AI, Energy and Water

What the numbers actually say

A plain-English executive brief for people who worry AI is draining the grid or drinking the country dry. The answer is less dramatic, and more useful: a single text prompt is tiny. Data centers at scale are large. Water impacts are small nationally compared with farming, but can matter locally.

The honest bottom line

One AI text prompt is usually comparable to seconds of TV or drops of water. The larger concern is not your single prompt. It is the growth of always-on data-center infrastructure, especially when facilities cluster where the grid or local water system is already stressed.

Use this report to replace panic with proportion.

First, define the buckets

Most bad AI footprint arguments mix these together.

Prompt-level impact

The electricity and water associated with one response. Google reports a median Gemini Apps text prompt at 0.24 Wh and 0.26 mL of water. That is a specific company, model, workload and methodology, not a universal law.

Data-center impact

The annual electricity and water used by data centers. This includes AI, cloud computing, streaming, business software, search, storage, networking and cooling. This is where the scale problem lives.

Local impact

A national percentage can look tiny while a single facility strains a local power grid or water supply. Location matters. Cooling design matters. Electricity source matters.

Plain-English rule

If someone says, "AI uses a bottle of water per prompt," ask: Which model? Which task? Which data center? Direct water only, or electricity-related water too? Training or everyday use? Without those answers, the claim is probably a meme wearing a lab coat.

Key source notes: [1] Google Cloud Blog, Measuring the environmental impact of AI inference, Aug. [3] Shehabi et al., 2024 United States Data Center Energy Usage Report, Lawrence Berkeley National Laboratory / U.S. [9] UC Riverside News, AI programs consume large volumes of scarce water, Apr. [10] Li, Yang, Islam and Ren, Making AI Less Thirsty, arXiv:2304.03271, 2023.

Energy: one AI text prompt is tiny

Google estimate for a median Gemini Apps text prompt: 0.24 watt-hours.

0.24

Wh per prompt

That is roughly the energy in less than nine seconds of TV, according to Google. Use this as a reasonable lower-end modern text-prompt estimate, not as a number for every AI task.

Everyday equivalents

Action	Energy	Equal to about
1 median Gemini text prompt	0.24 Wh	1 prompt
10-watt LED bulb for 1 hour	10 Wh	42 prompts
TV for 1 hour at 100 watts	100 Wh	417 prompts
Average U.S. home for 1 day	28,800 Wh	120,000 prompts

What this means: asking a normal text question is not the energy monster. The energy monster appears when millions of users, larger models, longer outputs, images, video, training, storage and cooling run constantly.

Sources: [1]; [4]

Energy: the system scale is real

Data centers are small compared with the whole economy, but big enough to reshape grid planning.

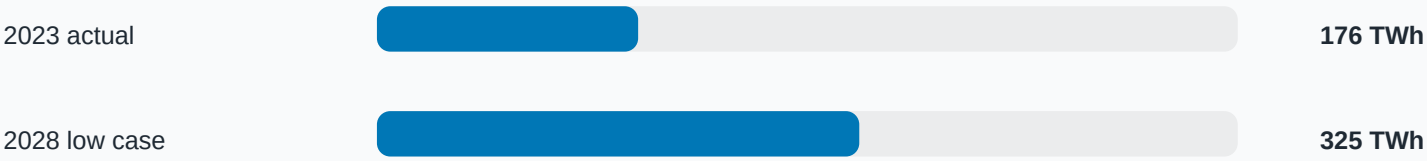
Global data centers

415 TWh in 2024. Projected around 945 TWh by 2030, just under 3% of global electricity.

U.S. data centers

176 TWh in 2023, equal to 4.4% of U.S. electricity. Projected 325-580 TWh in 2028.

U.S. data-center electricity, historical and projected



Household translation

16.8 million homes

U.S. data centers in 2023 used about as much electricity as 16.8 million average U.S. homes use in a year. That is why utilities, regulators and local governments are paying attention.

Sources: [2]; [3]; [4]

Water: one AI text prompt is usually drops, not a bot

But per-prompt water estimates vary more than the internet admits.

0.26 mL

about five drops per median Gemini text prompt

That is Google's estimate. The older UC Riverside/Ren estimate was much larger: roughly one 500 mL bottle for 20-50 queries, or about 10-25 mL per query. The honest answer is a range, because water use changes by model, cooling system, time of day, power source and location.

Everyday water equivalents using Google's 0.26 mL estimate

Everyday amount	Water	Equal to about
1 teaspoon	5 mL	19 prompts
1 cup	237 mL	912 prompts
1 water bottle	500 mL	1,923 prompts
1 average American shower	15.8 gallons	230,000 prompts

Sources: [1]; [7]; [8]; [9]; [10]

The water-bottle claim needs surgery

The viral version dropped the denominator. That is how myths are born.

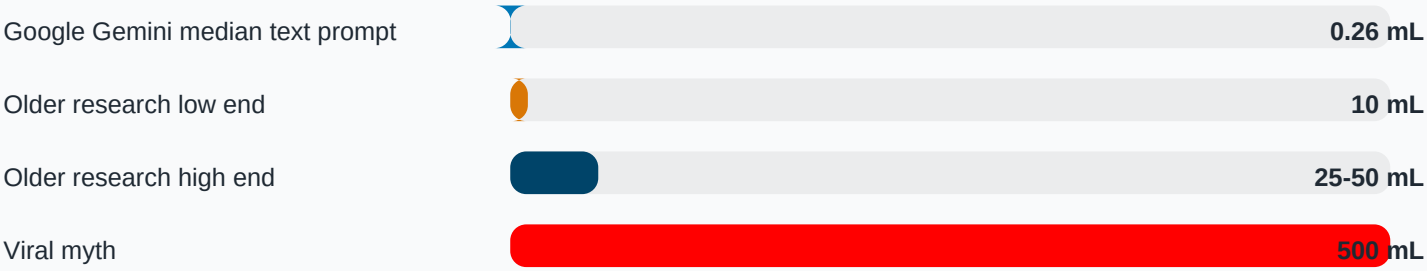
Viral claim

"AI uses a bottle of water for every prompt." This is not supported by the strongest public evidence.

Better reading

Older research: about one 500 mL bottle for 10-50 or 20-50 medium text responses, depending on deployment. Google reports far less for Gemini median text prompts.

How the estimates compare

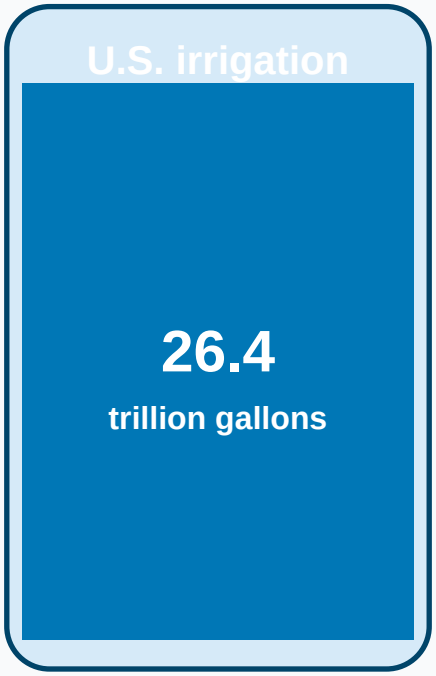


Why the spread? The older papers estimate water across data-center cooling and electricity in particular operating conditions. Google measures a median prompt on Gemini Apps with its own production stack. Different question. Different denominator. Different answer.

Sources: [1]; [9]; [10]

Water: farming is the giant bucket

Nationally, U.S. irrigation water dwarfs data-center direct water use.



Data-center direct water: 0.66 drops

If the farming bucket has 1,000 drops.

Direct + electricity water: 8.6 drop

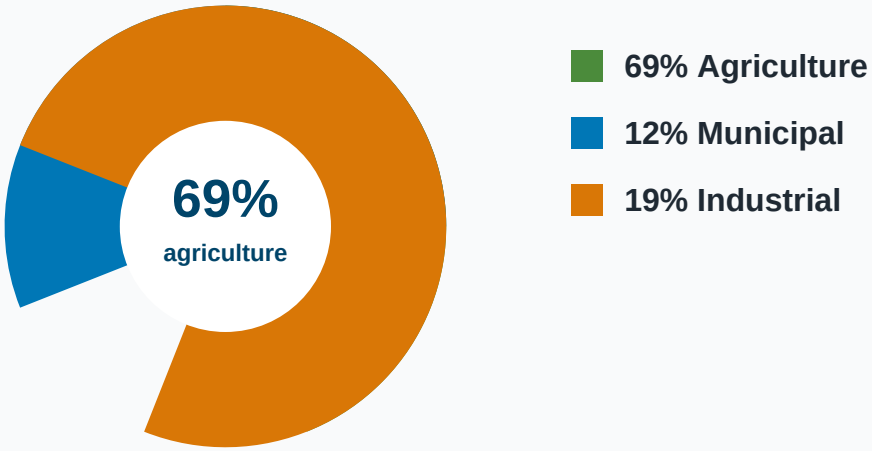
Still small nationally. Not always small locally.

USDA reports 81 million acre-feet of U.S. irrigation water in 2023. That equals about 26.4 trillion gallons. Berkeley Lab estimates 2023 U.S. data-center direct water consumption at about 66 billion liters, or 17.4 billion gallons. If you add the electricity-related indirect water footprint, the data-center total rises to about 228 billion gallons.

Sources: [3]; [5]

Global water: agriculture dominates withdrawals

This does not erase local data-center concerns. It gives proportion.



FAO AQUASTAT reports global freshwater withdrawals at roughly 69% agricultural, 12% municipal and 19% industrial. That global picture is useful, but water is intensely local. Western Europe looks very different from South Asia. A data center in a water-stressed community can be a serious issue even if the global share is small.

The responsible sentence

AI is not a farming-level water user nationally or globally. Still, data-center developers should disclose water source, cooling method, expected withdrawals, expected consumption and stress on the local basin.

Sources: [6]

How to talk about AI footprint without getting connec

Use these five questions whenever someone throws around a scary number.

1. Is it per prompt or total infrastructure?

A tiny per-prompt number and a huge annual data-center number can both be true.

2. Is it text, image, video or training?

A short text prompt is not the same as generating video or training a frontier model.

3. Is water direct or indirect?

Direct means cooling at the data center. Indirect means water used to generate electricity.

4. Where is the facility?

The same gallon matters differently in a wet region than in a drought-stressed basin.

5. Is the source independent?

Company estimates can be useful, but they should be read beside independent studies and government data.

The sentence executives can remember

One prompt is a sip. The infrastructure is the story. Compare honestly, locate impacts locally, and ask for disclosure before fear turns into policy.

Sources: [1]; [2]; [3]; [6]

Source notes and calculations

The math used in this brief.

U.S. irrigation: 81 million acre-feet x 325,851 gallons per acre-foot = 26.4 trillion gallons.
U.S. data-center direct water: 66 billion liters x 0.264172 = 17.4 billion gallons.
U.S. data-center indirect electricity-related water: 800 billion liters x 0.264172 = 211 billion gallons.
Direct data-center water as share of U.S. irrigation: 0.066%.
Direct + indirect data-center water as share of U.S. irrigation: 0.87%.
U.S. data-center household equivalent: 176 billion kWh / 10,500 kWh per household per year = 16.8 million homes.

Cited sources

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[2] International Energy Agency, Energy and AI: Energy demand from AI, 2025. https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai

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[5] USDA National Agricultural Statistics Service, 2023 Irrigation and Water Management data now available, Oct. 31, 2024. https://www.nass.usda.gov/Newsroom/2024/10-31-2024.php

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[7] U.S. EPA WaterSense, Showerheads. https://www.epa.gov/watersense/showerheads

[8] Home Water Works, Showers. https://home-water-works.org/indoor-use/showers

[9] UC Riverside News, AI programs consume large volumes of scarce water, Apr. 28, 2023. https://news.ucr.edu/articles/2023/04/28/ai-programs-consume-large-volumes-scarce-water

[10] Li, Yang, Islam and Ren, Making AI Less Thirsty, arXiv:2304.03271, 2023. https://arxiv.org/abs/2304.03271

Final verdict for fearful audiences

This is the version to say out loud.

AI has a real footprint. It uses electricity. It can use water. Data centers are growing quickly enough that utilities and communities should demand better transparency.

But the viral claim that one prompt drinks a whole bottle of water is not the best reading of the evidence. The better plain-English answer is this: a normal AI text prompt is usually tiny compared with everyday household activity. The national water comparison is even clearer. U.S. irrigation uses about 26.4 trillion gallons a year. U.S. data centers directly consumed about 17.4 billion gallons in 2023. In a 1,000-drop farming bucket, direct data-center water is less than one drop.

The serious issue is scale and location. When data centers cluster in one region, they can stress the grid, affect energy planning, require new transmission, and create water fights that national averages hide. The right response is not panic. It is disclosure, siting discipline, cooling choices, clean electricity, efficiency standards and a grown-up conversation about where AI gives more value than it costs.

Do not fear the prompt. Watch the infrastructure.

Sources: [1]; [2]; [3]; [5]; [6]