

Artificial Intelligence, Data Centers, and (Y)our Electric Bill

What's Changing—and Why It Matters

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Bainbridge Island's Open Mic Science

Tuesday, June 9, 2026

Classification: **Public**

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Acknowledging Last Month's Big Success...

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Long waiting line before doors open...



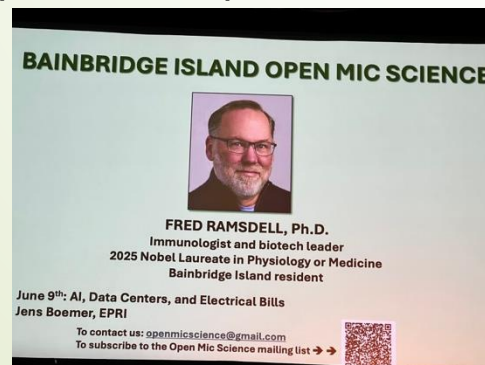
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Theater hall filled to the brink...



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Remarkable speaker and presentation...



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Hello! ...and A Few Words About Myself

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Long waiting line before doors open...



Theater hall filled to the brink...



Remarkable speaker and presentation...



June 9th: AI, Data Centers, and Electrical Bills
Jens Boemer, EPRI

To contact us: openmicscience@gmail.com

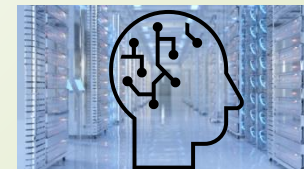
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...A Few Words About Myself

- No, not a Nobel Laureate—sorry! 🙄♂ ...and I prefer pizza 🍕!
- Born in **Germany** DE, lived in Berlin (2005-2012)  
- Ph.D. thesis 📄 at **TU Delft** NL NL (2012-2014)
 - R&D project with **VDE FNN** Forum Network Technology/Network Operation in the VDE
- Moved to **Bainbridge Island** and joined **EPRI** in **2014**
 - **Technical Executive**, focusing on **modeling** ⚙️ and **standards development** 📄 for inverter-based resources (**wind** 🌬️, **solar** ☀️, **storage** ⚡), ... 

... and more recently, large loads (**data centers**)!



How I Plan To Go About This Talk

Speaking as the Island Resident, when I wear my **burlap hat**...



© E.B.

How I Plan To Go About This Talk



Speaking as the Technical Executive, when I wear my **wool hat**...



© E.B.

How I Prepared for This Talk...

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1. **Anxious** about **uncertainties** related to **AI and data centers** boom
2. **Realized**, my **knowledge** had fallen **behind** 
3. Reviewed **Bainbridge Open Mic Science** talk on Generative Artificial Intelligence by Island resident **Brad Friedman**

4. Talked to my wife and collected **questions** from **community members...**
5. Reviewed and collected **EPRI and other research** and information, and **used Microsoft Co-Pilot** to help with some illustrations and summaries.

Questions You (and I) May Ask Ourselves...

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Existential Questions

What do we need AI for, if at all?

What are the risks (and opportunities) of deploying AI with little to no regulatory oversight?

How much decision-making power will humans (knowingly or unknowingly) hand over to AI?

How will AI impact my job (security) and that of my children, friends, and colleagues?

Questions You (and I) May Ask Ourselves...

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Environmental and Social Questions

How do large data centers impact local or regional water resources?

What are potential impacts of large data centers on the global environment and climate?

How could large data centers impact electric bills?

Questions You (and I) May Ask Ourselves...

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Community and Personal Questions

What are potential impacts of large data centers on our local environment and communities?

Are there any large data centers planned on Bainbridge Island, or in Kitsap County?

What are 5x practical steps I can take to switch OFF any AI on my smartphone?

... And Some More (Geeky) Questions

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Questions I am most qualified to answer

How could large data centers impact the electric grid?

How do data centers used for AI differ from legacy data centers?

What flexibility and functional capabilities should large data centers have to reduce negative grid impacts?

What technical standards could be needed to improve the interconnection and integration of large data centers into the electricity system?

Some Fundamentals for Background

Power vs. Energy Analogy

Power

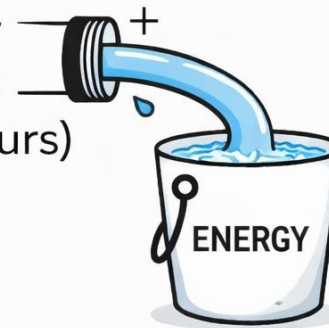
Watts or
kilowatts
(megawatts)



...is like the
flow rate of
water

Energy

Watt-hours or
kilowatt hours
(megawatt-hours)



...is like the
amount of
water that
ends up in
the bucket

Some Fundamentals for Background

1x Data Center

~100x Costco Warehouses



Source: Microsoft Co-Pilot illustration based on architect vision of a new Costco Warehouse published at <https://mainebiz.biz/article/warehouse-retailer-costco-hopes-to-open-first-maine-store-in-scarborough/>

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The following slides were adapted from EPRI materials available to the public at no cost.

Classification: Public

Data Centers could consume one-fifth of the U.S. electricity in 2035.

DC electricity use grows from about 4–5% of U.S. demand today to 9–17% by 2030 across scenarios, increasing further to 10–20% by 2035

Artificial Intelligence (AI) plays a growing, but uncertain role in data center load.

AI workloads are estimated to account for 15–25% of data center electricity today and that share is rising rapidly even as non-AI data center demand continues steady growth.

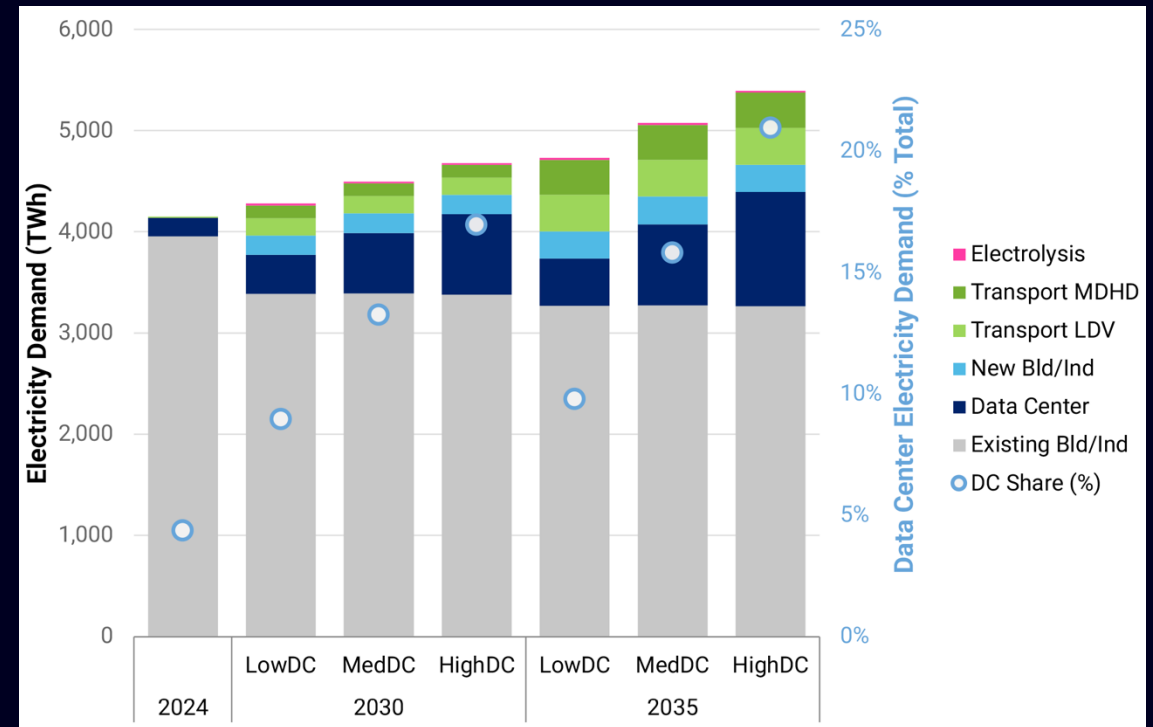
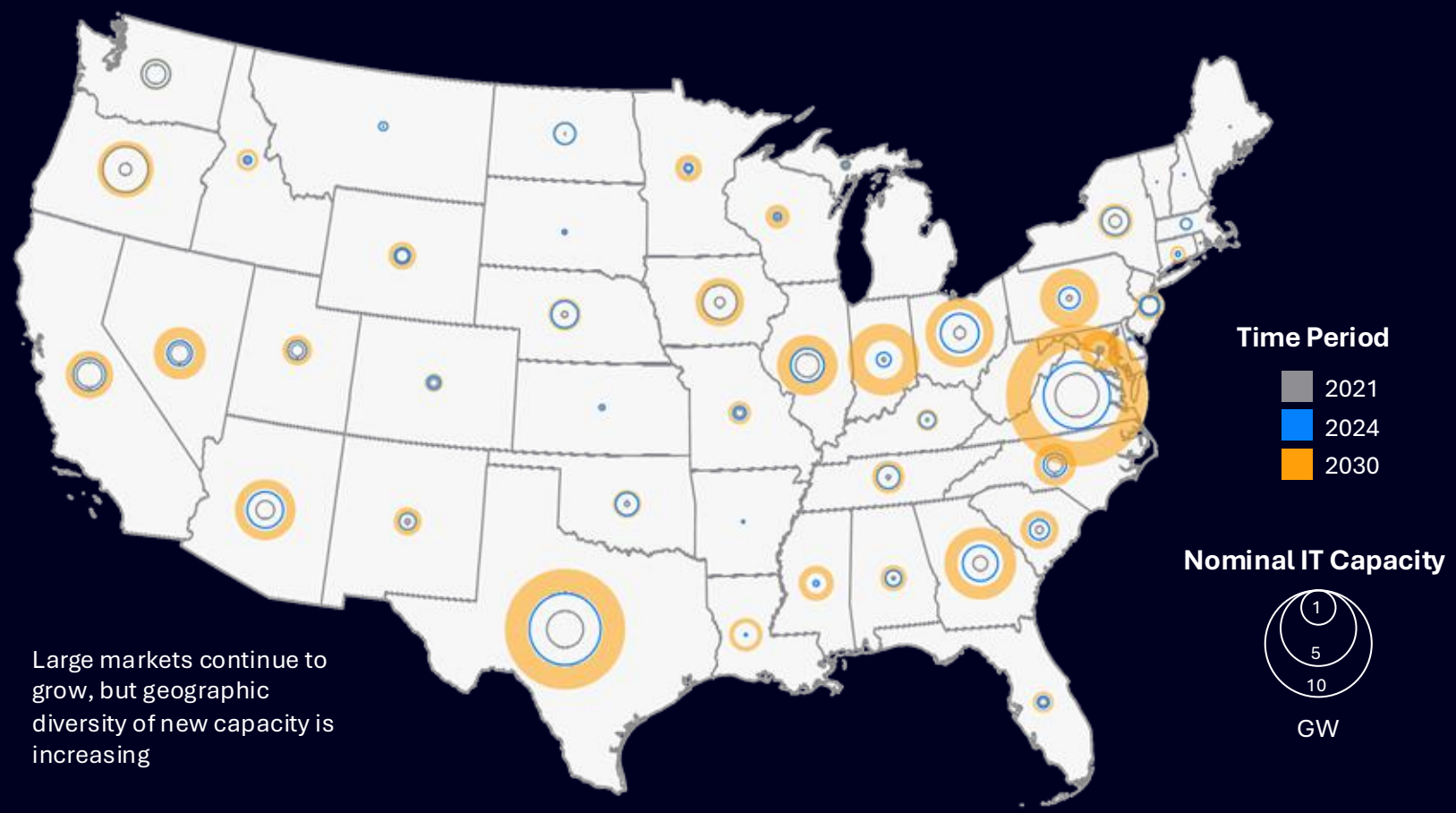


Figure 9. U.S. electricity demand by end use and data center share of total demand. Values are shown for 2024, 2030, and 2035 across three data center scenarios. Outputs from EPRI’s US-REGEN model under reference policies. The figure highlights how rapid DC growth can raise the DC share from today’s 4-5% to 10-20% by 2035. MDHD = medium- and heavy-duty vehicles; LDV = light-duty vehicles.

[Source: Powering Intelligence: Figure 9. U.S. electricity demand by end use and data center share of total demand.]

Anticipated Data Center Capacity by State



Large markets continue to grow, but geographic diversity of new capacity is increasing

- A single large data center (100–1,000 MW) uses about as much electricity as 80,000 to 800,000 homes — roughly the size of a mid-size to large city.
- Using that comparison: **Today’s data center electricity use** is equivalent to the power demand of dozens of large cities combined.
- **By 2030**, data centers are estimated to add the equivalent of multiple major metro areas’ worth of demand.

Source: EPRI Powering Intelligence 2026

Growing Data Center Share of Electricity Demand

Load growth is **highly localized**, creating regional grid challenges.

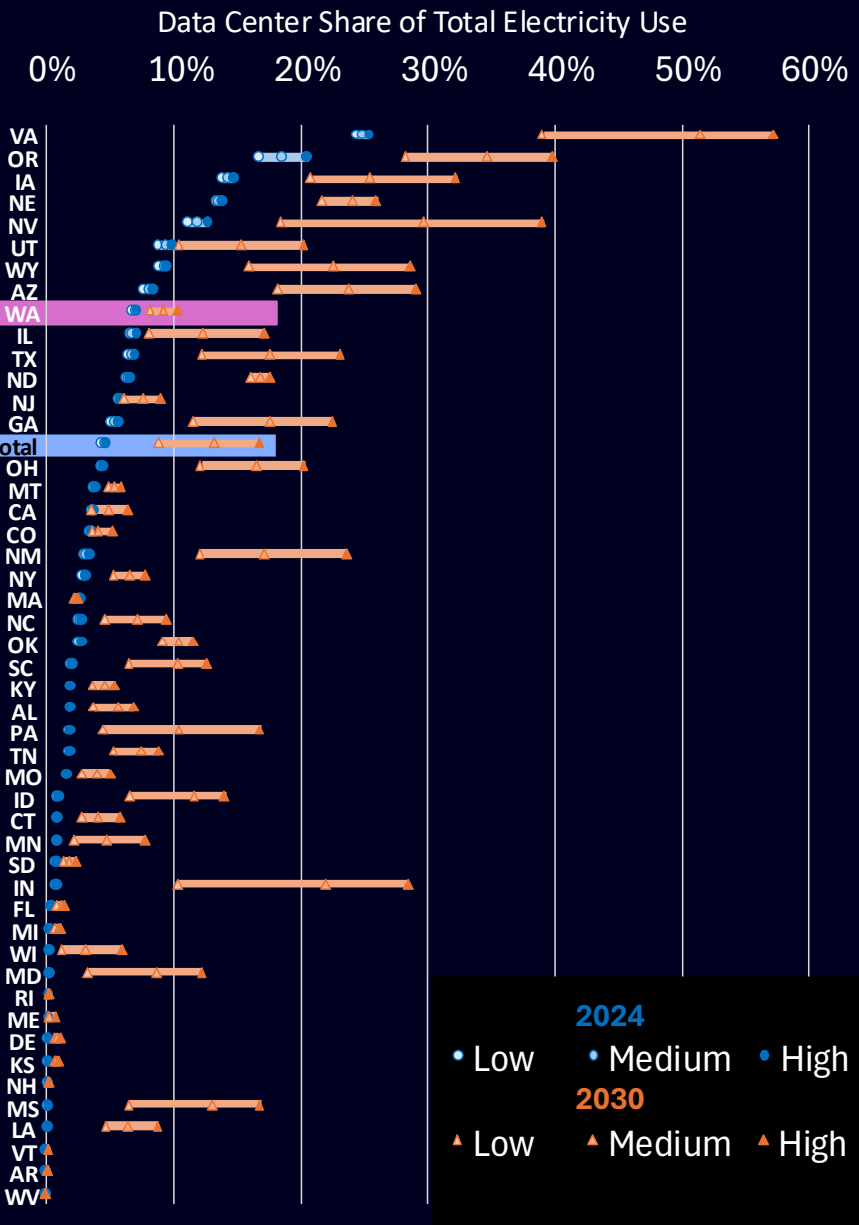
Today, VA is only state today where data centers exceed **20% of electricity demand**, Projected to reach **39-57% by 2030**

By 2030, up to **seven additional states** could exceed a **20% data center share** under the Medium scenario - OR, IA, NE, NV, WY, AZ, and IN.

Some states with high current shares **project relatively little growth** (e.g. **WA, NJ**)

WA estimated share
6-7% in 2024
8-11% in 2030

U.S. estimated share
4-5% in 2024
9-17% in 2030



[Source: Powering Intelligence: Figure ES-3. Data center share of total electricity demand by state.]

Electricity Price Can Negatively Correlate with Load Growth



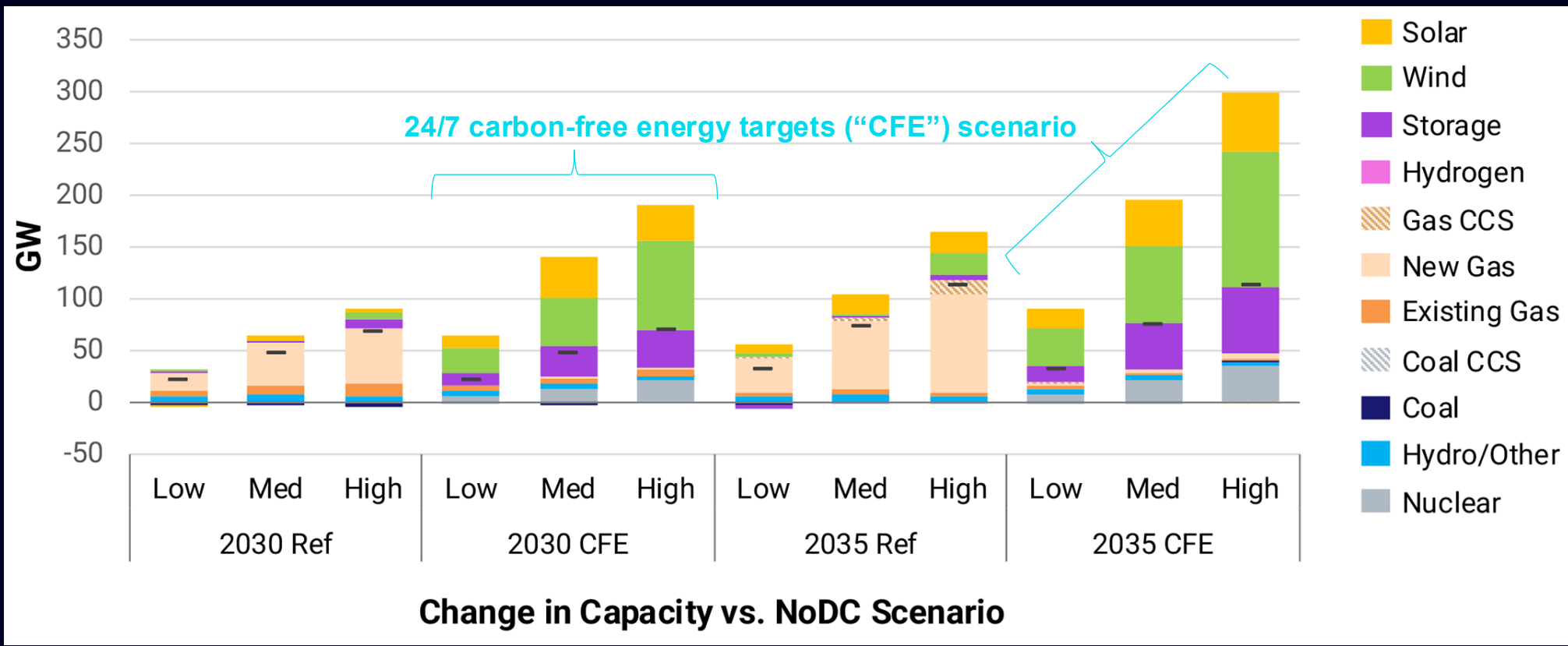
- Largest price increases have been in states with zero or negative load growth
- States with largest load growth have had flat or declining prices (adjusted for inflation)
- Correlation does not necessarily imply causation; EPRI analysis is exploring additional factors

See winwin.epri.com for more information

Price change shown in 2024\$, adjusted for inflation
 Circle size reflects total load in 2024
 Midwest states shown in blue

Generation Adequacy

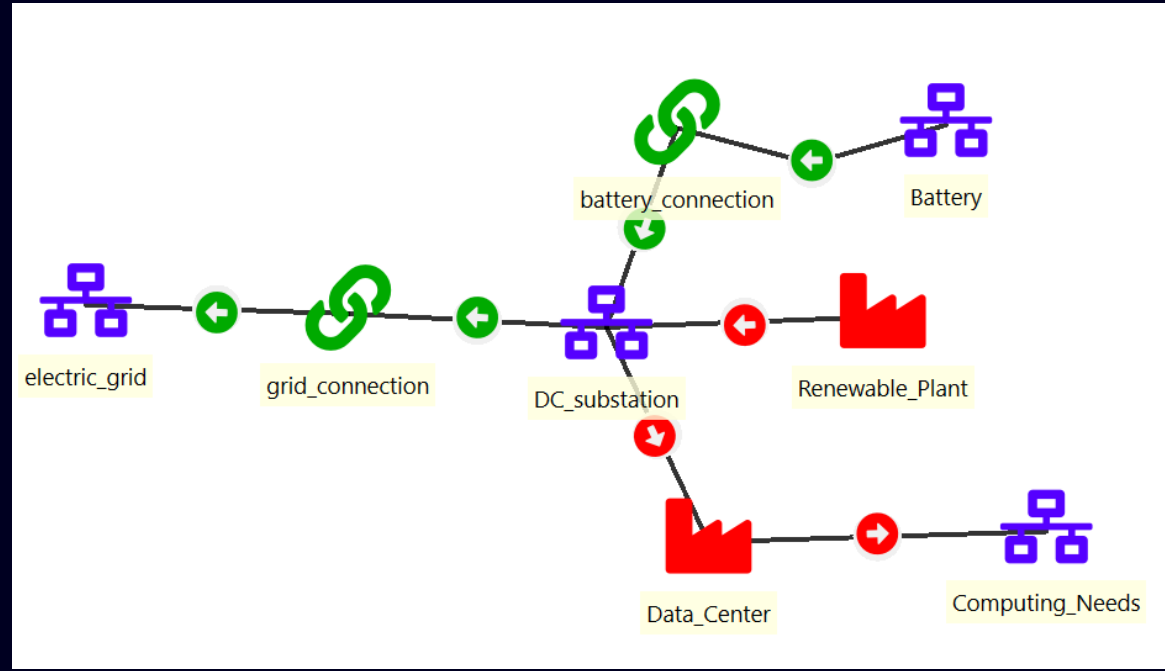
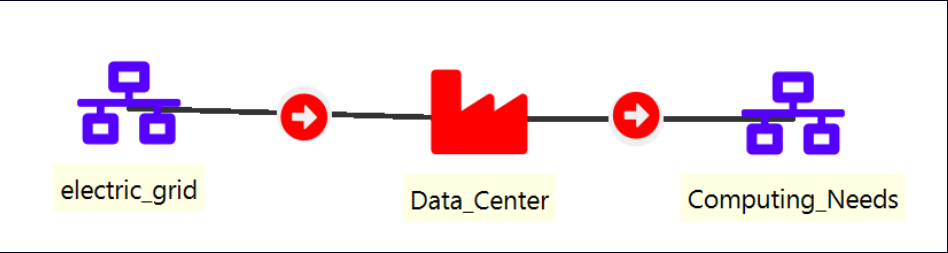
Having adequate generation and storage resources to cover peak load



Source: EPRI Powering Intelligence 2026

Data Centers Can be Co-Located with Renewables

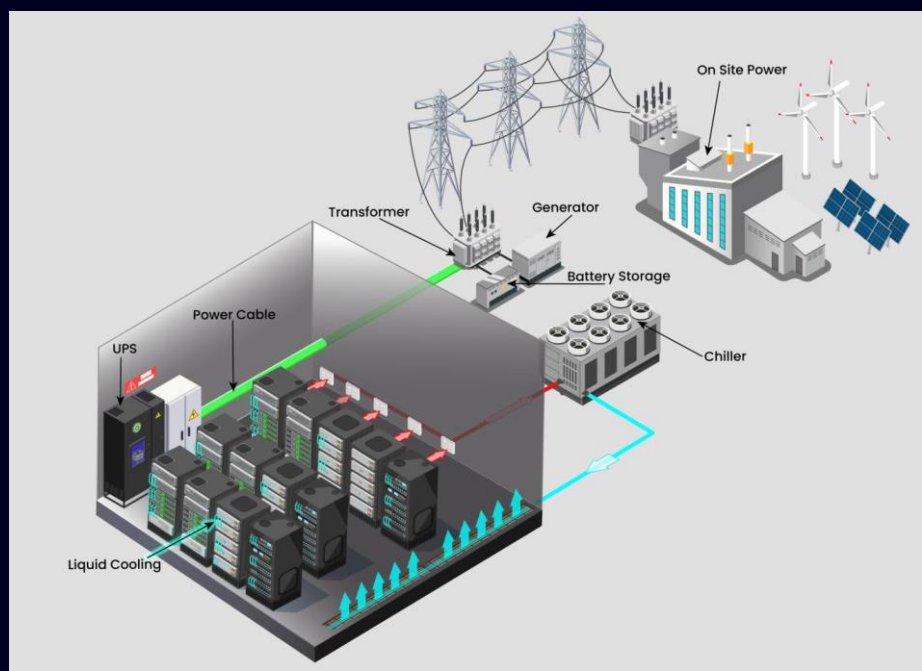
Renewables can be wind, solar, or storage plants



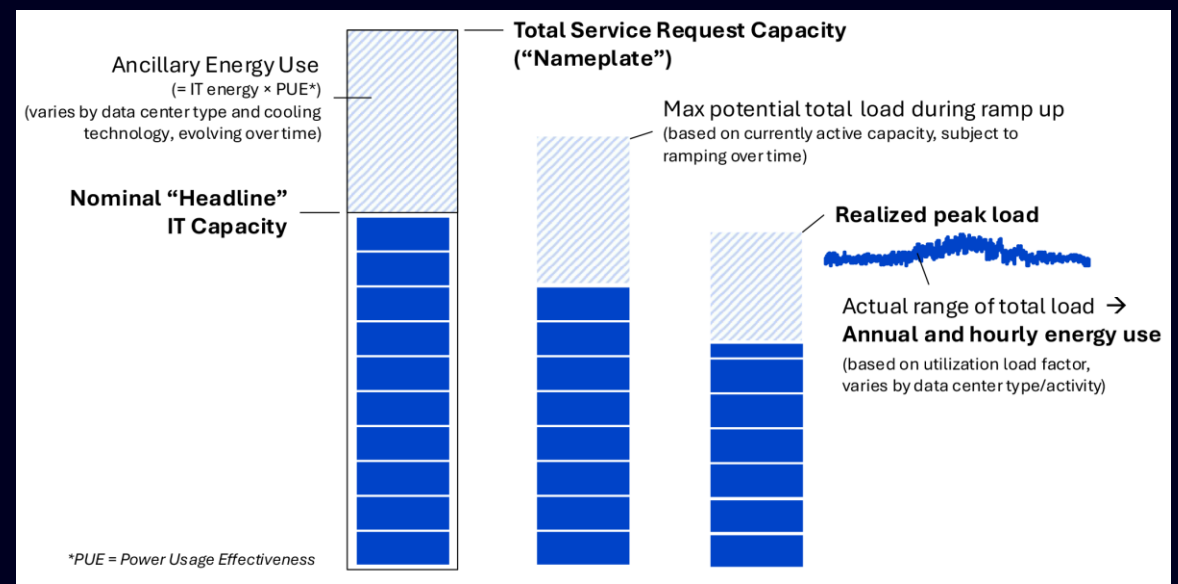
Flexible Data Centers Can Help With Balancing

Balancing generation and demand at all times (hours, minutes, ...)

Data center capacity and utilization



Data center capacity and utilization



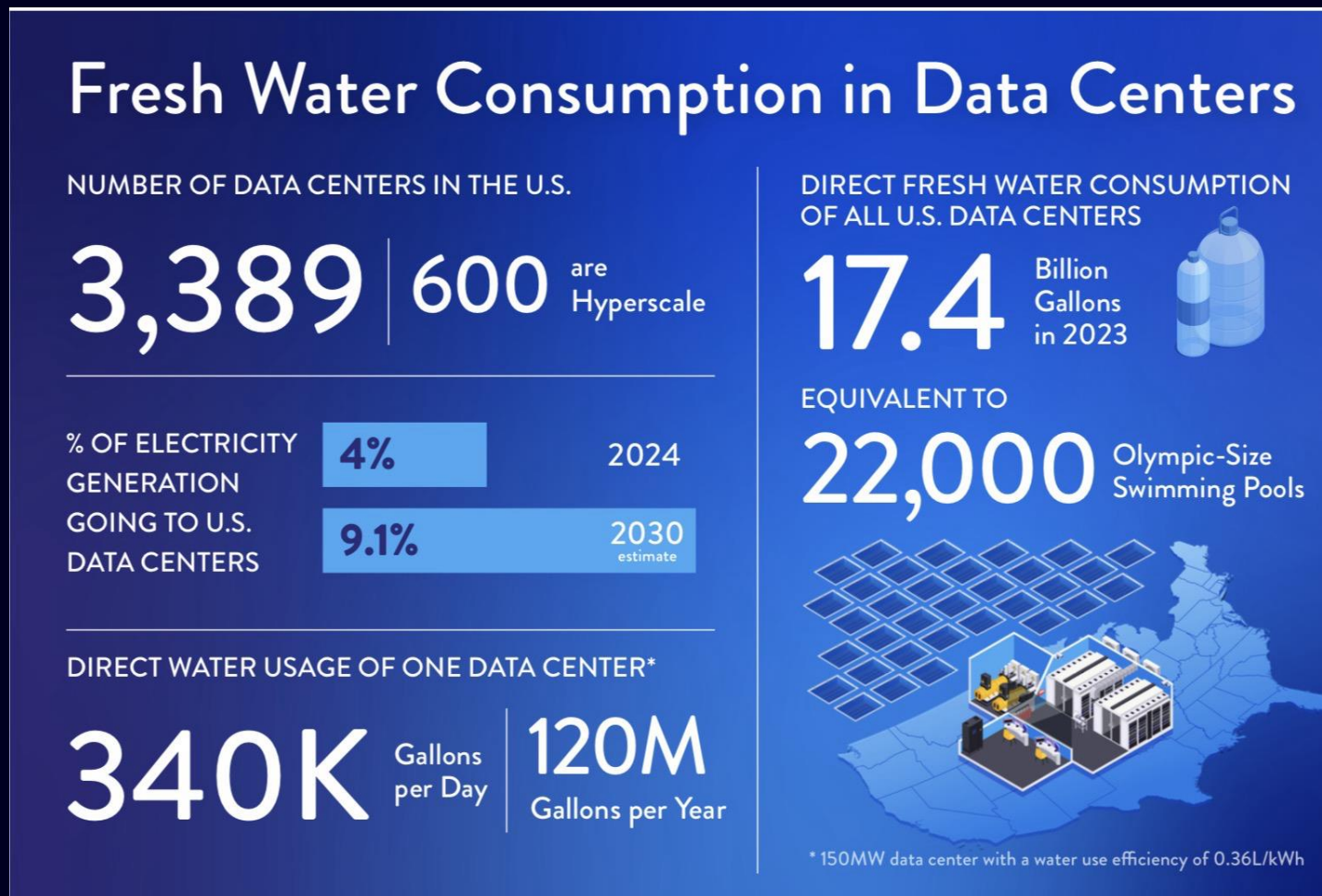
Source: DCflex, WS1, <https://dcflex.epri.com/workstream-1>

Source: EPRI Powering Intelligence 2026

Water Consumption

A closer look

- Direct vs. indirect use
- Trade-off between energy and water use
 - + Water usage effectiveness
 - + Power usage effectiveness
- Opportunities from newer cooling methods



Source: *Technology Innovation Spotlight: Water Usage in Data Centers*. EPRI, Palo Alto, CA: 2025. [3002033251](#)

Partnering for Progress:

Understanding Community-Centered Data Center Development

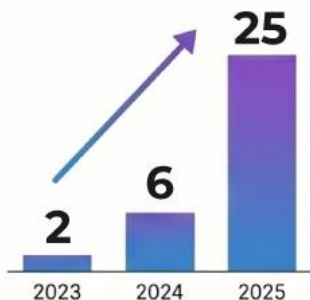
Community Concern



Top Drivers of Local Resistance

- Air Emissions
- Data center impact
- Electricity demand and affordability
- Lack of transparency and governance
- Land use risks and cumulative impacts
- Macro-policy tensions
- Noise and proximity
- Water use and watershed risk

Surge in U.S. Project Cancellations



\$156B in Projects Blocked or Delayed

Estimated value of U.S. data center projects halted in 2025.

Source: www.datacenterwatch.org/q3-q4-2025

Collaboration Opportunities

Leading practices from 13 cases in North America and Western Europe:



Accountability Activities and Verification



Concrete Local Economic Development Impacts



Commitment to Environmental Impact Mitigation



Public Education and Regulatory Innovation



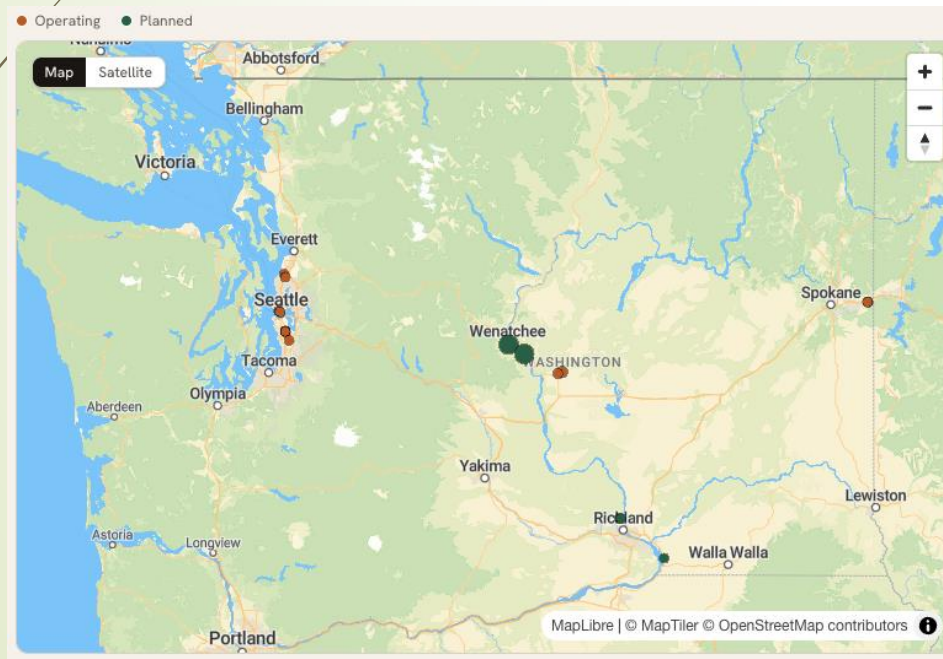
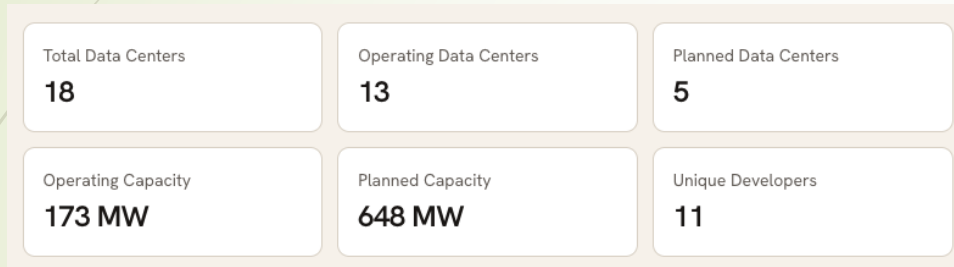
Transparency of Local Impacts

LEARN MORE:



community-centered.epri.com

What's Going on in Our State and Neighborhood?



Five large data centers eyed for Seattle

April 10, 2026 at 8:00 am | Updated April 10, 2026 at 8:00 am



Power lines seen in the Sodo area in Seattle in January 2025. (Karen Ducey / The Seattle Times)

<https://cleanview.co/data-centers/washington>

Thank You!

Grab me afterwards to talk more... or send me an email at
j.c.boemer@ieee.org