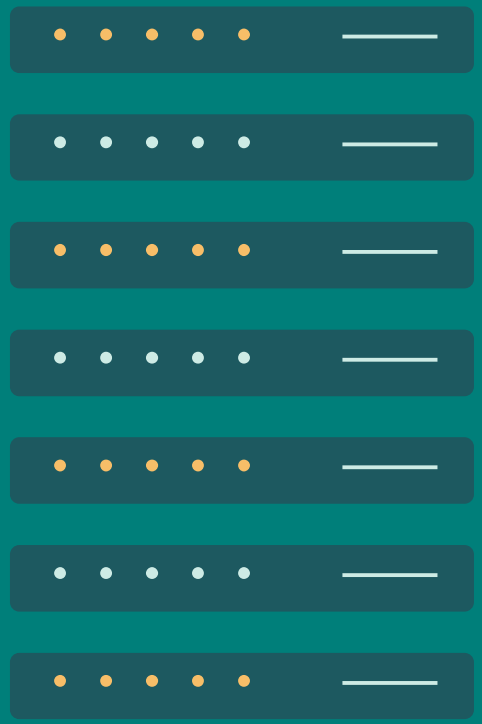
SCIENCE MADE SIMPLE

DATA CENTERS & THE ENVIRONMENT

Water • Electricity • Climate • Communities

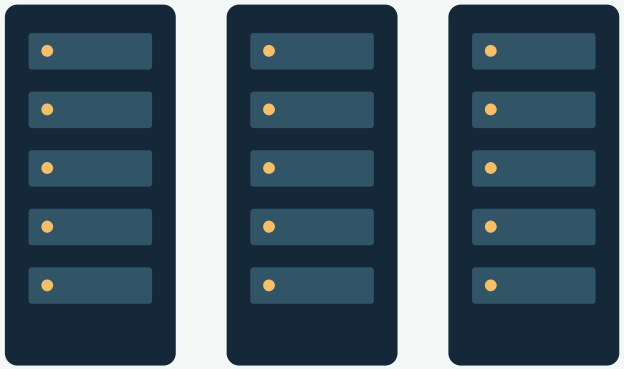
Real numbers. Clear explanations. Scientific sources.



THE BASICS

What is a data center?

A building full of powerful computers that work day and night.



COMPUTERS

1. **Run digital services**
2. **Use electricity**
3. **Make heat**
4. **Need cooling**

FOUR IMPORTANT NUMBERS

The U.S. data-center footprint

Estimated 2023 figures and a separately labeled 2030 projection.

176 billion kWh

Estimated electricity use in 2023

4.4% of U.S. electricity

17.4 billion gallons

Estimated water consumed on site in 2023

Direct water consumption

~211 billion gallons

Estimated water consumed to generate electricity

Indirect water consumption

9.5–15.3%

Possible U.S. electricity share in 2030

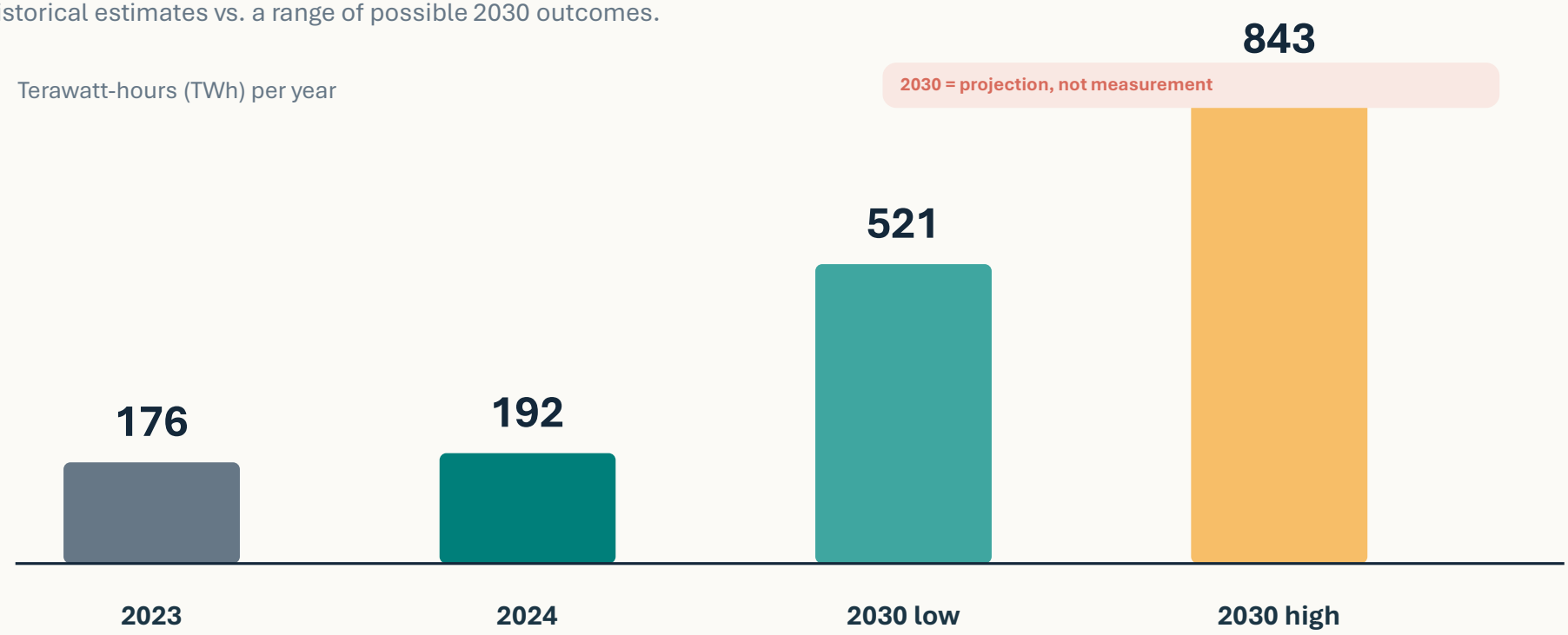
FORECAST — not today's fact

Sources: [1] Berkeley Lab (2024); [2] Berkeley Lab (2026)

ELECTRICITY

Demand could grow sharply

Historical estimates vs. a range of possible 2030 outcomes.



1 TWh = 1 billion kWh

Sources: [1] Berkeley Lab (2024); [2] Berkeley Lab (2026)

WATER

Two kinds of water impact

Both matter, but they occur in different places.

1 **DIRECT WATER**

17.4B

gallons in 2023

Consumed at data-center facilities, mainly for cooling.

2 **INDIRECT WATER**

~211B

gallons in 2023

Consumed elsewhere while producing the electricity they use.

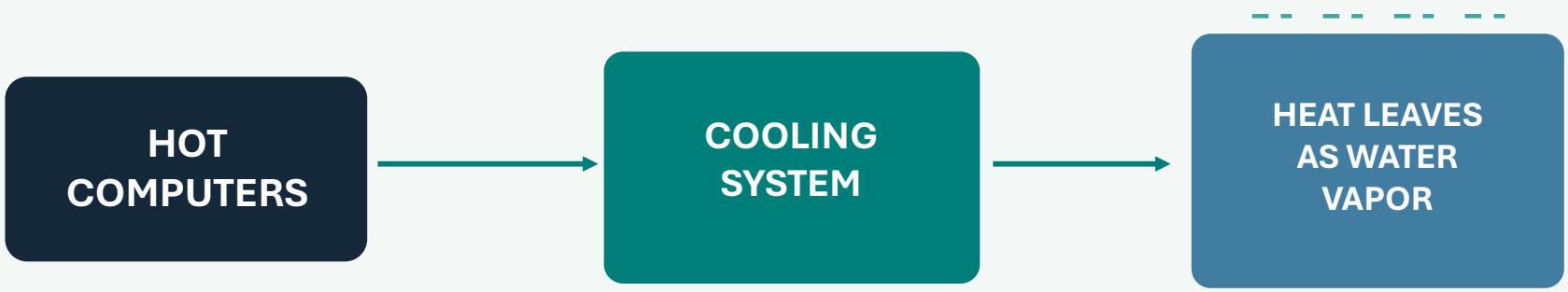
Water “consumed” is not available for immediate reuse from the same local supply.

Sources: [1] Berkeley Lab (2024); [3] Congressional Research Service

HOW COOLING WORKS

Where does the water go?

Some cooling systems use evaporation to carry heat away.



Fresh water replaces water lost to evaporation.

The water is not destroyed; it enters the atmosphere and is no longer immediately available locally.

Sources: [3] Congressional Research Service

IMPORTANT DISTINCTION

Can water be reused? Is it toxic?

Neither question has a one-size-fits-all answer.

CLOSED-LOOP

Liquid circulates in sealed pipes. A separate cooling tower may still use water.

EVAPORATIVE

Water recirculates, but some evaporates; concentrated leftover water may be drained.

RECLAIMED WATER

Treated wastewater can replace drinking-quality water in some facilities.

Wastewater can contain salts, treatment chemicals or metals. It is NOT automatically toxic.

What matters: testing, concentration, treatment and discharge location.

Sources: [3] Congressional Research Service; [5] U.S. DOE

LOCAL RISK

Why drought and heat matter

Water risk depends on the local watershed—not just national averages.

HOTTER DAYS

Cooling water demand may increase.

DRY PERIODS

Rivers, aquifers and wells may be strained.

COMPETING NEEDS

People, farms and ecosystems need water too.

POWER SYSTEMS

Some power generation also requires cooling water.

Same-size data centers can have very different local impacts.

Sources: [3] Congressional Research Service; [6] National Climate Assessment

ONE LARGE FACILITY

How much could ONE data center use?

Illustrative model for a 100-megawatt U.S. facility — not a universal figure.

MODELED EXAMPLE

~528,000

gallons of TOTAL water consumed per day

~190,000 gallons on site

Remaining amount: indirect water consumption

Real-world use varies with location, cooling design, weather and power sources.

Sources: [4] International Energy Agency (2025)

BEYOND WATER

Other environmental effects

Potential impacts require measurement at the facility and community level.

CO_2 / CLIMATE	Electricity emissions depend on the power supply.
AIR QUALITY	Backup diesel generators can emit pollutants.
MANUFACTURING	Chips and servers require materials, energy and water.
LAND / WILDLIFE	Construction can affect habitats, runoff and wetlands.
NEIGHBORHOODS	Noise, traffic and electric-grid upgrades can matter.

Global 2024 estimate: ~180 million metric tons CO_2 from data-center electricity

Sources: [4] IEA (2025); source figure is an estimate

WHAT ABOUT MAINE?

A wetter state can still face local water stress

Statewide rainfall cannot replace a site-specific water study.

MAINE

Warmer and wetter overall

But historical extreme droughts occurred in 2002, 2016 and 2020.

ASK ABOUT THE ACTUAL...

- River or groundwater source
- Water utility and capacity
- Summer peak demand
- Drought restrictions

A project's risk cannot be determined by its state alone.

Sources: [7] NOAA Maine State Climate Summary

SOLUTIONS

Can the impacts be reduced?

Yes, but each choice may involve trade-offs.

Efficient computers	Reduce the amount of electricity per task.
Smarter cooling	Lower energy and/or water use.
Reclaimed water	Protect drinking-quality supplies.
Clean power	Reduce electricity-related CO_2 emissions.
Water testing	Help manage chemicals and discharges.

Example trade-off: dry cooling can save water but sometimes use more electricity.

Sources: [3] CRS; [5] U.S. Department of Energy

COMMUNITY CHECKLIST

Six questions before a data center is approved

Ask for specific numbers, plans and publicly available monitoring results.

01 **How many gallons per day?**

Average AND hottest-day use

02 **Where does the water come from?**

Drinking, groundwater, river or reclaimed

03 **What happens in a drought?**

Restrictions and priority of users

04 **What leaves the site?**

Chemicals, treatment and testing

05 **How much power is needed?**

Demand, source and grid upgrades

06 **What happens nearby?**

Noise, runoff, wetlands and neighbors

Sources: [3] CRS; [5] DOE; [6] National Climate Assessment

THE BOTTOM LINE

Data centers provide valuable digital services. Their environmental costs are real—and local.

What will THIS data center take from THIS community—

and what measurements prove the impacts can be managed?

Source: Data Centers & the Environment — Explained Simply (October 2026)

SCIENTIFIC REFERENCES

Where the numbers come from

Government and scientific studies. Tap a title in PowerPoint to open the source.

- [1] Berkeley Lab — U.S. Data Center Energy Usage Report (2024)
- [2] Berkeley Lab — U.S. Data Center Energy 2025 Update (2026)
- [3] Congressional Research Service — Data Centers and Water FAQ (2026)
- [4] International Energy Agency — Energy and AI (2025)
- [5] U.S. Department of Energy — Cooling Water Efficiency
- [6] Fifth National Climate Assessment — Water (2023)
- [7] NOAA — Maine State Climate Summary (2022)

Figures are rounded. Forecasts are not measurements. Modeled examples do not represent every facility.