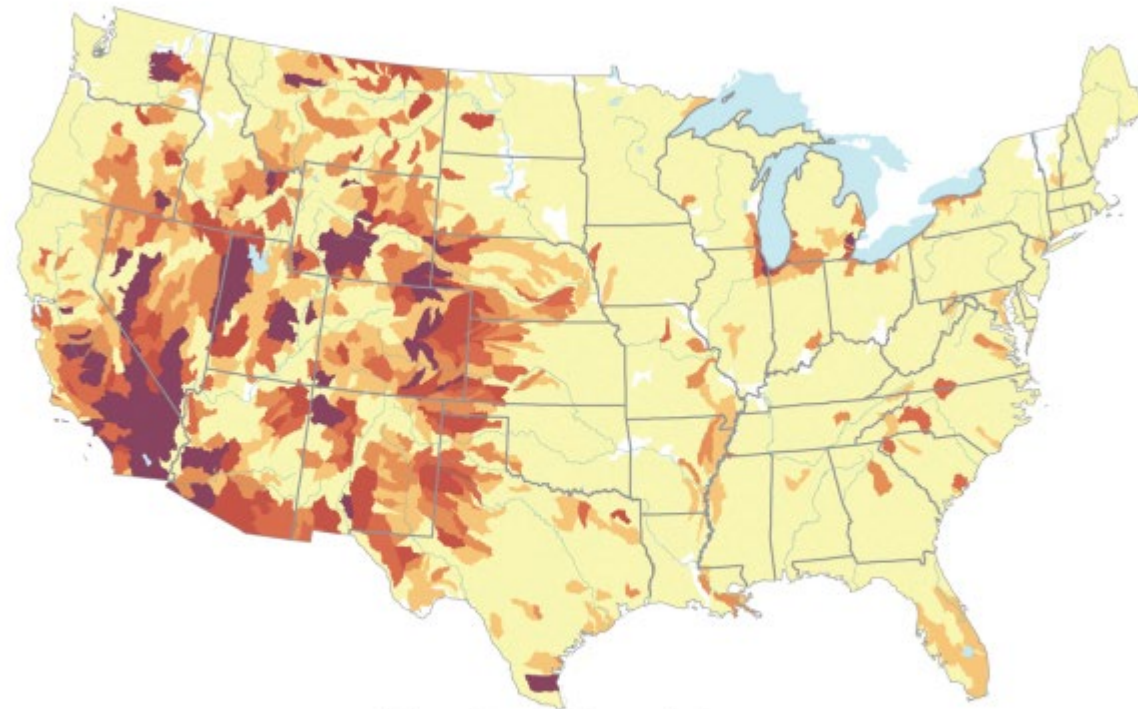
- **New Jersey (Reporting bills)**
Passed legislature but: **conditionally vetoed / not finalized into full law**
- **California (multiple bills like AB 93, AB 1577)**
Would require: water reporting and pre-permit disclosure
But: **vetoed or stalled**
- **Illinois (Transparency + aquifer protection bills)**
Very strong proposals (reporting + groundwater bans)
Still **introduced / pending**, not enacted

...



How to Support Data Center Expansion Without Compromising Water Resources?

Water Stress in the U.S.



WEST: What is the optimal use of existing water? (transfer of existing permits)

EAST: How much DC expansion can available water support? (new permits)



Maximize Benefit and Minimize Cost

- Is the project using water as efficiently as it can?
- Who benefits and who bears the cost?
- Can the water system support this demand now and in the future?

Community Benefit Agreements

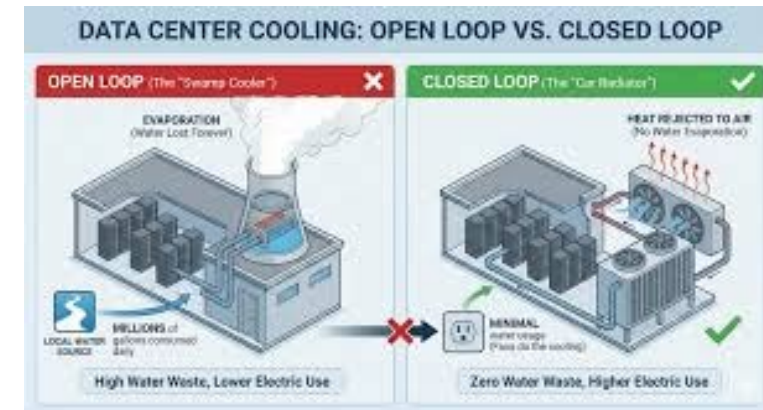
Microsoft: use of closed-loop water recycling systems that continuously circulate the same water between servers and chillers, eliminating the need for freshwater top-ups (2026: Arizona and Wisconsin).

AWS: expand use of recycled wastewater for cooling (2030: operate 120 data centers with reclaimed water).

AWS: use data center cooling water for agricultural irrigation (Umatilla, Oregon).

AWS: funded water supply modernization and flood-risk reduction (Spain's Aragon region).

Essential Utilities: built an 18-million-gallon-per-day treatment plant to supply both a data center and its onsite power facility (US\$26 million investment; Pennsylvania).





Not All Datacenters Are Created Equal



Increase transparency: Measure and disclose data center’s operations and impacts to support effective resource management.

Assess risks holistically: Adopt system of systems approach to understand impact across sectors and scales. Explore cumulative impacts at regional scale.

Adopt circularity principles: Build closed loops and use recycled water to minimize resource use and waste.

Support research & innovation: Create incentives for innovation (energy efficient hardware and software, server cooling technology, energy storage, water recycling, etc.).

Implement regulatory oversight: Create evidence-based policy and robust governance frameworks to support sustainable growth and adoption.

Market forces: Data center water consumption is emerging as a credit risk

MOODY'S RATINGS

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TABLE OF CONTENTS	
Summary	1
Data center water consumption is emerging as a credit risk	2
Large data center clusters in areas with high water stress spark competition over water resources	3
Water consumption – and attempts to reduce it – will raise regulatory and operational risks	5

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Data Centers – Global

Water management challenges will loom large amid surging computing demand

Summary

As global data center capacity continues to grow at a rapid rate, the importance of sound water management will rise in importance. Data centers must cool their servers to prevent them from overheating. Most existing data centers use air-based cooling given their low server rack density. But roughly half of much larger hyperscale or AI data centers rely on water-based cooling that requires less electricity than air-cooling systems but depend on local water supplies. As cloud-computing and internet giants, or hyperscalers, build or lease new data centers to meet escalating computing demand, their water consumption may strain resources in some markets. Data center developers that fail to use water-efficient or waterless cooling systems may face heightened scrutiny from regulators and investors.

» **Data center water consumption is emerging as a credit risk.** High-performance computing workloads, such as artificial intelligence (AI) model training, generate significantly more heat than conventional computing tasks, increasing cooling needs and, potentially, water consumption. As groundwater shortages become more prevalent

Thank you

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