The Power and Water Demand of Data Centers:
Some Questions (and Answers)

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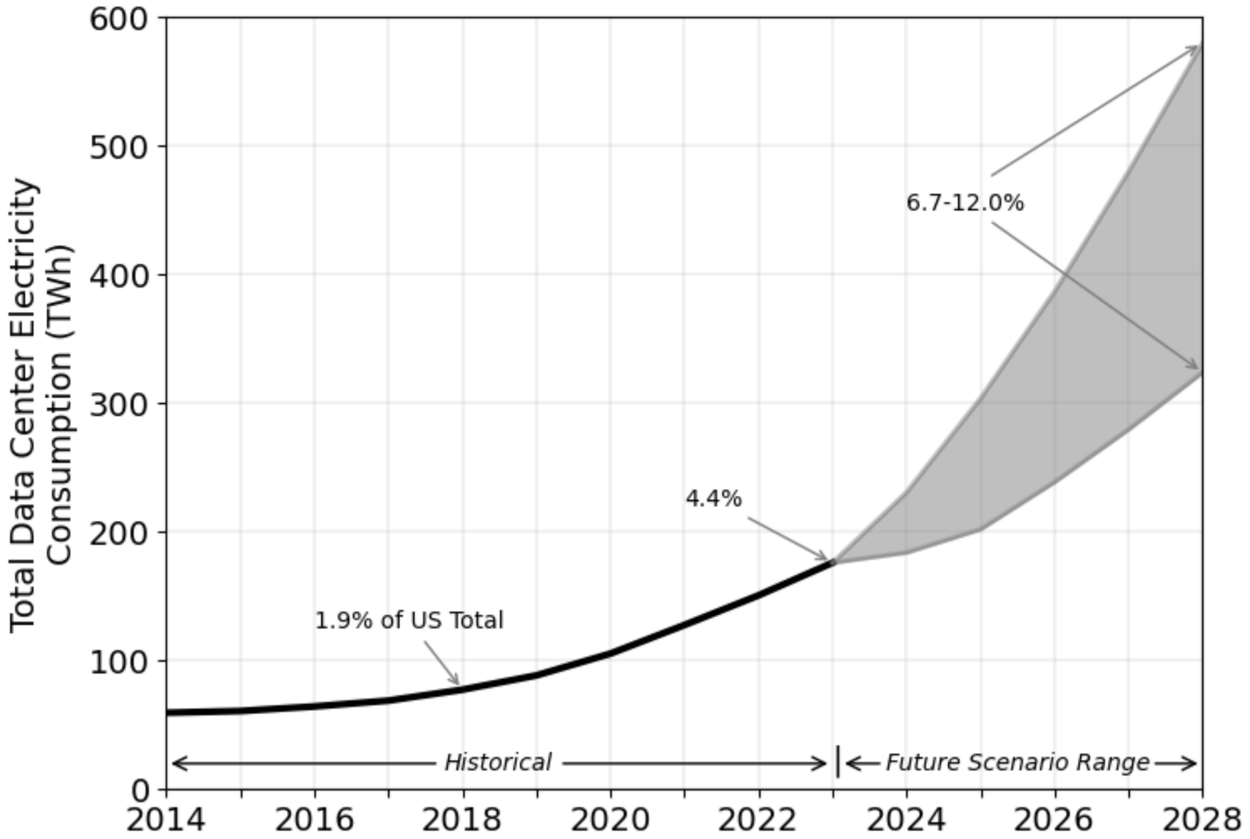
The presentation is not intended to advocate for or against the construction of data centers, nor to support or oppose any specific project, which requires detailed, context-specific evaluation. Instead, it aims to provide essential background and a quantitative assessment of the potential environmental and societal impacts of AI and data centers.

The growing demand for energy

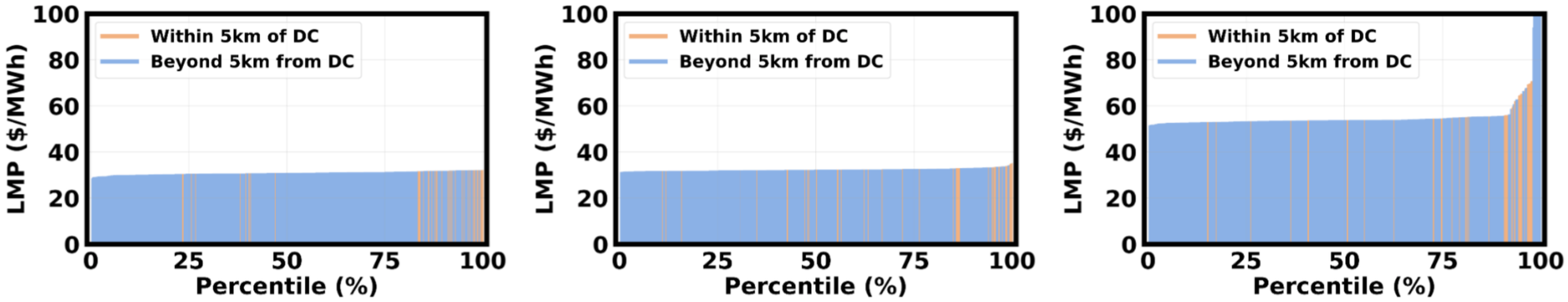


The U.S. data centers, almost entirely driven by AI, will consume up to ~600 TWh electricity in 2028, accounting for **6.7 – 12.0%** of the national electricity demand.

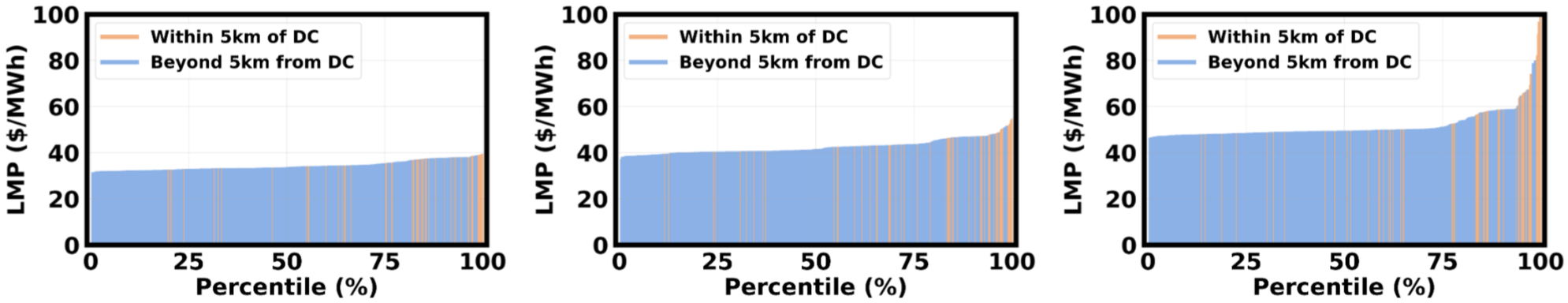
Source: 2024 United States Data Center Energy Usage Report

Transmission congestion

Day-ahead wholesale market prices in Dominion



(a) 2015/2016 (b) 2018/2019 (c) 2021/2022

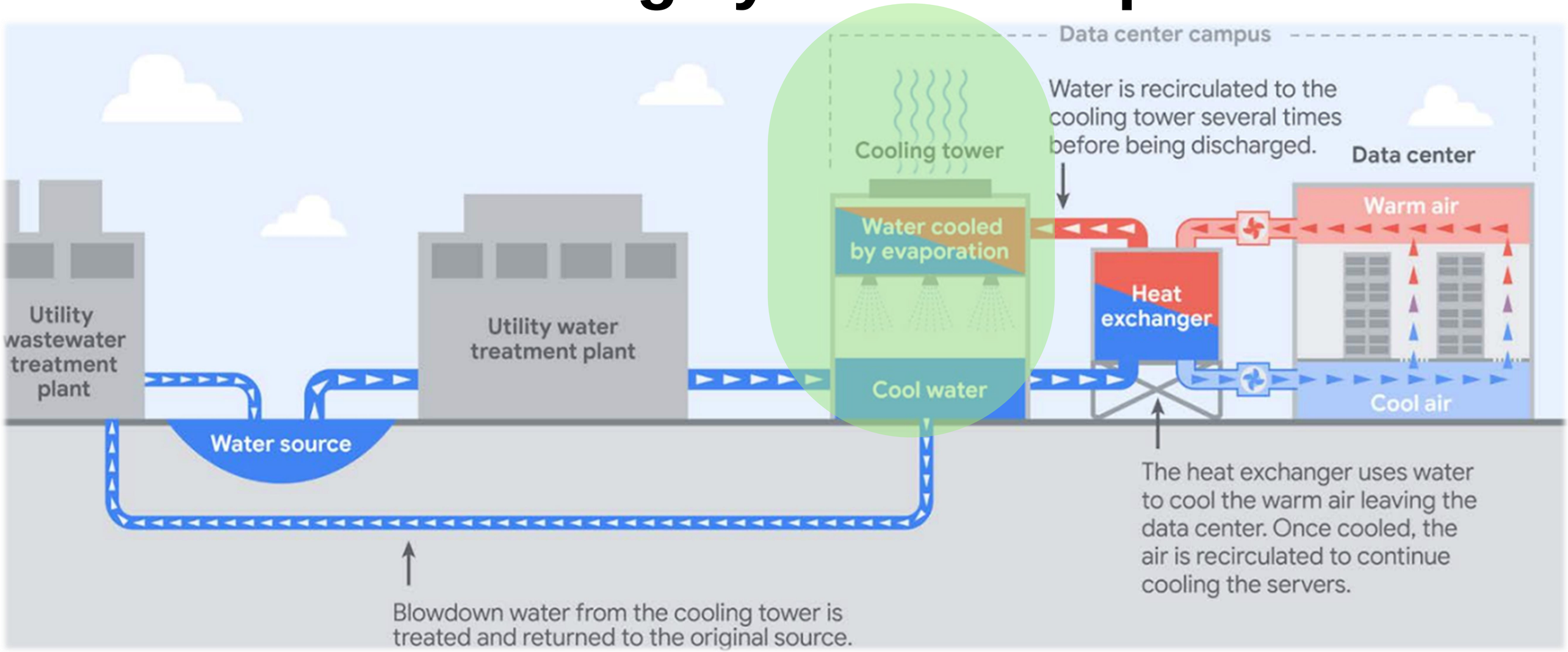


(d) 2023/2024 (e) 2024/2025 (f) 2025 (Jun-Nov)

Source: Unpublished as of 02/24/2026

Why do data centers use water?

Here's one cooling system example



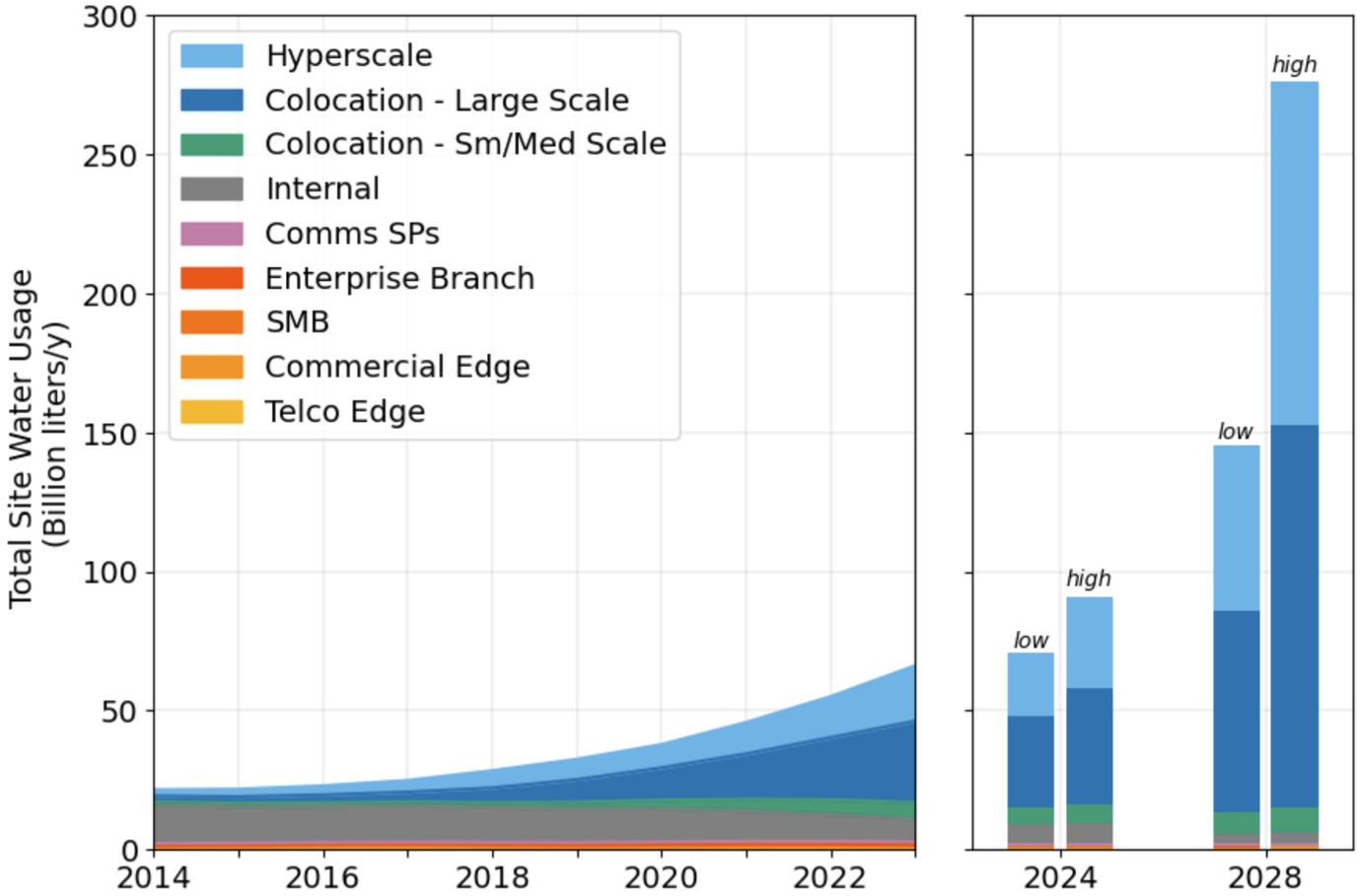
Onsite cooling water primarily comes from public water systems.

Source: Google

Source: Google

How much water does AI use?

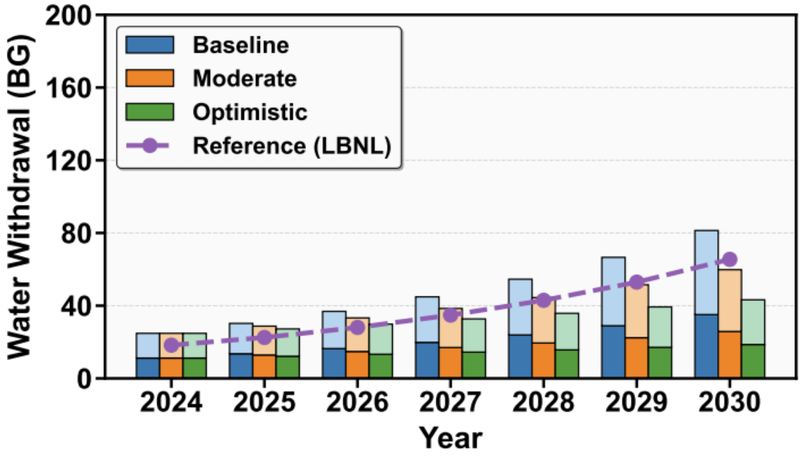
The growing thirst for water



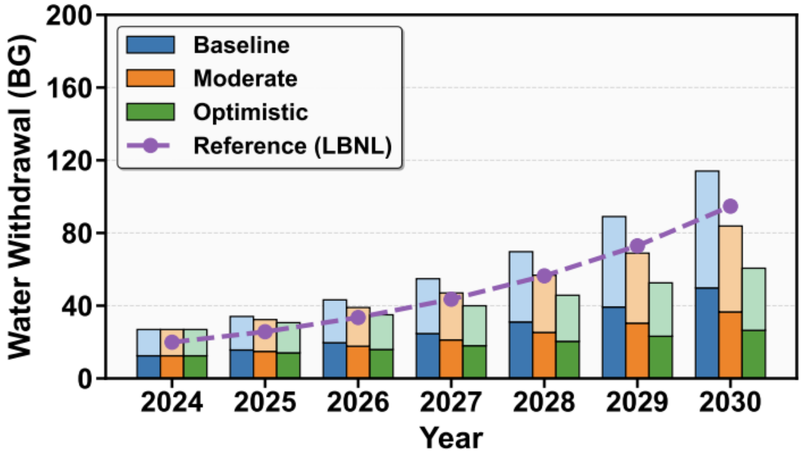
Source: 2024 United States Data Center Energy Usage Report

Water withdrawal

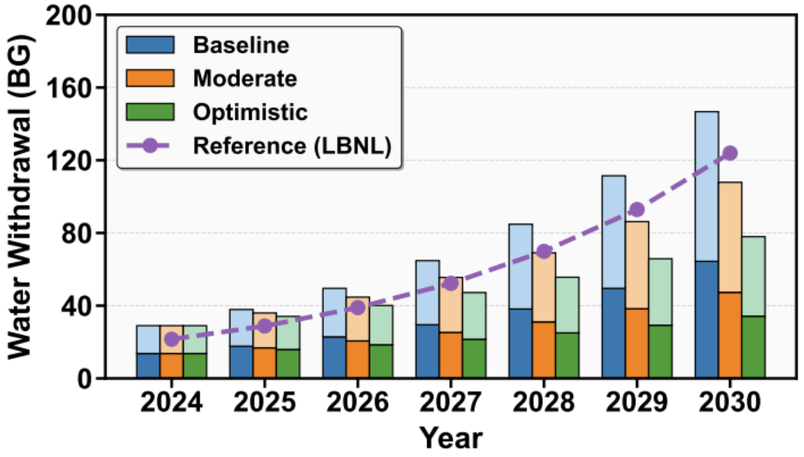
By comparison, Los Angeles Department of Water and Power supplies ~160 billion gallons of water per year.



(*a*) *Low Growth*



(*b*) *Mid Growth*



(*c*) *High Growth*

Source: Unpublished as of 02/24/2026

What are the benefits of water?

“Water is the most efficient means of cooling in many places.”

“…reduces electricity demand by 25-35% at the same time when the grid experiences peak summer loads and regional power demand is at its highest.”

Source: https://www.gstatic.com/gumdrop/sustainability/google-2025-environmental-report.pdf and https://www.aboutamazon.com/news/company-news/amazon-data-center-louisiana-new-jobs

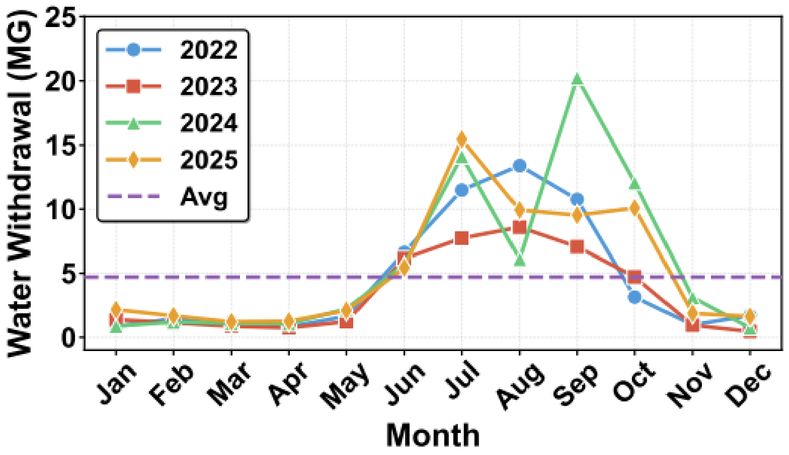
Does the U.S. have (enough) water for data centers?

There is no “national reservoir.”

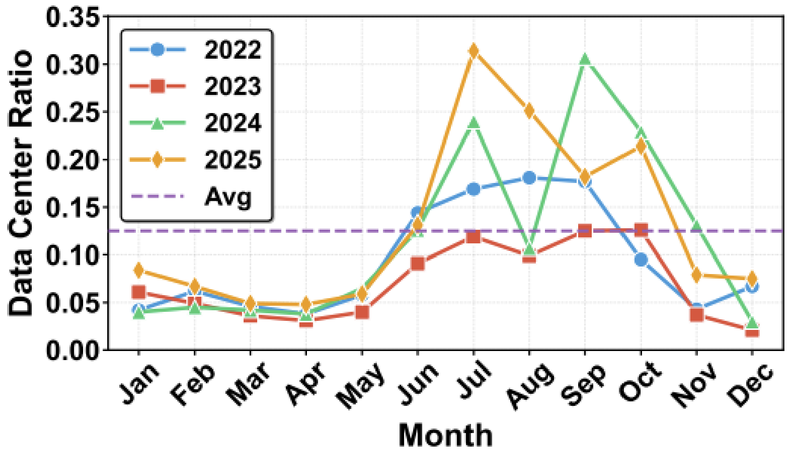
Data centers receive (mostly potable) water from municipal water systems.

Monthly water use of a hyperscaler

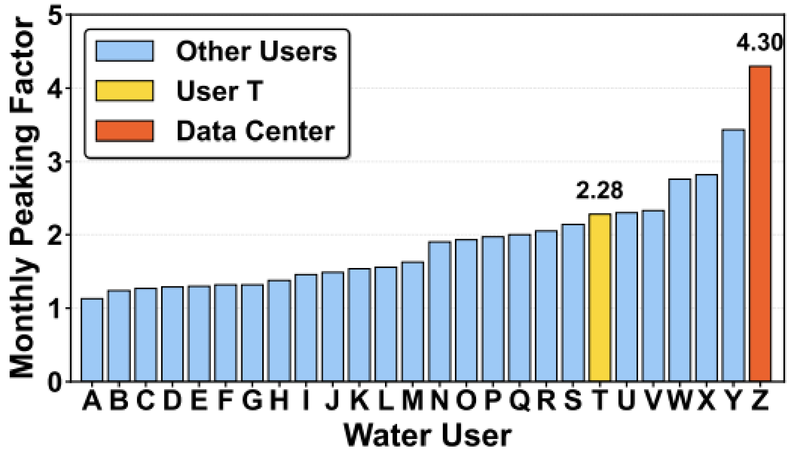
In 2025, the largest water user in the city serving ~70,000 residents and tens of commercial/industrial users. Estimated daily peaking factor ~6.5



(*a*) *Data Center Water Withdrawal*



(*b*) *Ratio of Data Center Water Withdrawal*

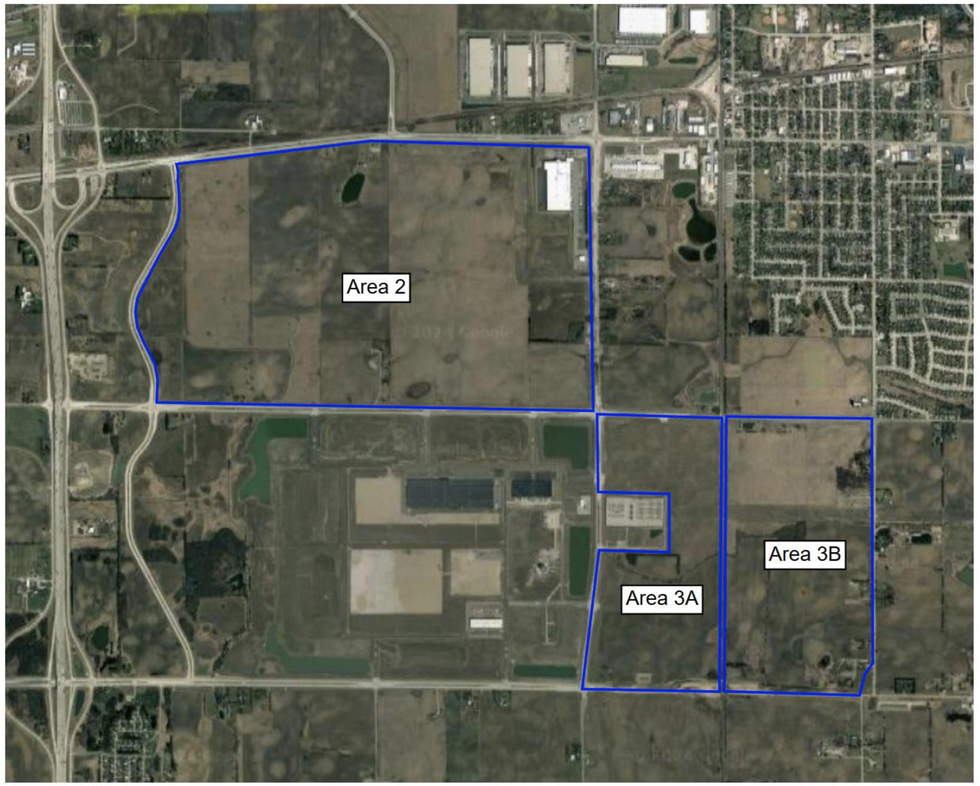


(*c*) *Monthly Peaking Factor*

Source: https://www.wdmww.com/minutesandagendas.aspx

Water usage of a hyperscale data center

Planned water usage of a zero-water hyperscale data center in Wisconsin. Estimated peaking factor 30.



	Water Demand		Wastewater Discharge		Properties Included
	Peak Day GPD	Annual GPY	Peak Day GPD	Annual GPY	
2026	234,000	2,814,000	81,000	2,031,000	Area 3B
Future (TBD)	702,000	8,442,000	243,000	6,093,000	Area 3B, Area 3A, Area 2

Source: https://www.wpr.org/wp-content/uploads/2025/09/MKE-Regional-Demands-030124.pdf

“Most communities” lack available water capacity

Susquehanna River Basin Commission: FAQ on data center water use

How could a data center using a large amount of water affect a community? What’s the concern?

Most communities do not have large surpluses of excess water supply readily available to provide to hyperscale data centers or new power plants built to serve them. Data centers can be constructed quickly – in under two years – but it can take many years longer than that to identify and develop new sources of water supply.

With traditional cooling methods, it is unlikely that a hyperscale data center will be able to obtain enough required water from the local public water supplier. So if the data center is proposing to supply its own water from groundwater wells or a nearby stream or river, careful review will be needed to ensure that the volume of water needed can be safely supported by the source without depleting it, without denying water to existing users, and without harming aquatic habitat and wildlife that rely on the water.

Source: https://www.srbc.gov/about/news/docs/srbc-data-centers-faq.pdf

What water utilities say

When interviewed about the water capacity request of 6 million gallons per day (MGD) from a new data center that would exceed the available supply in Newton County, Georgia, a representative of the county's water authority responded:

> "What the data centers don't understand is that they're taking up the community wealth." and **"We just don't have the water."**

Source: https://www.nytimes.com/2025/07/14/technology/meta-data-center-water.html

Water capacity can be a binding constraint

Without sufficient water capacity, data centers often must rely on **waterless, less-efficient dry cooling**, which can increase electricity demand and add stress to the power grid during summer peaks.

What is the challenge?

How to accommodate the new industrial-scale water demand in (rural) communities

~150,000 public water systems in the U.S.

~50,000 community water systems (90+% small/medium)

Compared to ~3,000 power utilities.

Source: https://www.epa.gov/dwreginfo/information-about-public-water-systems

EPA estimates a $1.3 trillion funding need from 2022-2041,

including $630 billion for drinking water and $650 for wastewater

Source: EPA drinking water and wastewater surveys.

EPA estimates 12-19 million households lack affordable water services

Source: https://www.epa.gov/system/files/documents/2024-12/water-affordability-needs-assessment.pdf

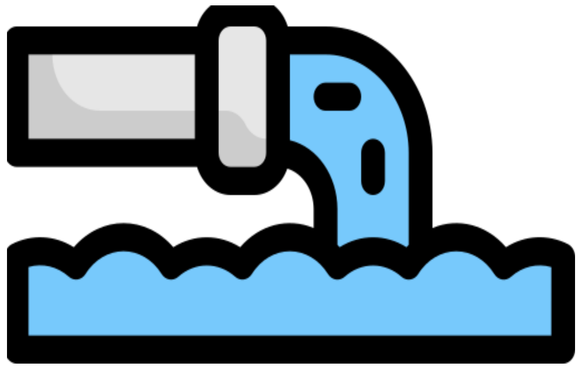
Corporate-community partnership

A large technology company announced in February, 2026, $400 million to upgrade local public water infrastructure to support its Louisiana data centers hosting AI and cloud services.

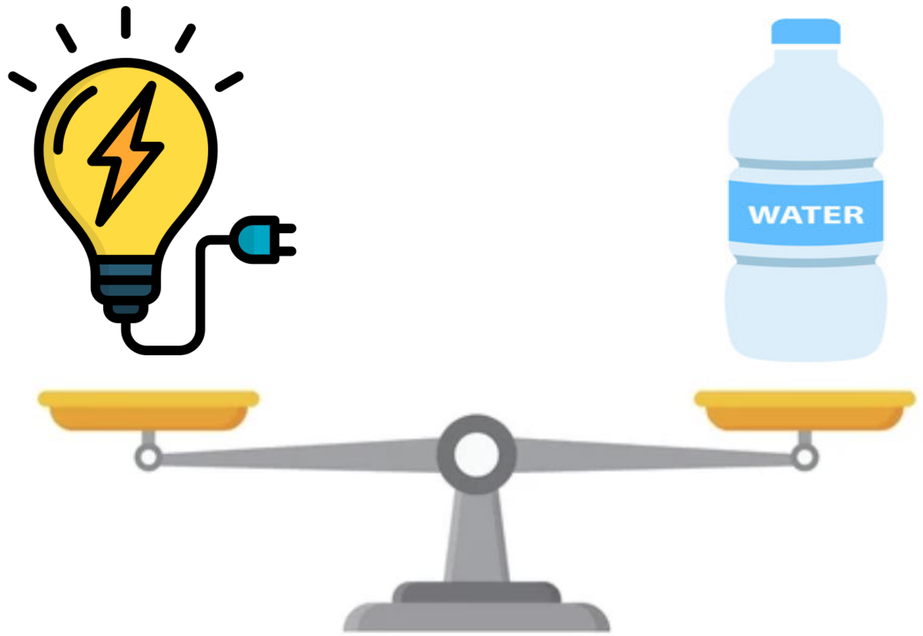
Source: https://www.aboutamazon.com/news/company-news/amazon-data-center-louisiana-new-jobs

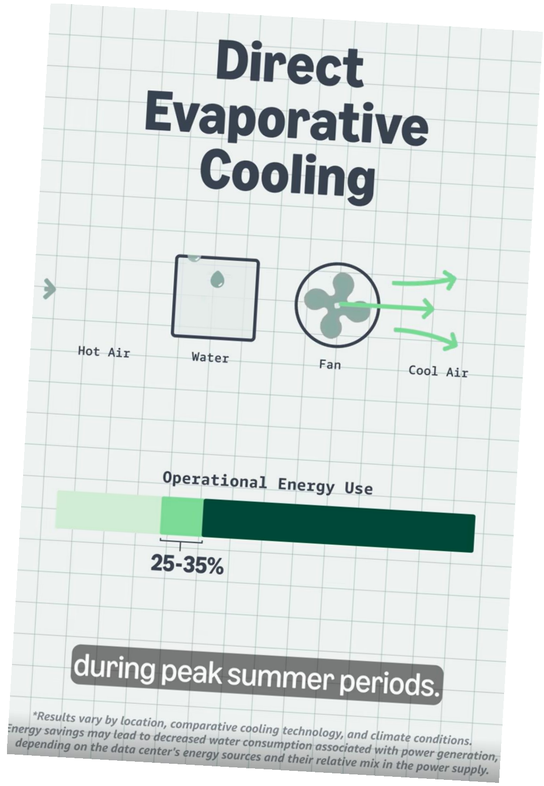
Water Positive

Water Positive
+
“Pipe Neutral”



Coordinated water-power planning





Source: https://sustainability.aboutamazon.com/stories/just-back-from-weftec-why-does-ai-use-water

Community-first AI

Siting Factor	Historical Importance	Importance Today	Importance in ~5 years
Power Availability and Cost	3	1	3
Land Price	4	7	8
Water Availability	8	3	2
Fiber Network	2	4	5
Proximity to Demand	6	8	6
Corporate Tax Rate	5	9	9
Tax Incentives	1	5	7
Human Capital	7	6	4
Community Opposition	9	2	1

Source: E3: Forecasting Large Loads in the Age of AI and Data Centers