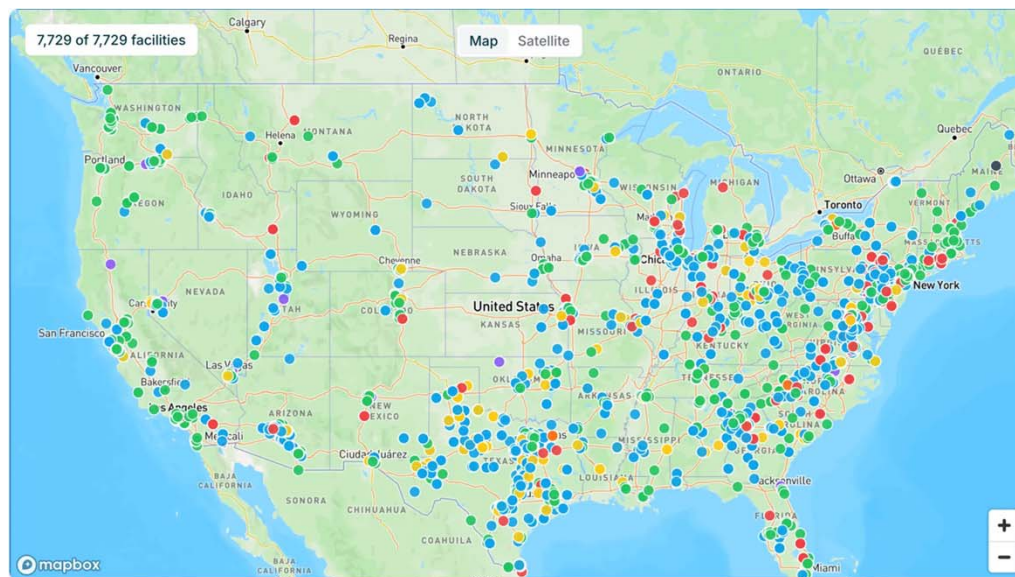


Supplying Electricity to Hyperscale Data Centers in the U.S.

Paul L Joskow
MIT

Florence School of Regulation and MIT CEEPR
October 8, 2026

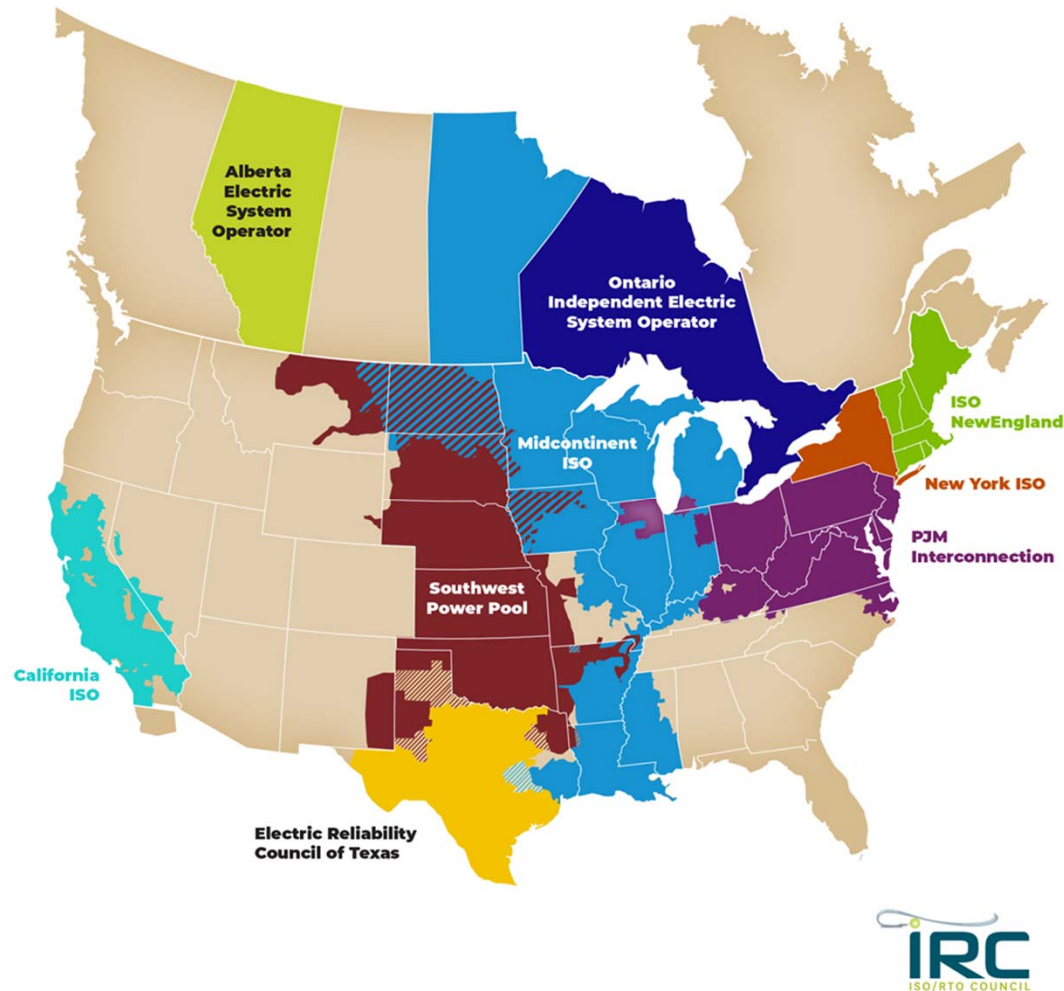


<https://www.aterio.io/insights/us-data-centers>

Outline

- U.S. context --- complicated
- Data centers vs. hyperscale data centers
- Demand growth expectations
- Network interconnection
- Generation supply
- Who pays and how?
- How did new AI data centers become politically toxic?

U.S. Context



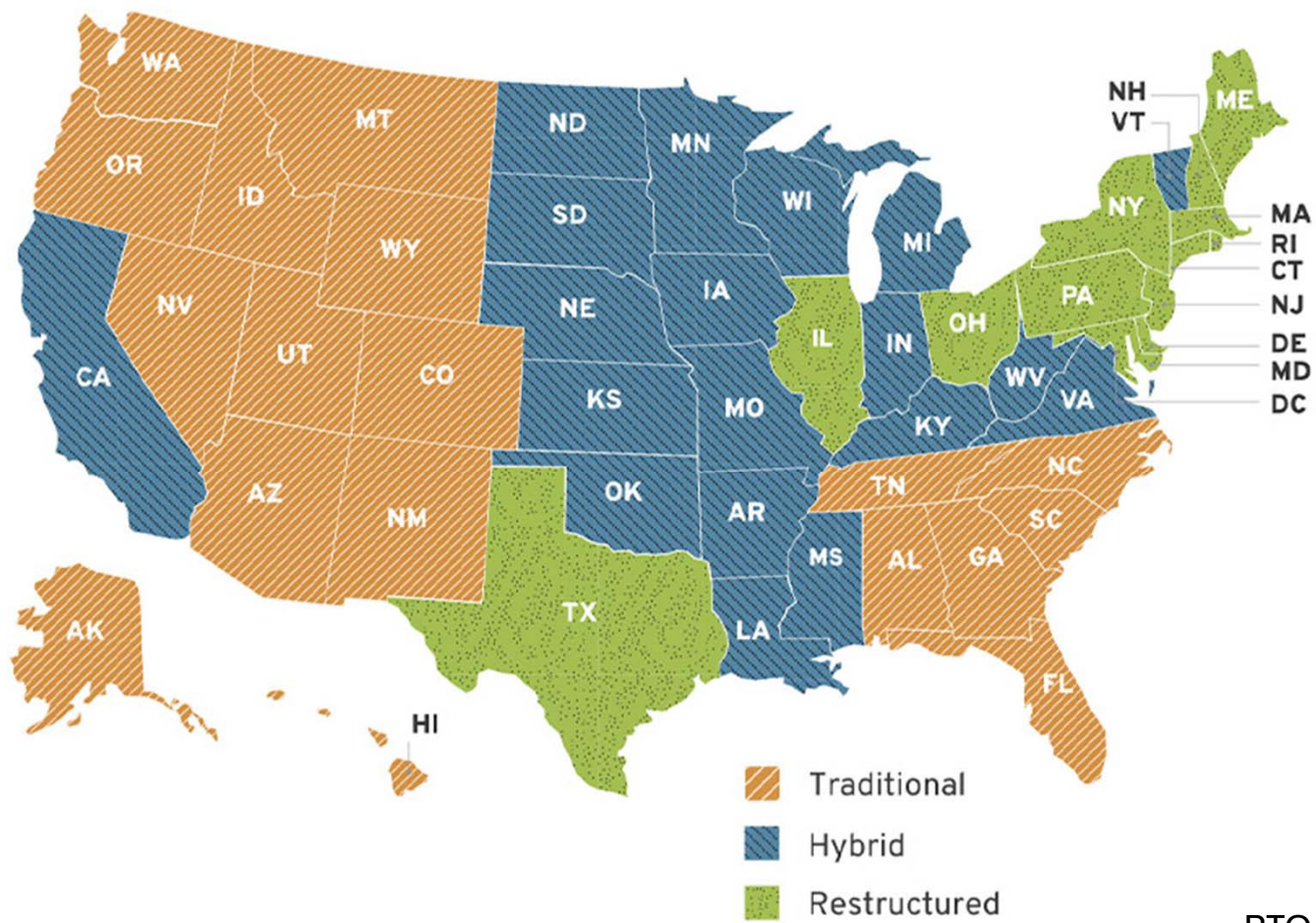
IOU (~165)
municipals (~460)
coops (~600)
federal/state (~30)
IPPs (~55% generation)

Economic Regulation:
49 states+DC
Federal (FERC)
Muni/Coop/Fed (self)

Retail Competition:
Comprehensive: 12
Large loads: selective

Environmental etc. permits
Federal
State
Local

Reliability criteria:
US/Canada: NERC
US: FERC



RTO Insider,
September 25, 2026

Data Centers in General vs. Hyperscale Data Centers in Particular

NERC Large Load Definition

“Any commercial or industrial individual load facility or aggregation of load facilities at a single site behind one or more point(s) of interconnection that can pose reliability risks to the BPS due to its demand, operational characteristics, or other factors. Examples include, but are not limited to, data centers, cryptocurrency mining facilities, hydrogen electrolyzers, manufacturing facilities, and arc furnaces”

NERC, July 2025





Microsoft, Mt. Pleasant, Wisconsin:
900 MW (Phase 1 + 2), 315 acres, 3
primary buildings. Power density =
1,800 MW/square mile. (rising to 3.3
GW on multiple sites)



Meta, Hyperion
Louisiana
5 GW
10 million square feet
3,650 acres of land. Power
density ~ 1,000
MW/square mile



Amazon, South Bend, Indiana --- 2.6 GW
peak demand (50 times MIT's peak demand),
1200 acres, power density = 1,420
MW/square mile

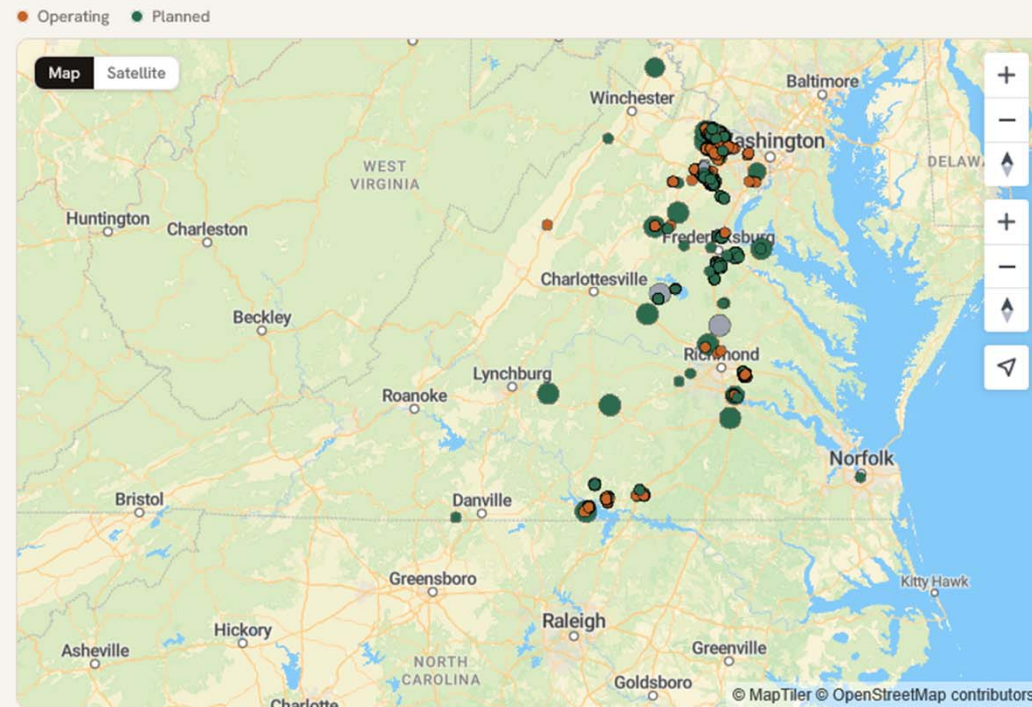
Mid-size city: power density
of 50-200 MW/square mile

Largest Operating: 243 MW

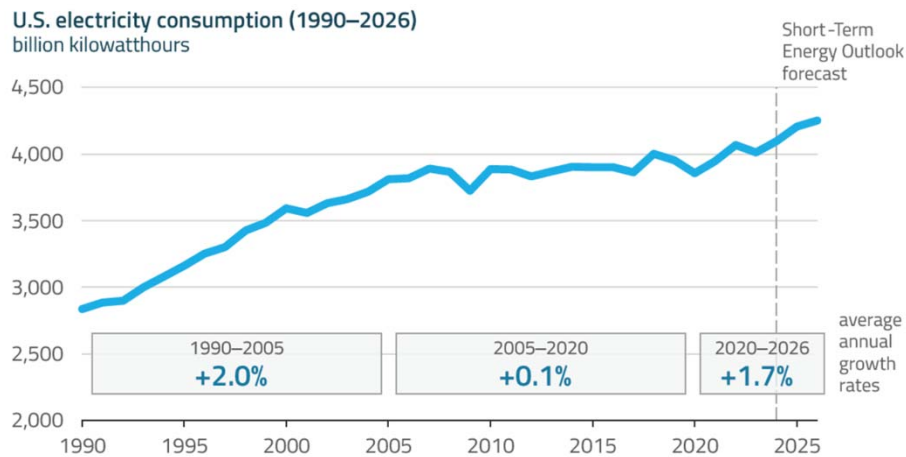
Largest Planned: 2,400 MW

Virginia Data Center Map

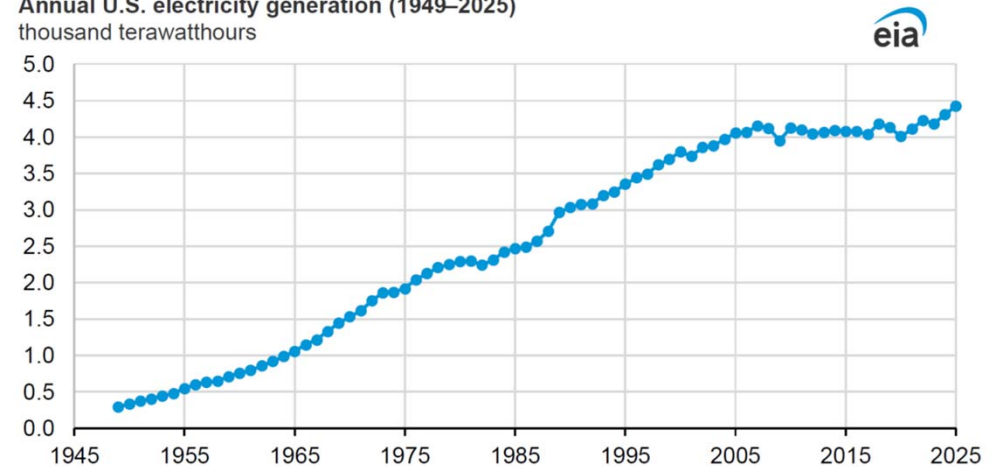
Map of data centers in Virginia. Orange markers indicate operating facilities and green markers show planned projects. Marker size reflects capacity — only facilities with reported capacity data are shown.



Demand Growth: Surprise and Uncertainty

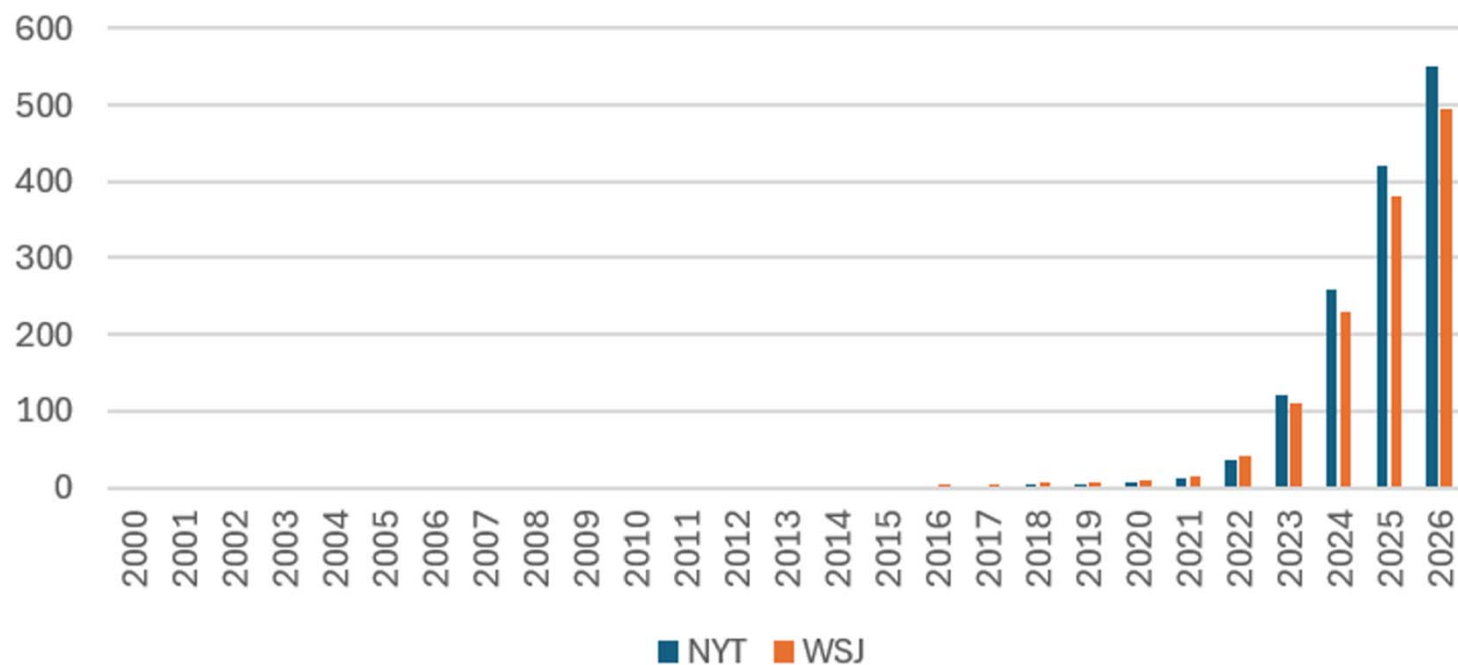


Annual U.S. electricity generation (1949–2025)
thousand terawatthours



EnerKnol 2025

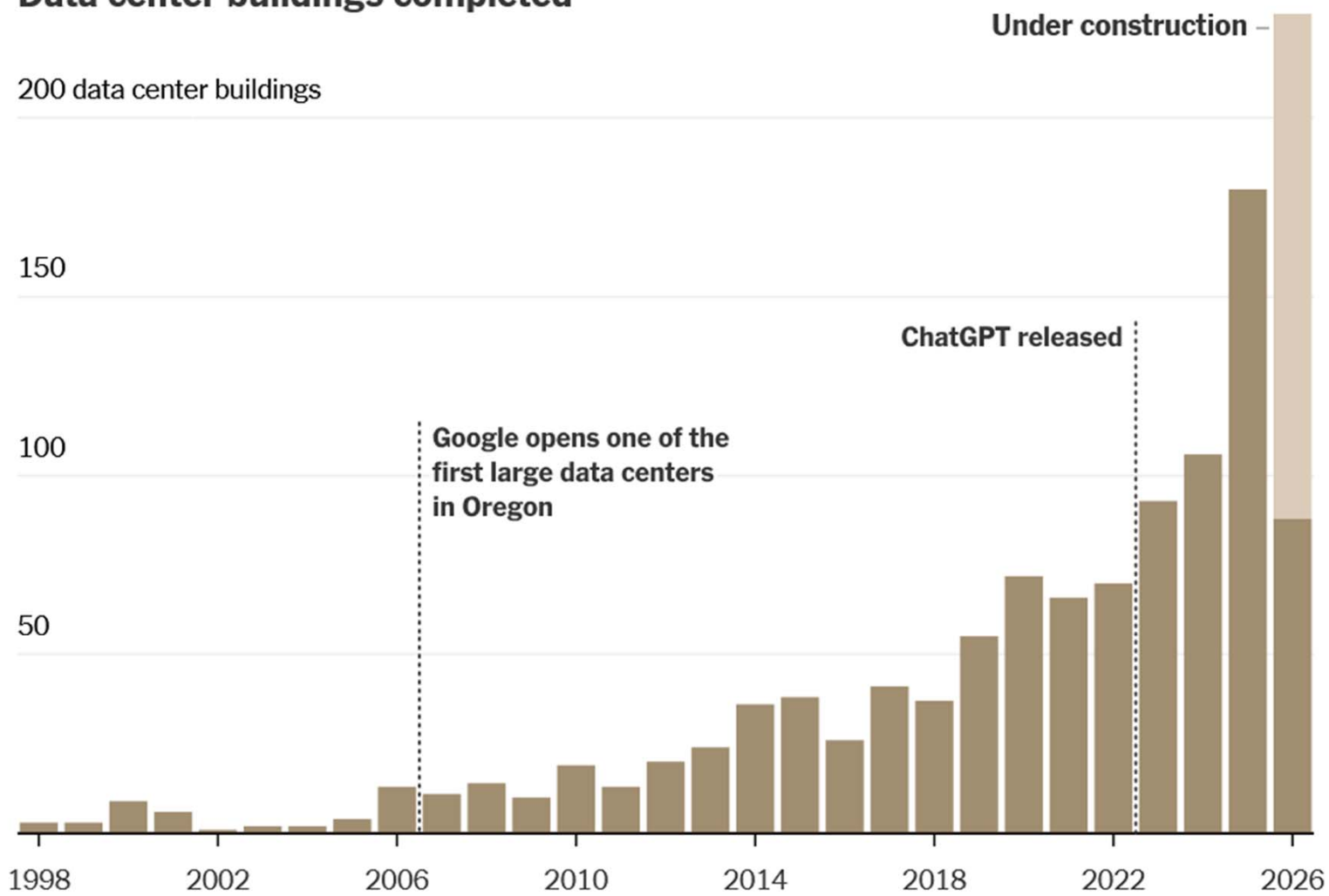
Data Center + Power+Electricity Infrastructure Mentions in NYT, WSJ, 2000 - 2026 (proj)



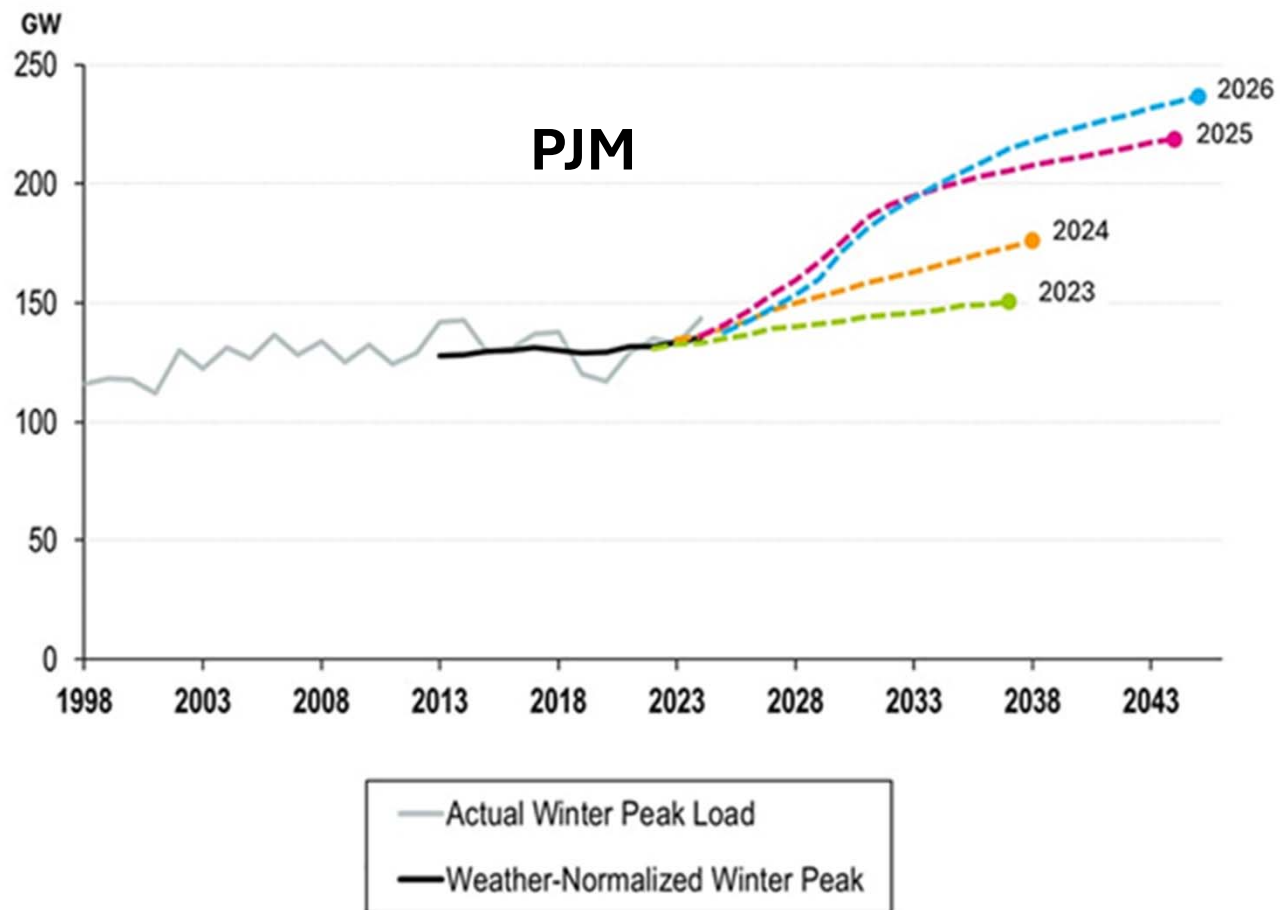
ChatGPT: November 30, 2022
Claude 1: March 14, 2023
Gemini: December 6, 2023

ChatGPT 5.6 results; 2026 projected
From September 22, 2026

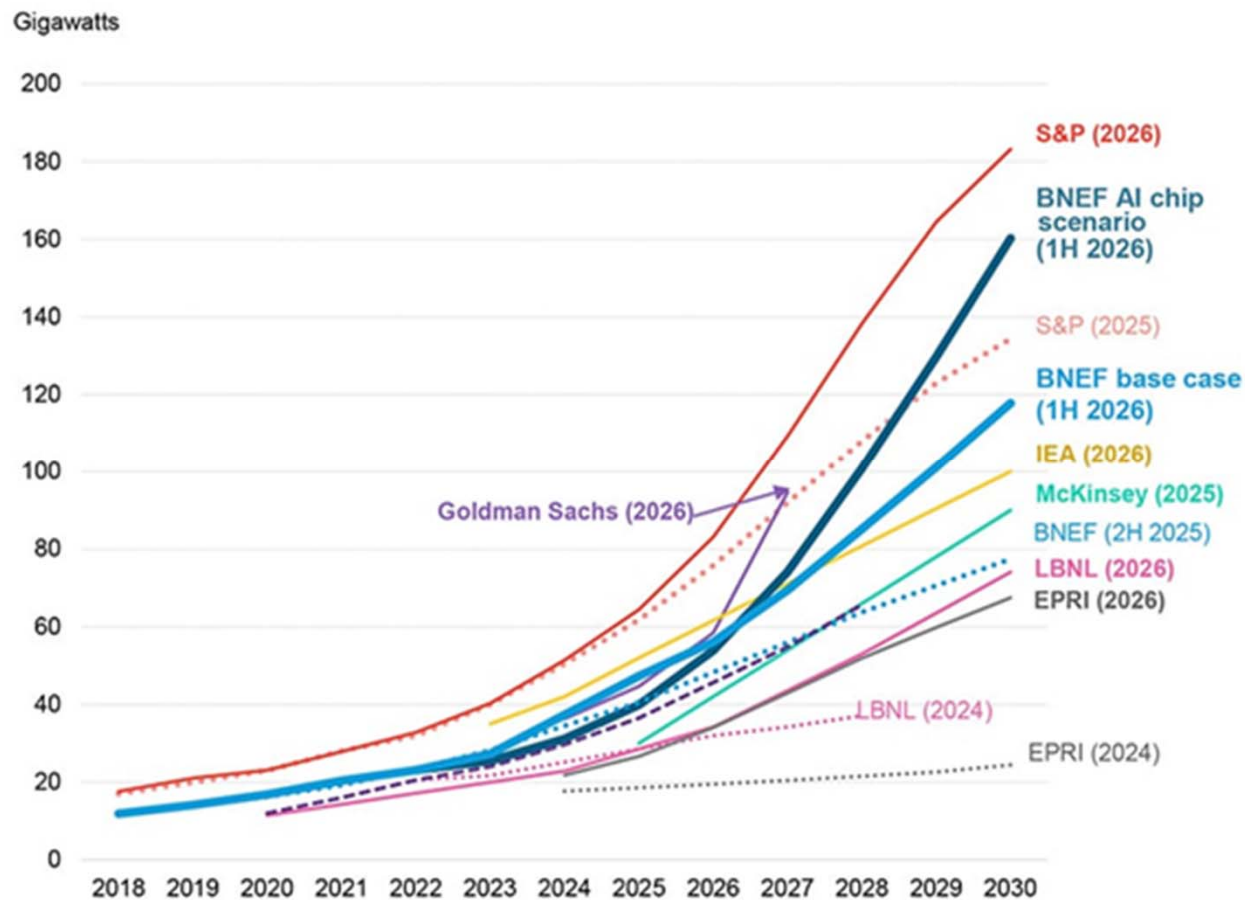
Data center buildings completed



Source: Cleanview



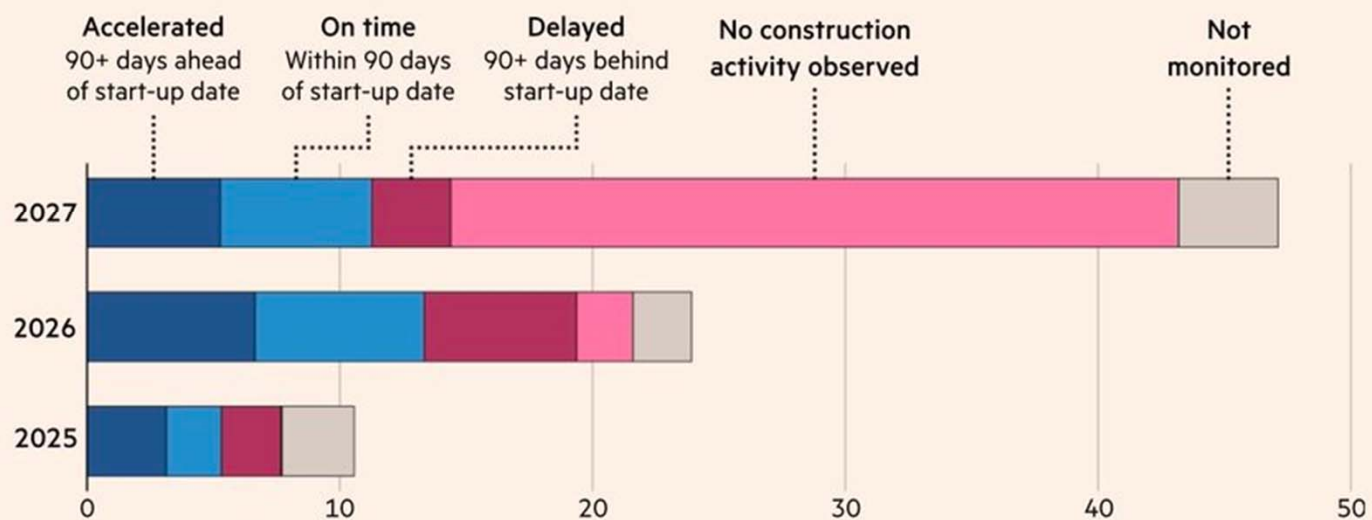
Halcyon
PJM



A BloombergNEF chart shows the sharp increase — and wide disparity — of projected U.S. data center power consumption through 2030. | *BloombergNEF per RTO Insider July 23, 2026*

Significant US data centre capacity at risk of delay

US data centre capacity by status (GW)



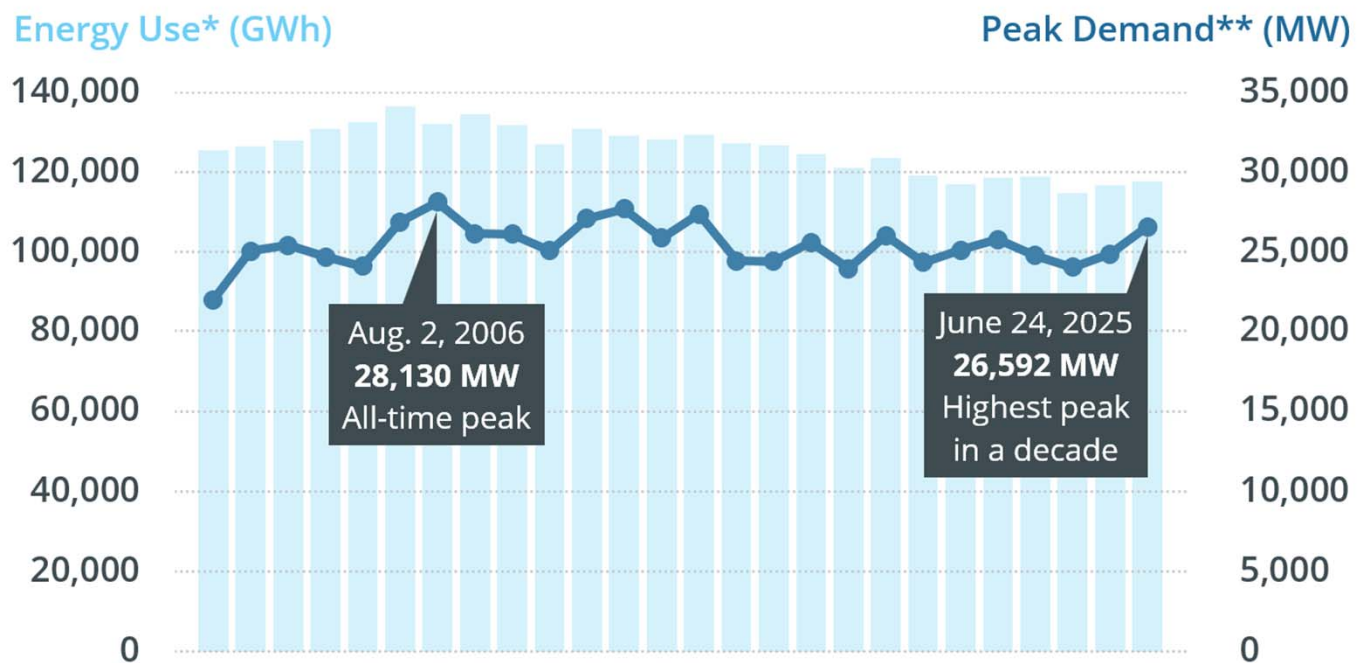
Source: SynMax Vulcan Platform, IIR Energy • Data as of April 9 2026

FINANCIAL TIMES

When required to provide financial and legal commitments, the speculative data center queue of 30,000 MW reduced to 5,642 MW of data load that has signed ESAs with substantial financial commitments. This signed and right-sized load will now be used for PJM transmission planning purposes.

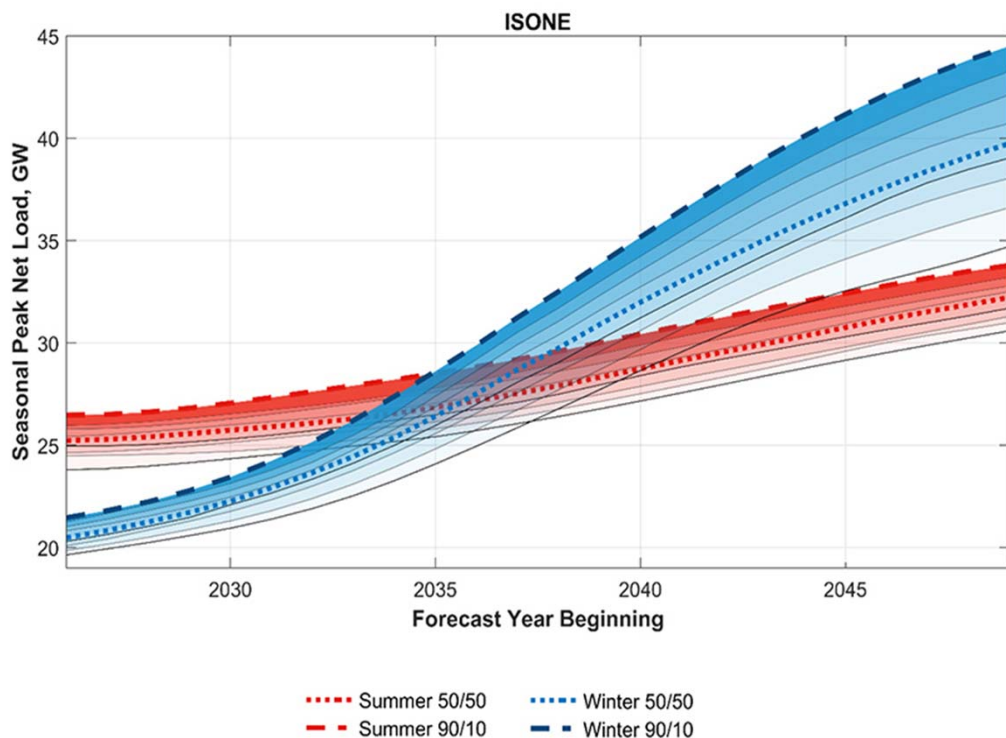
New England

Annual Energy Use vs. Peak Demand, 2000-2025



SOURCE: ISO NEW ENGLAND

ISO-NE Cuts Long-term Demand Forecast, Reflecting Federal Policy Shift



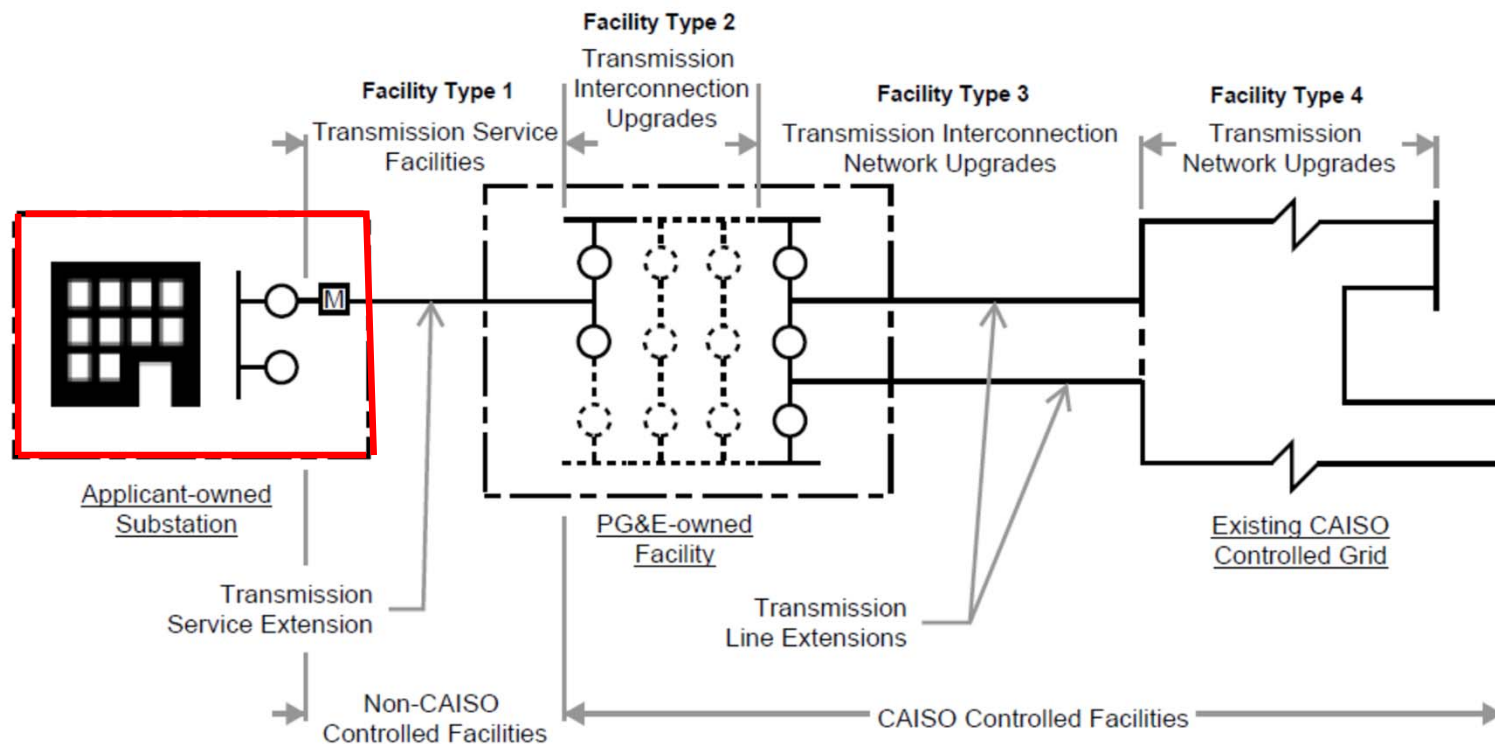
ISO New England's long-term load forecast projects that regional net electricity use will rise at an average of 1.0% annually, growing from about 116.7 TWh in 2025 to 127.7 TWh in 2035, and reaching 160 TWh by 2046.

Large Loads: Proposed large loads, such as data centers, currently account for a smaller portion of forecasted growth in New England compared to other regions, adding an estimated 132 MW to 285 MW.

Interconnection to the Transmission Network



TVA



**PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 E)
 RESPONSE TO ADMINISTRATIVE LAW JUDGE'S
 RULING REQUESTING INFORMATION ON THE
 MOTION FOR INTERIM IMPLEMENTATION OF
 ELECTRIC RULE NO. 30 [PUBLIC VERSION]**

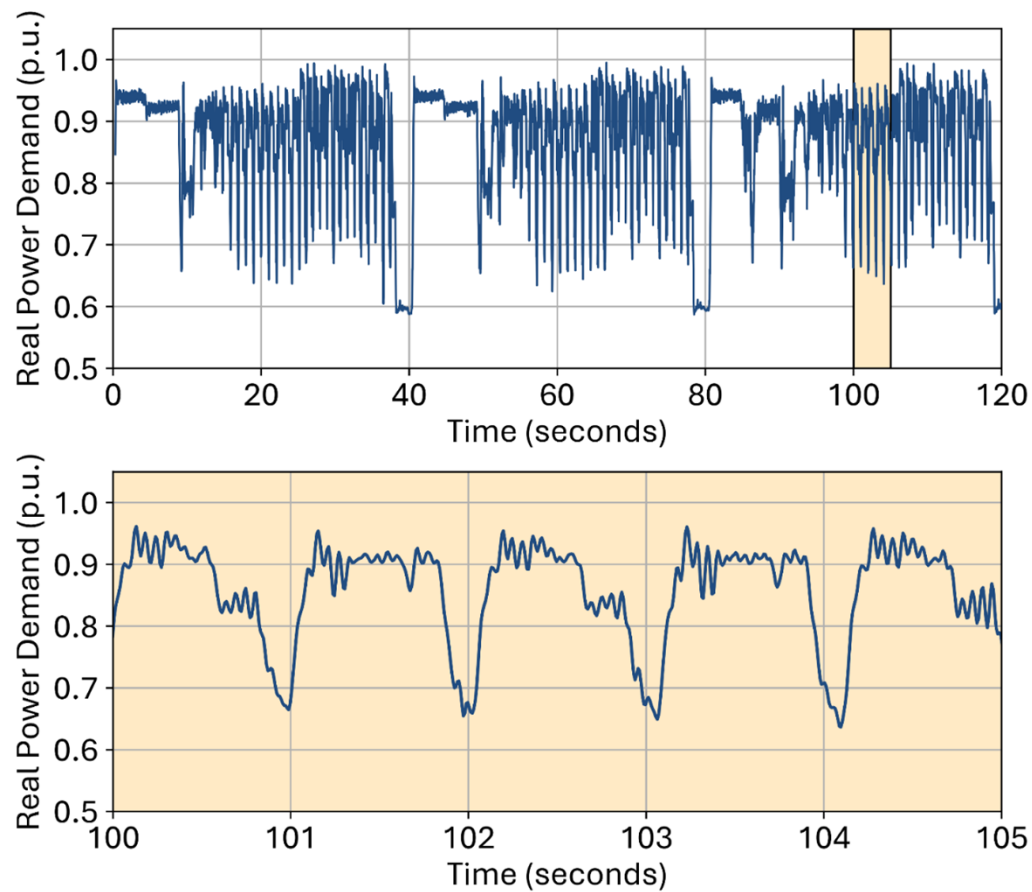


Figure 3.8: Example AI Data Center Load Profile During Training Over Two Minutes (Top) and in a Five-Second Period (Bottom)

FERC Tries to Bring Order to Chaos in RTO/ISO Regions

THE HEADLINE

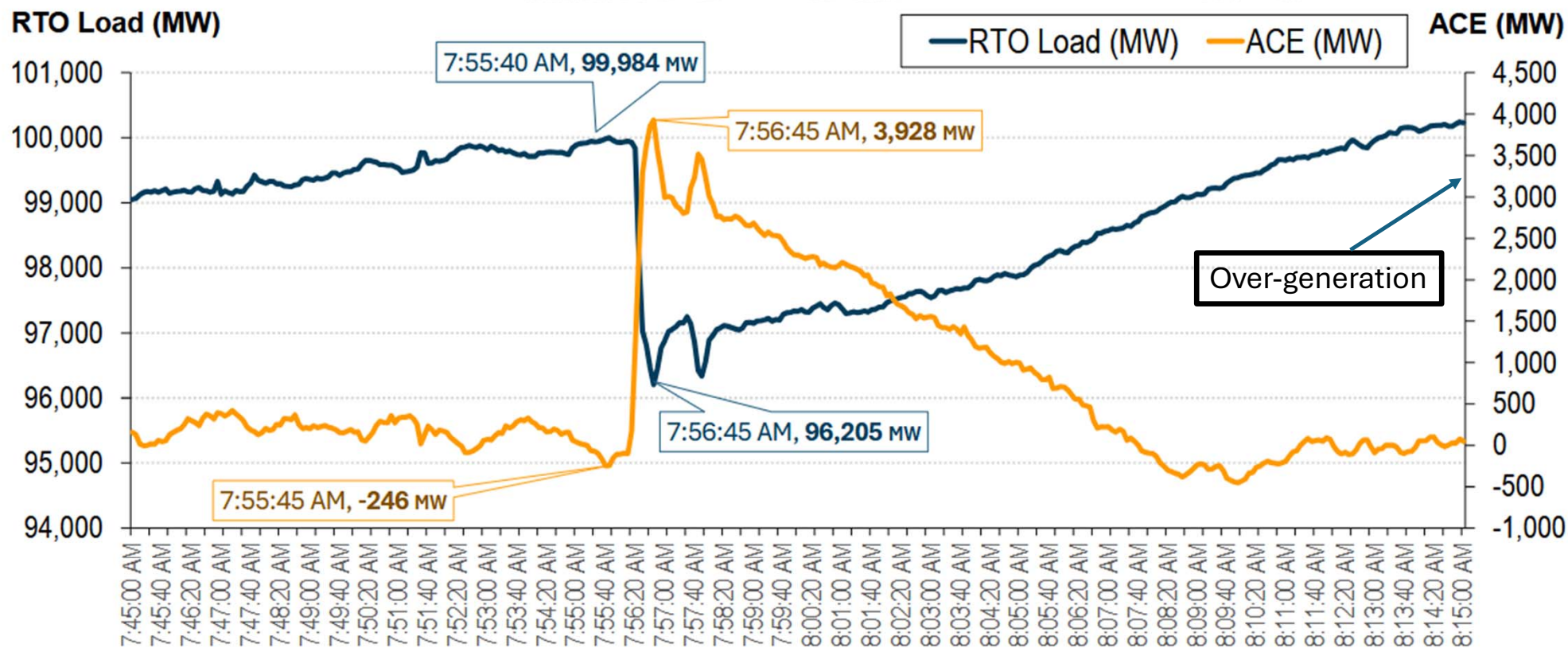
What FERC Did

FERC issued tailored show cause orders under section 206 of the Federal Power Act to each of the six regional grid operators, directing them to justify or reform the tariff provisions that govern how data centers, manufacturing facilities, and other large energy users connect to the grid. The action advances the goals of the Secretary of Energy's ANOPR, delivering the speed to power needed for the innovation economy.

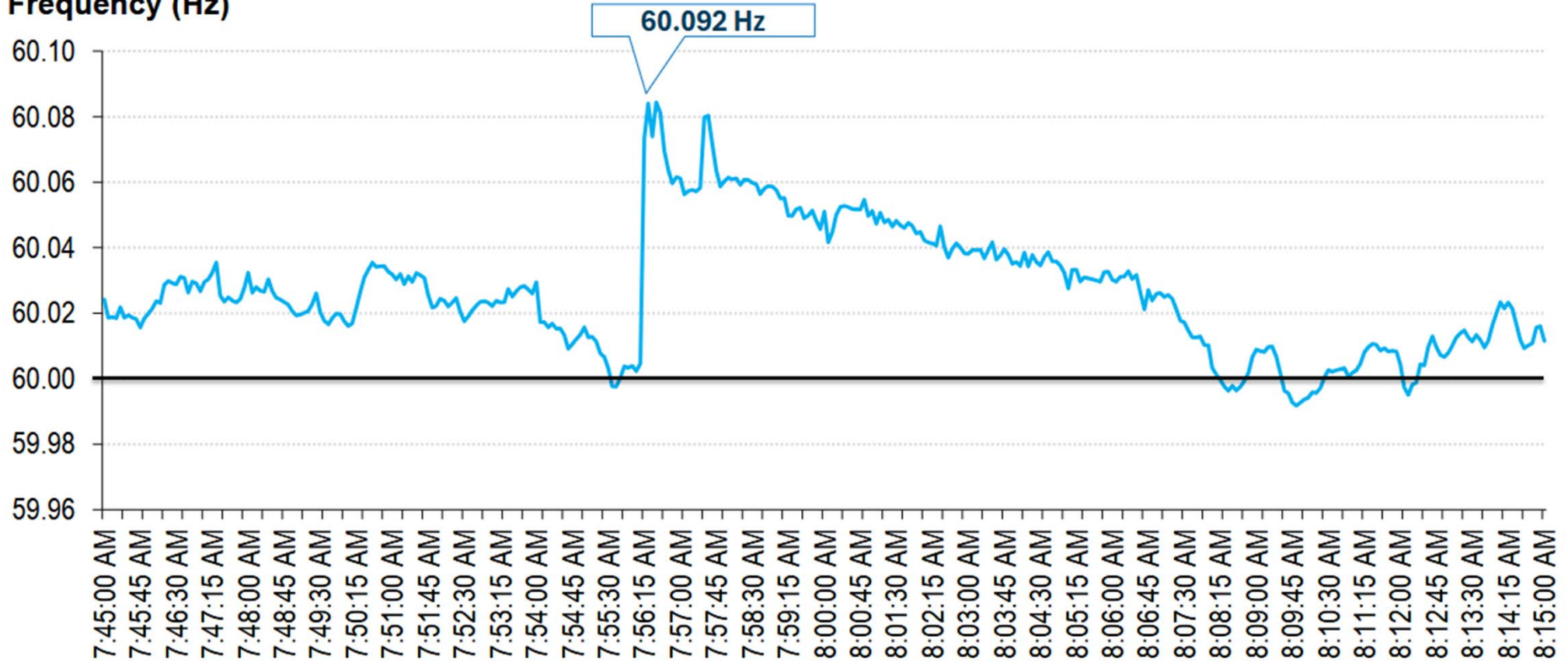
June 18, 2026

July 11, 2026

RTO Load vs. ACE



Frequency (Hz)



**Be Advised // 1,300MW Data Center // Oracle+Vantage // \$2.5BN
Substations and 345kV // Wisconsin**

American Transmission Company has **refiled its application** for a Certificate of Public Convenience and Necessity (**CPCN**) for **substations and 345 kilovolt** transmission lines serving the **1,300 megawatt Oracle+Vantage Port Washington / Lighthouse Data Center** in **Ozaukee County, Wisconsin**.

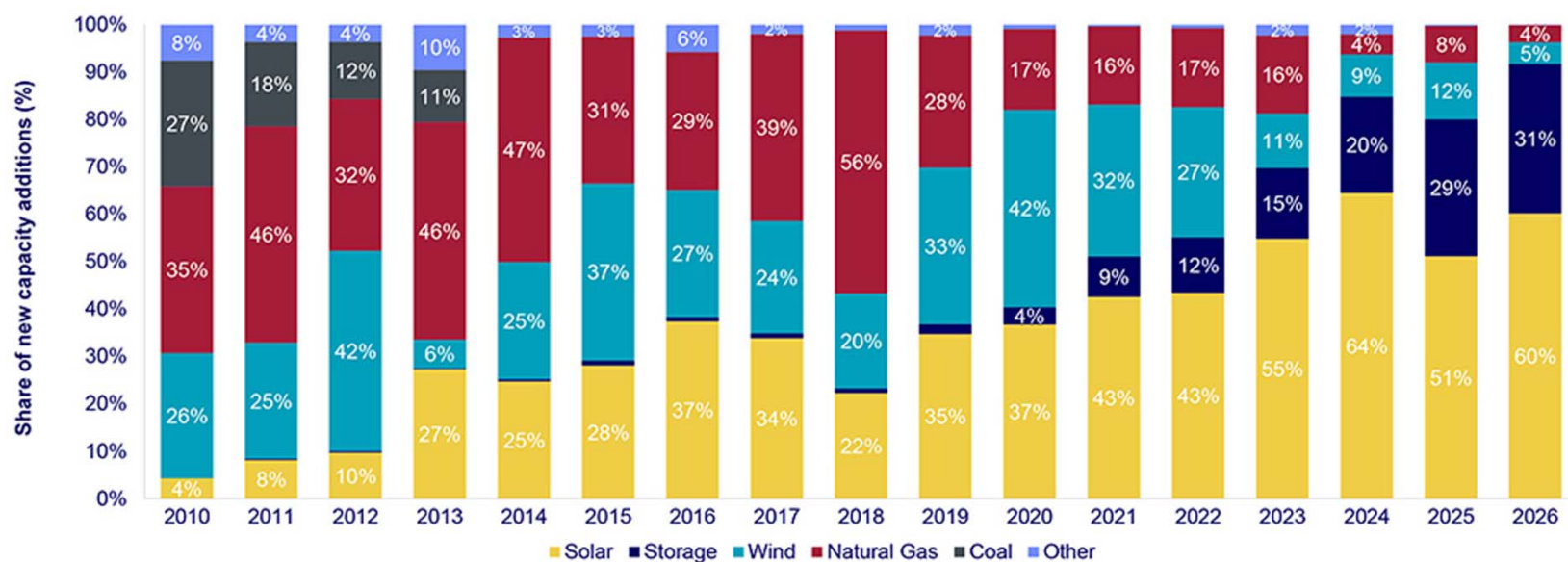
Costs are estimated between \$2.49-\$2.72 billion, depending on the route chosen. **Oracle will be responsible for costs** other than a "small percentage attributable to the MISO LRTP Project 28 substations" through the **Very Large Customer tariff** and a **Payment and Cancellation Agreement** with distribution utility **Wisconsin Electric (We Energies)**. Included in that cost is \$1.1 billion for a 600MW (5-second) E-STATCOM device to mitigate power oscillations.

Halcyon, September 26, 2026

Generation

- Transition from low demand growth and high penetration of wind, solar, and storage
- AI data centers place a very high value on speed to market
- Traditional regulated VI utility generation
- Utility supplied “dedicated” new generating plants
- Bring your own generation on the network
- Bring your own new generation on the network
- Behind the meter generation (BTM) and co-located generation
- Hybrid transition from BTM to network generation
- All data centers have backup batteries and diesel or gas turbines
- Load flexibility and curtailment obligations

New US electricity-generating capacity additions, 2010 – Q1 2026



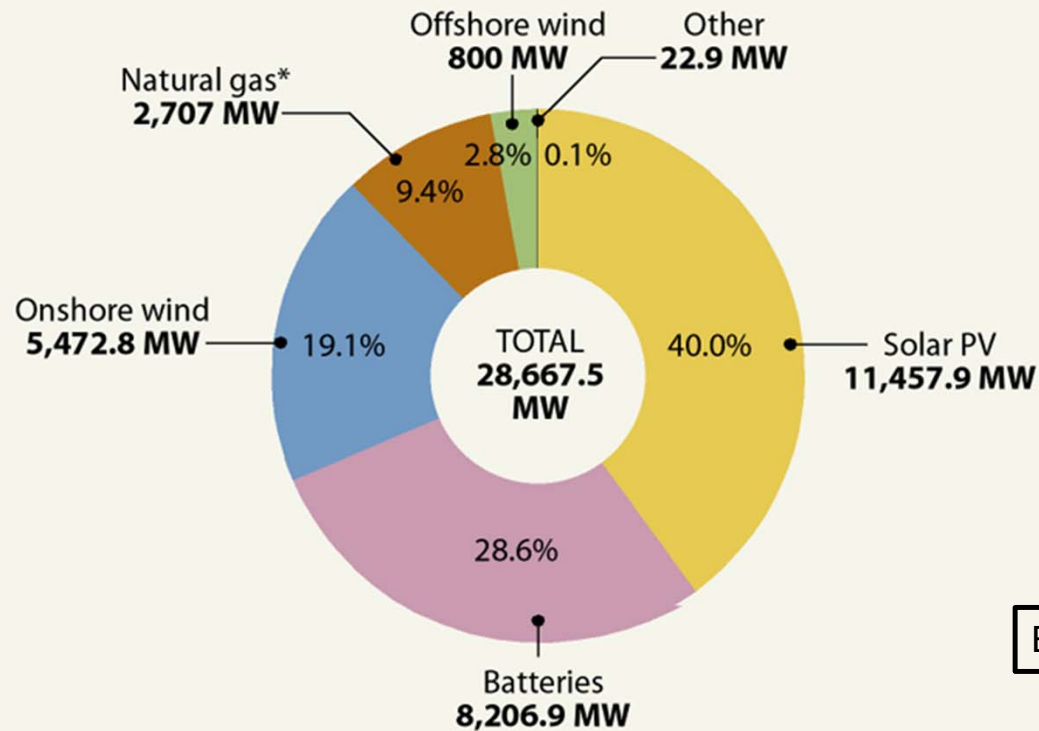
Wood Mackenzie 2026

The Year So Far in Power Plants

Solar and batteries dominated new power plant deployments in the first half of 2026, continuing recent trends. While gas plants were a small part of the mix, they could see a sharp increase as data center developers drive new demand.

NEW U.S. POWER PLANTS

Summer generating capacity in megawatts, by type, Jan.-June 2026



ELCC adjusted:~ 13,000 MW

*Includes combustion turbine, combined cycle and internal combustion engine.

SOURCE: Energy Information Administration

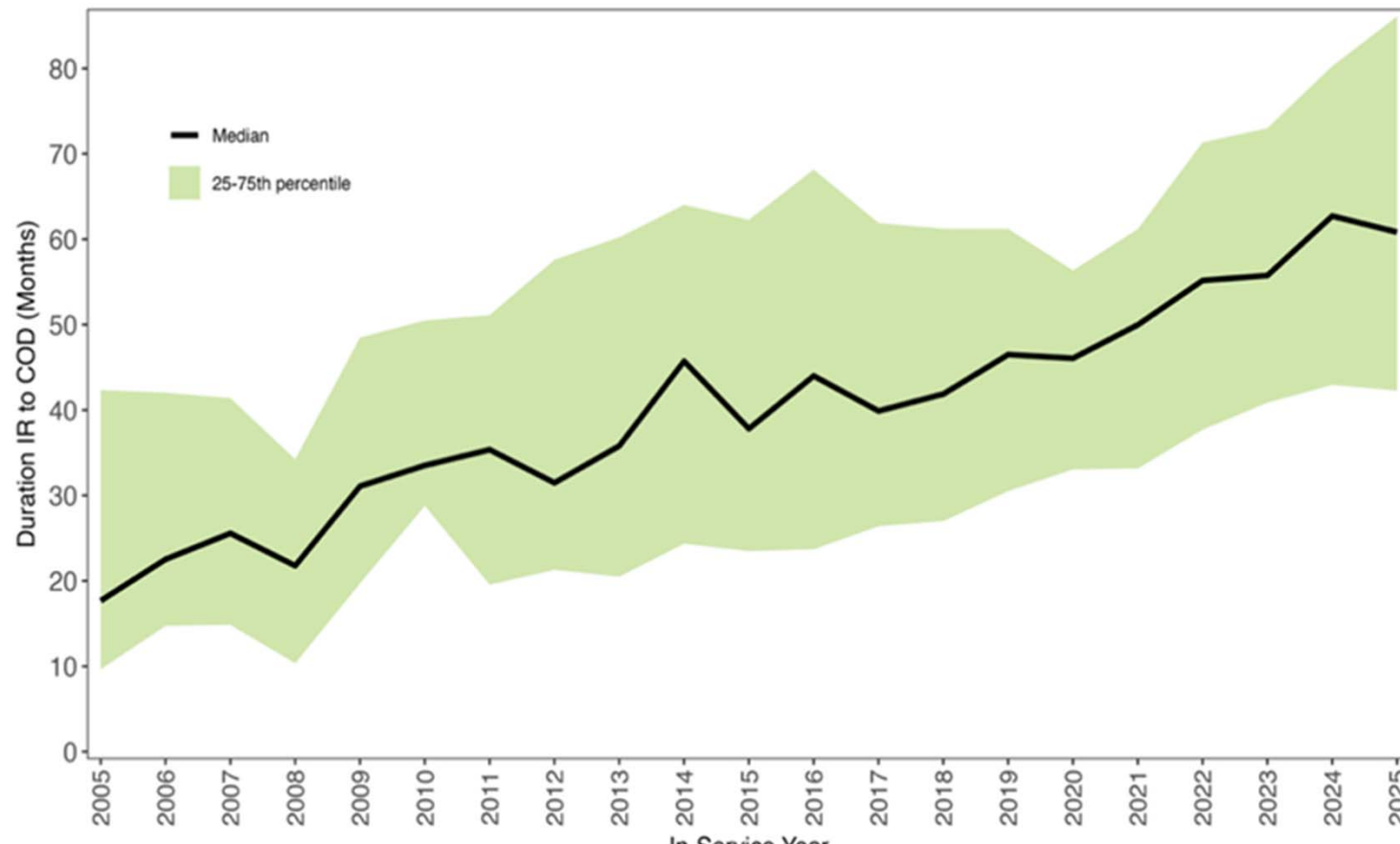
PAUL HORN / Inside Climate News

Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid

Constellation signs its largest-ever power purchase agreement with Microsoft, a deal that will restore TMI Unit 1 to service and keep it online for decades; add approximately 835 megawatts of carbon-free energy to the grid; create 3,400 direct and indirect jobs and deliver more than \$3 billion in state and federal taxes



Median (and p25/p75) duration from interconnection request (IR) to commercial operations date (COD), 2005-2025



LBNL 2026

Data centers are building their own power plants

Data center developers announced 50 GW of behind-the-meter projects in 2025, according to Cleanview's project tracker. Now ~30% of all planned capacity is expected to come from BTM data centers.

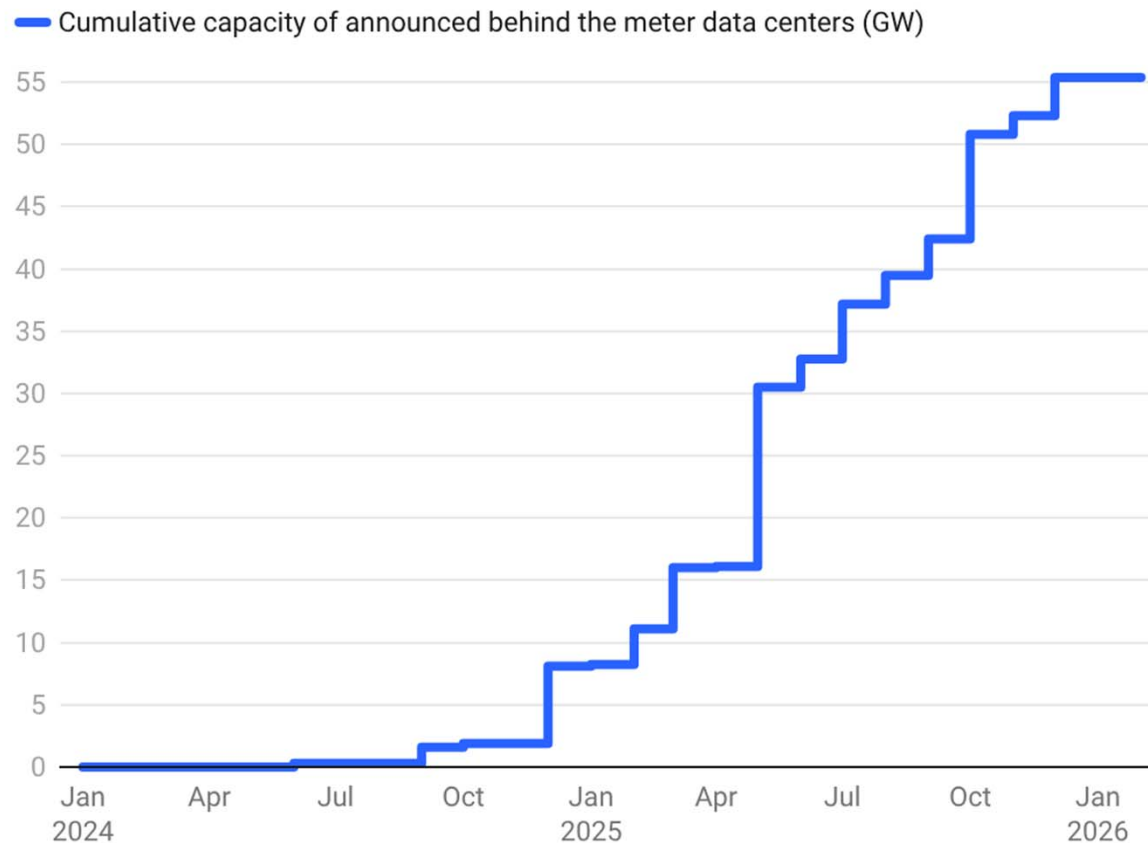


Chart: Michael Thomas • Source: Cleanview project tracker • Created with Datawrapper



Data Center Forecast

Forecast Peak Load (Summer)

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
Capacity (MW)	448	701	881	1226	1644	2588	3171	3661	3848	3993	4005	4014	4022	4030	4038	4045	4053	4060	4061	4061	4061
Demand (MW)	365	580	732	1025	1380	2182	2678	3095	3254	3377	3387	3395	3402	3408	3415	3421	3428	3434	3435	3435	3435

Firm/Non-Firm Data Center Load

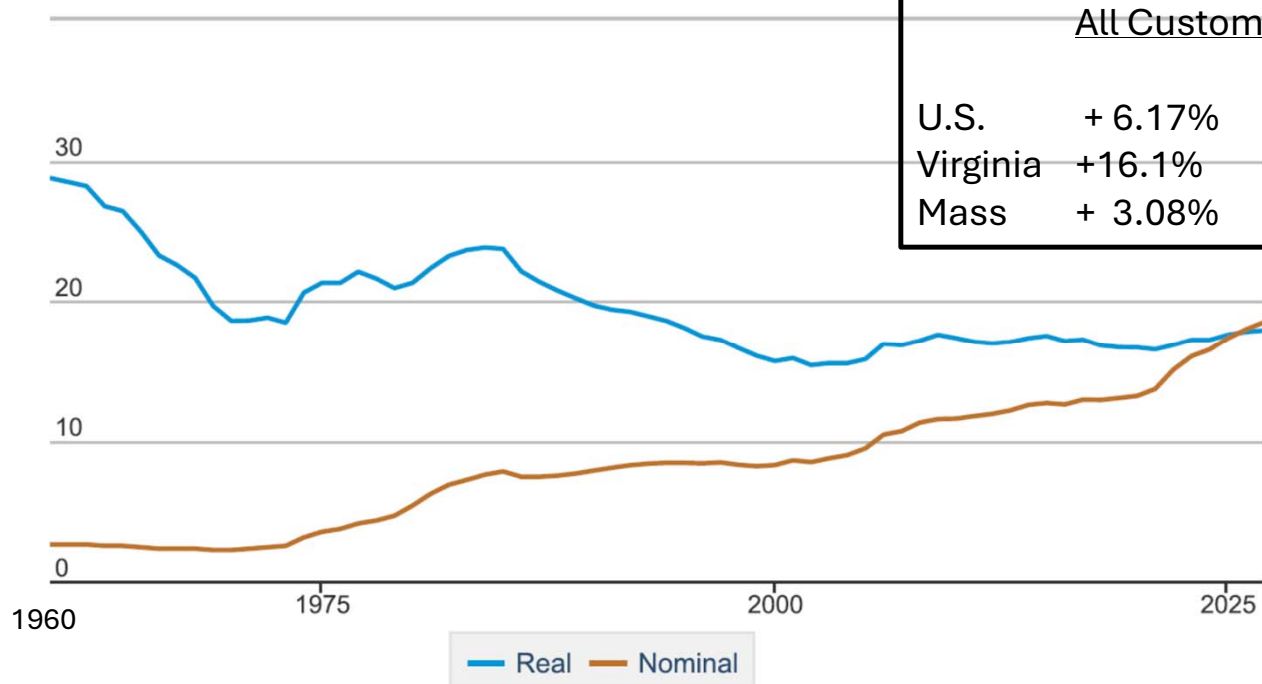
Firm: 20%
Non-Firm: 80%



Who Pays and How?

Residential Electricity Prices

Values



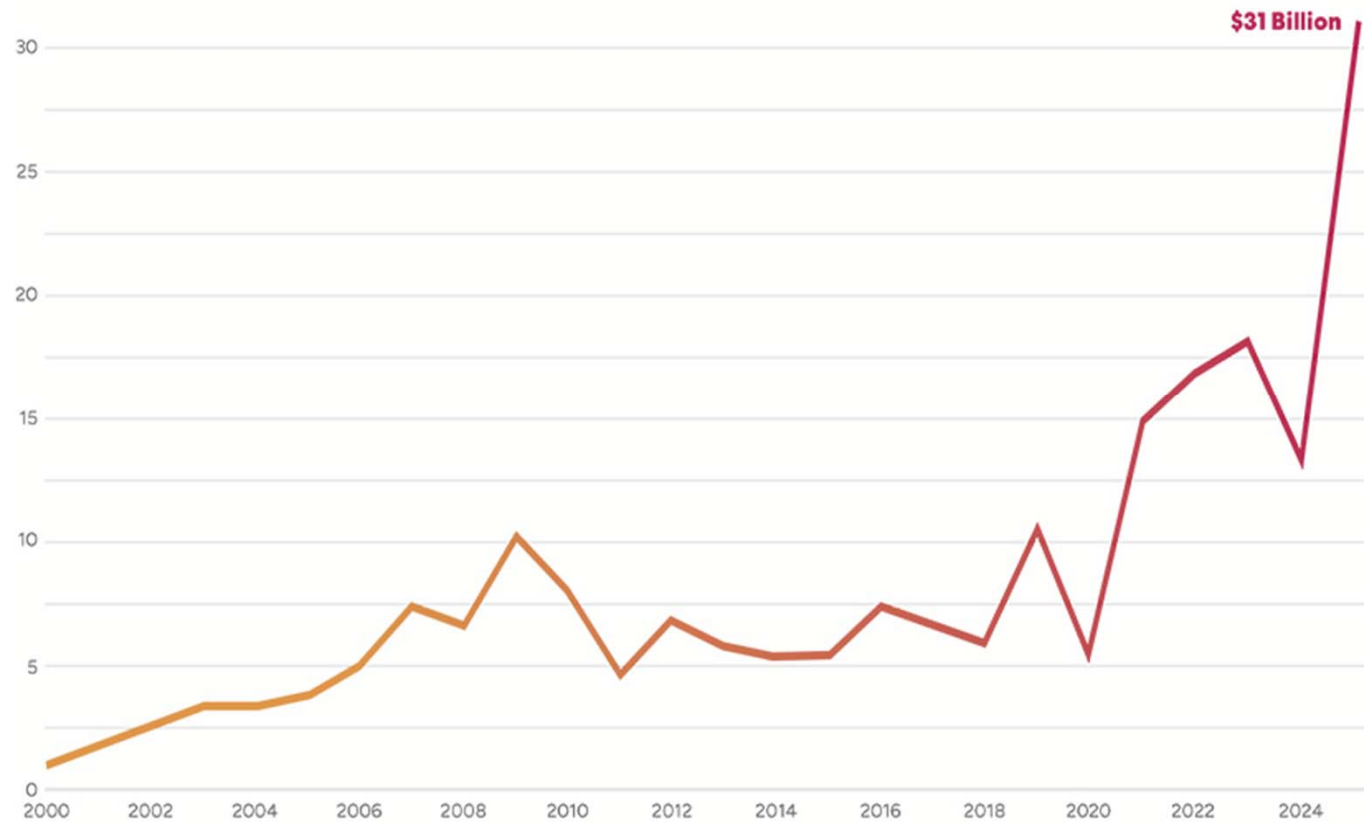
Year to Date 2026 (July)

	All Customers	Residential
U.S.	+ 6.17%	+ 6.94%
Virginia	+16.1%	+11.59%
Mass	+ 3.08%	- 0.03%



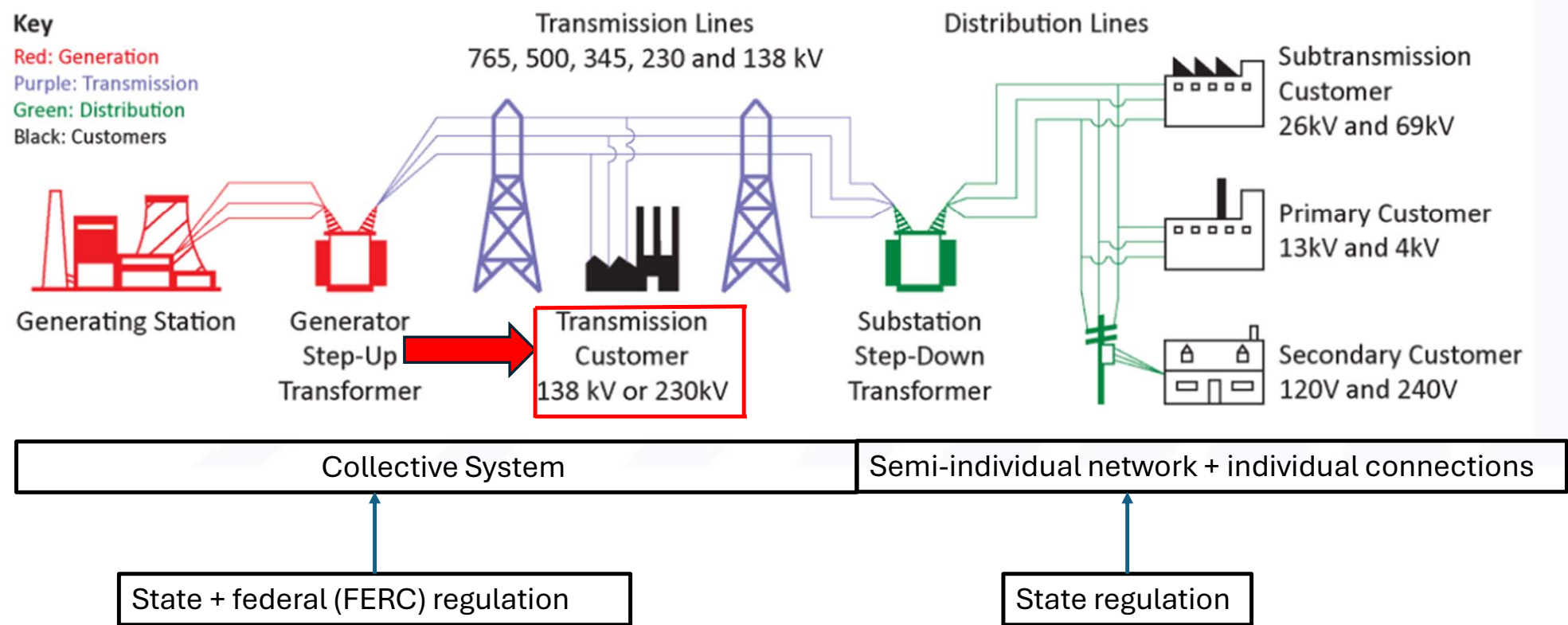
Data source: U.S. Energy Information Administration

ELECTRIC AND GAS UTILITY RATE INCREASE REQUESTS SINCE 2000 (BILLION \$)

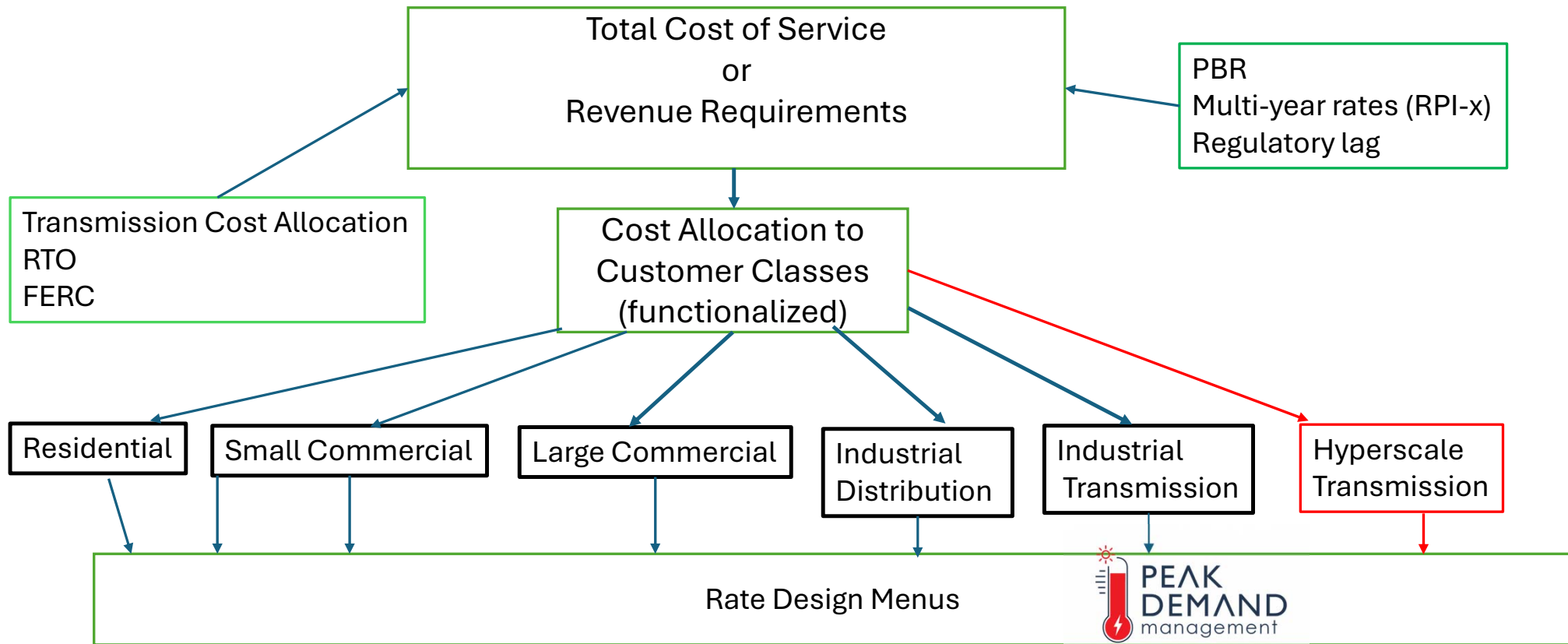


RTO Insider September 18, 2026

<https://www.nerc.com/globalassets/who-we-are/september-2025-understanding-the-grid.pdf>



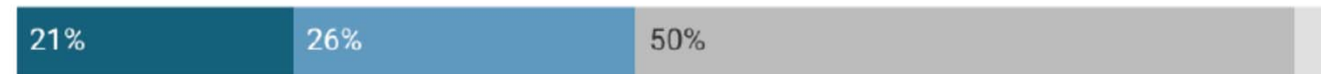
Cost of Service Regulation (COSR)



Drivers of Distribution and Transmission Investment

■ Adaptation, hardening, resilience ■ Replacement ■ Expansion ■ Other

Transmission



Distribution

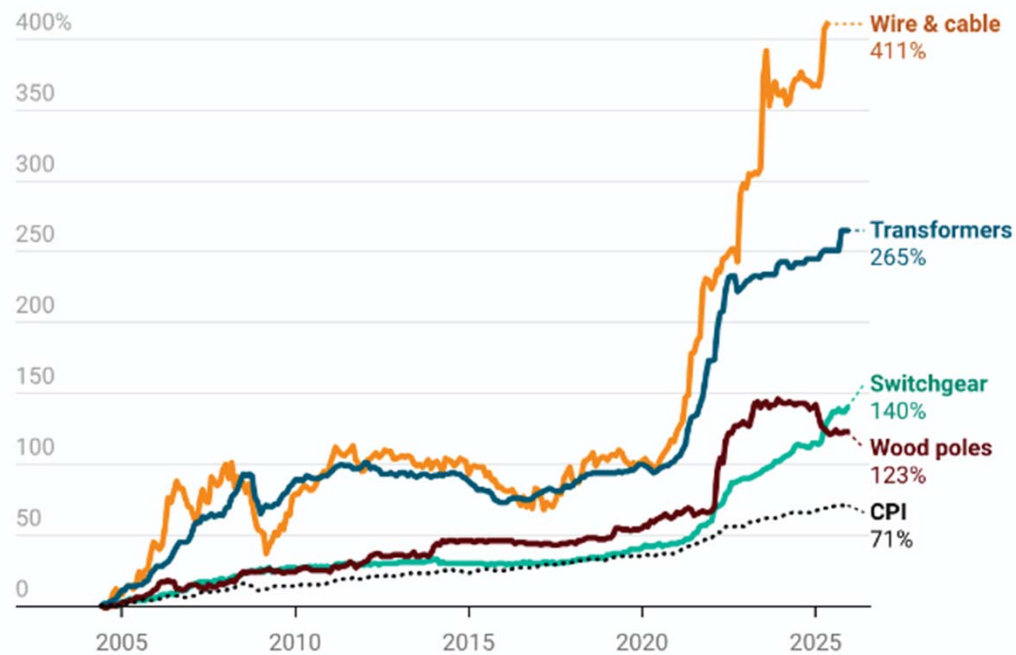


Source: EEI • Created with Datawrapper

¹ [Brattle \(2025\)](#), ² [EEI \(2025\)](#), ³ [FERC \(2026\)](#)

Producer Price Index for Power System Equipment

Shown as percentage change relative to June 1, 2004, also compared to CPI



Source: BLS, FRED • Created with Datawrapper

LBNL May 2026

Efforts to Mitigate Impacts of Hyperscale Data Centers on Electricity Prices

- Traditional regulatory approach to setting prices is to “roll-in” (pool) incremental costs of new facilities with historical costs (depreciated original cost) into the total cost of service and then to use functional allocation factors to allocate these costs into customer class “buckets.”
- Assign responsibility for incremental costs incurred to supply new hyperscale data centers to those facilities through special tariffs and contracts
 - Vintage pricing
- Bring your own “new” generation to the system (BYONG)
 - What is “new?”
 - “Inside the fence” generation with no connections to the grid.
- Agree to long-term contracts with take or pay provisions (10-20 years) to mitigate stranded cost risk
- What about “public policy costs?”
 - Energy efficiency
 - RPS
 - EV/PV support
- What about “overhead” operating and capital costs?

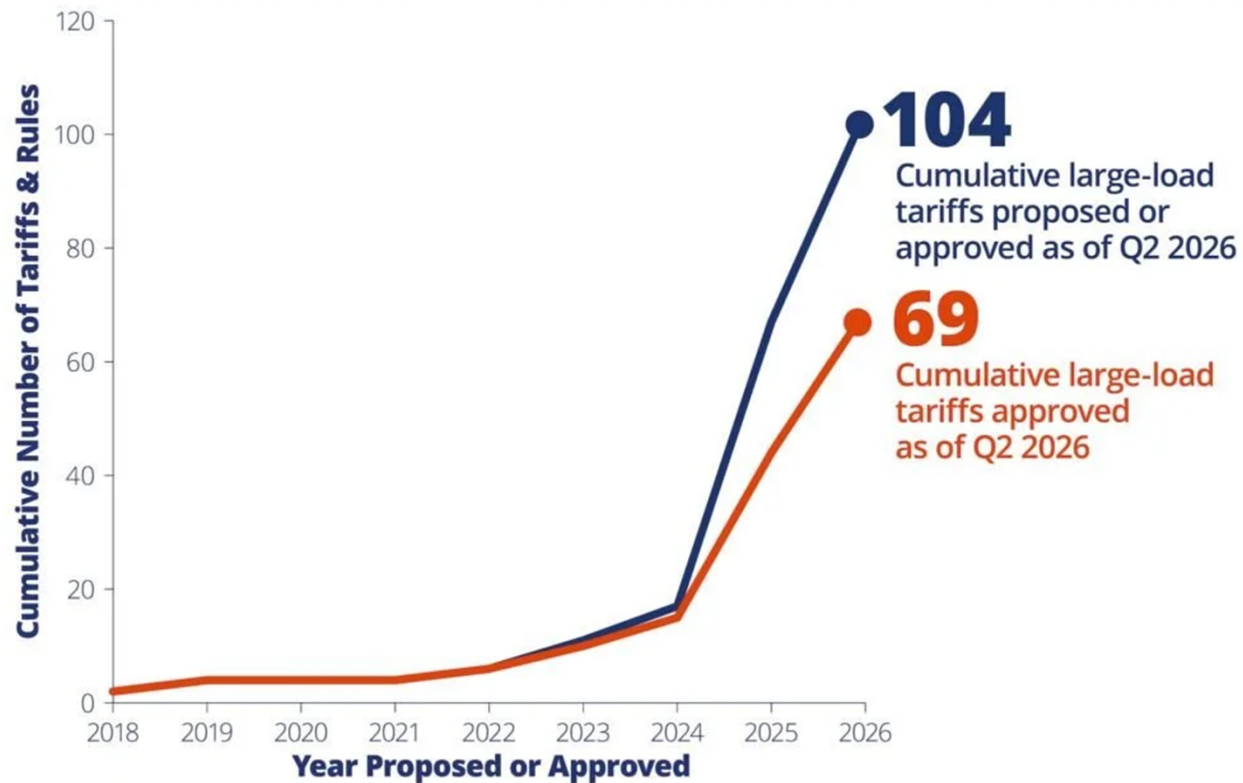
White House Ratepayer Protection Pledge (March 4, 2026)

A public commitment that hyperscalers, AI companies, and the utilities and data-center developers behind them will build, bring, or buy every kilowatt their facilities need — and cover every dollar of the infrastructure that delivers it. American households and businesses should not be footing the bill.

- 1. Building, Bringing, or Buying New Power Supply**
- 2. Paying for New Power Delivery Infrastructure Upgrades**
- 3. Paying Whether They Use the Power or Not**
- 4. Investing in Local Job Creation and Workforce Development**
- 5. Contributing to Electric and Community Resilience**

Large-Load Tariff Approvals Are Surging

Approvals surged between 2024 and 2026, while a growing pipeline of proposed tariffs signals continued regulatory change.



Source: SEPA and NC Clean Energy
Technology Center, DELTa, Q2 2026. See:
sepower.org/large-load-tariffs-database



Smart Electric
Power Alliance



NC CLEAN ENERGY
TECHNOLOGY CENTER

Be Advised

Powered by Halcyon

Be Advised // 1,061MW Data Center // Amazon SBN500 // Construction+Operating Permit // Indiana

Amazon has filed a **construction and operating permit** with the **Indiana Department of Environmental Management (IDEM)** for its **1,061 megawatt SBN500 data center** in Wheatfield. The application specifies **384x Caterpillar model 3516E critical emergency generators**, each with a rated output of **2,750 kilowatts**.

Northern Indiana Public Service Company (NIPSCO) is providing grid power from its **Schahfer Power Generation Station** for SBN500. The permit now enters a 30-day public comment period, after which IDEM may decide to hold a public hearing.

15-year contract, Amazon pays 100% of incremental infrastructure and generation costs, ramp up over 5 years, \$1.4 billion customer credits over 15 years, one-time adjustment to reduce capacity, credit security



Be Advised

Powered by Halcyon

Be Advised // Data Center Power Supply Agreement // DTE // Google // Michigan // APPROVED By Public Service Commission

The **Michigan Public Service Commission** has approved the **Primary Supply Agreement (PSA)** and **Clean Capacity Accelerator Agreement (CCAA)** between **DTE Electric** and **Google**. The PSA and CCAA are for a **1,000 megawatt data center** in **Wayne County, MI**, with a **20-year minimum term**, an **80% minimum billing demand payment**, and commitments for **up to 480 MW of energy storage**, **1,600 MW of renewable energy projects**, and **300 MW of zonal resource credits**.

The approval has conditions including: **removing commitment caps** from Google toward electric infrastructure upgrades, adding with-Google and without-Google study cases in **DTE's next Integrated Resource Plan**, and notifying Google of DTE's **energy waste reduction goals**.

Tariff approval [here](#)

Redacted Primary Supply Agreement [here](#)

Redacted Clean Capacity Accelerator Agreement [here](#)

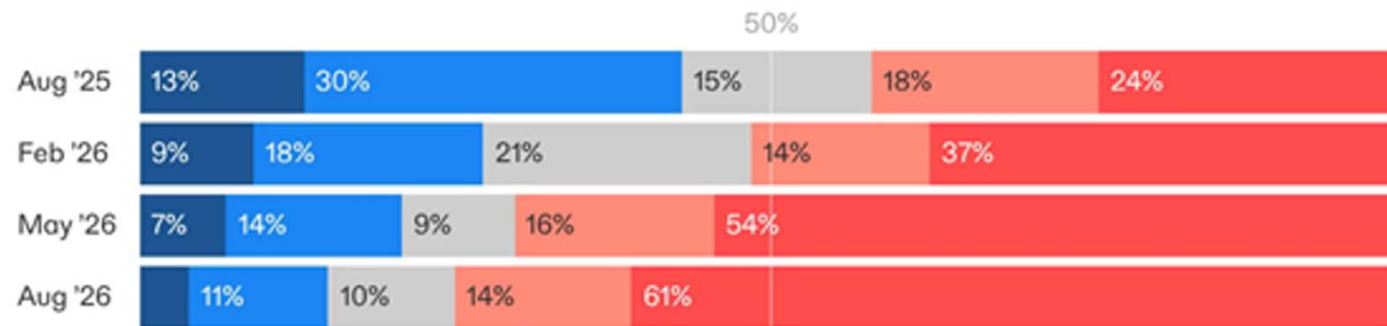
Why Have Data Centers Become Politically Toxic?

Move Fast and Break Things vs. Move Carefully with Regulatory Approval and Break Nothing

Americans' Openness to Data Centers Has Kept Declining

Heatmap News asked: "As you may know, data centers are facilities that house the servers that power the internet, apps, and artificial intelligence. Would you **support or oppose** a data center being built near where you live?"

Strongly support Somewhat support Not sure Somewhat oppose Strongly oppose X.10
X.11

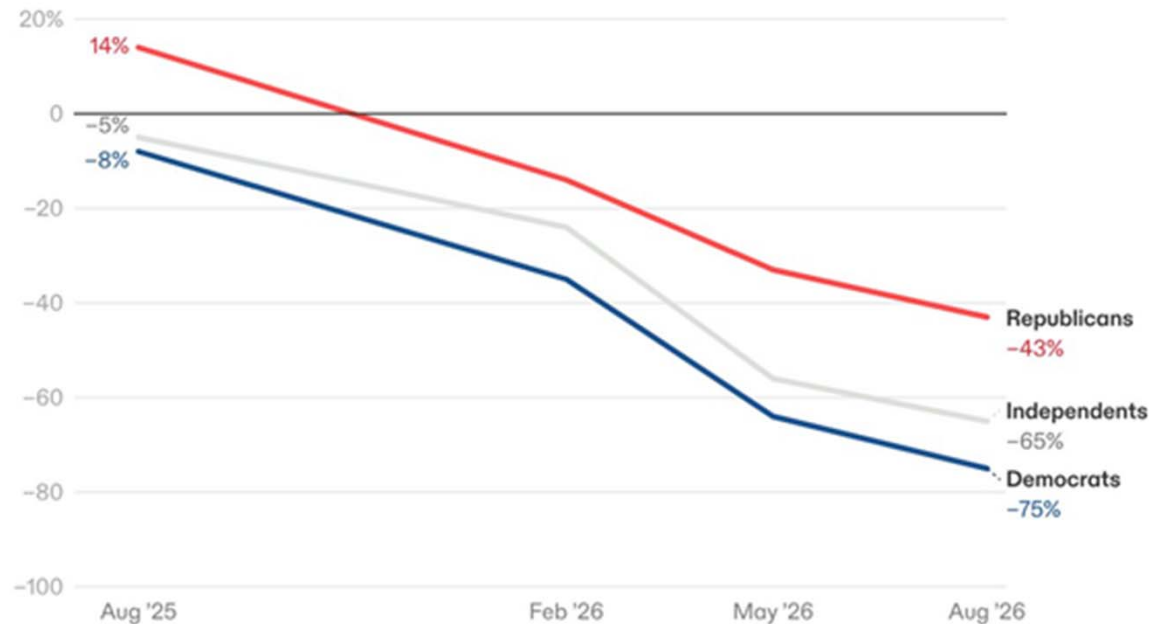


Source: Heatmap Pro / Embold Research
August 19, 2026



Across Parties, Data Center Support Keeps Falling

Heatmap News asked: "As you may know, data centers are facilities that house the servers that power the internet, apps, and artificial intelligence. Would you **support** or **oppose** a data center being built near where you live?"



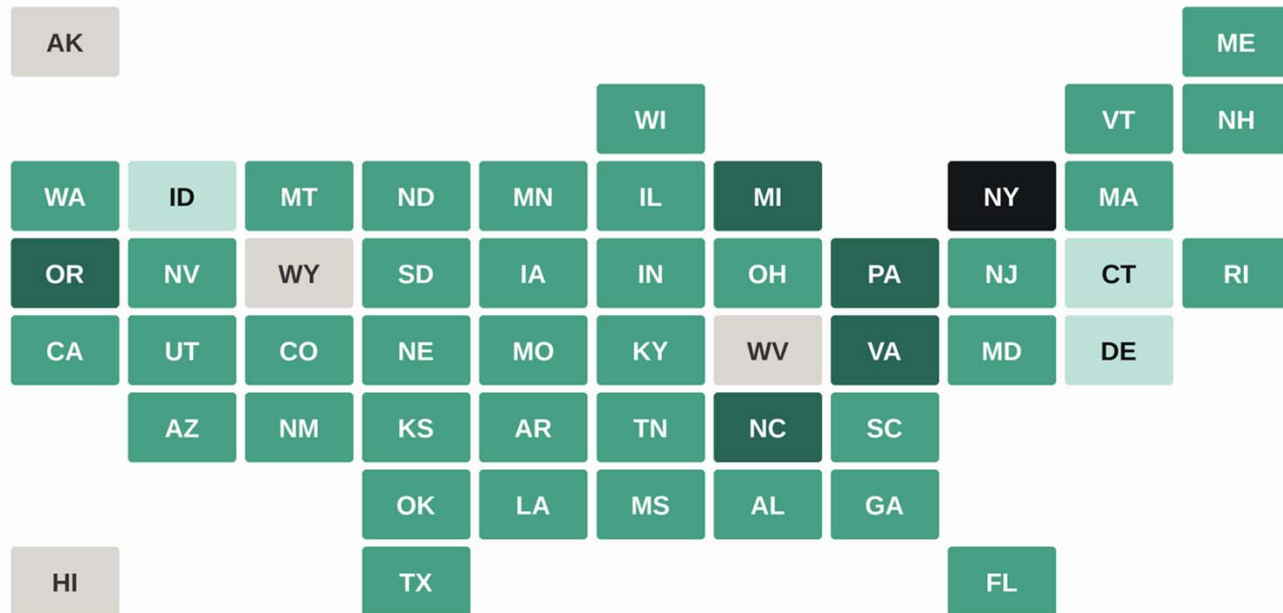
Source: Heatmap Pro / Embold Research



August 19, 2026

Data Center Moratoriums and Bans by State

Status as of October 1, 2026. A state counts as active if any city, county, or township has a ban or moratorium in effect.



■ Statewide moratorium in force (1)

Active local ban or moratorium in effect (42)

■ also has a statewide moratorium bill in play (5)

■ no statewide bill (37)

■ Considered, stalled, or lapsed (3)

■ No restrictions on record (4)

Source: Programs.com analysis of state legislative records, local ordinances, and news reports.



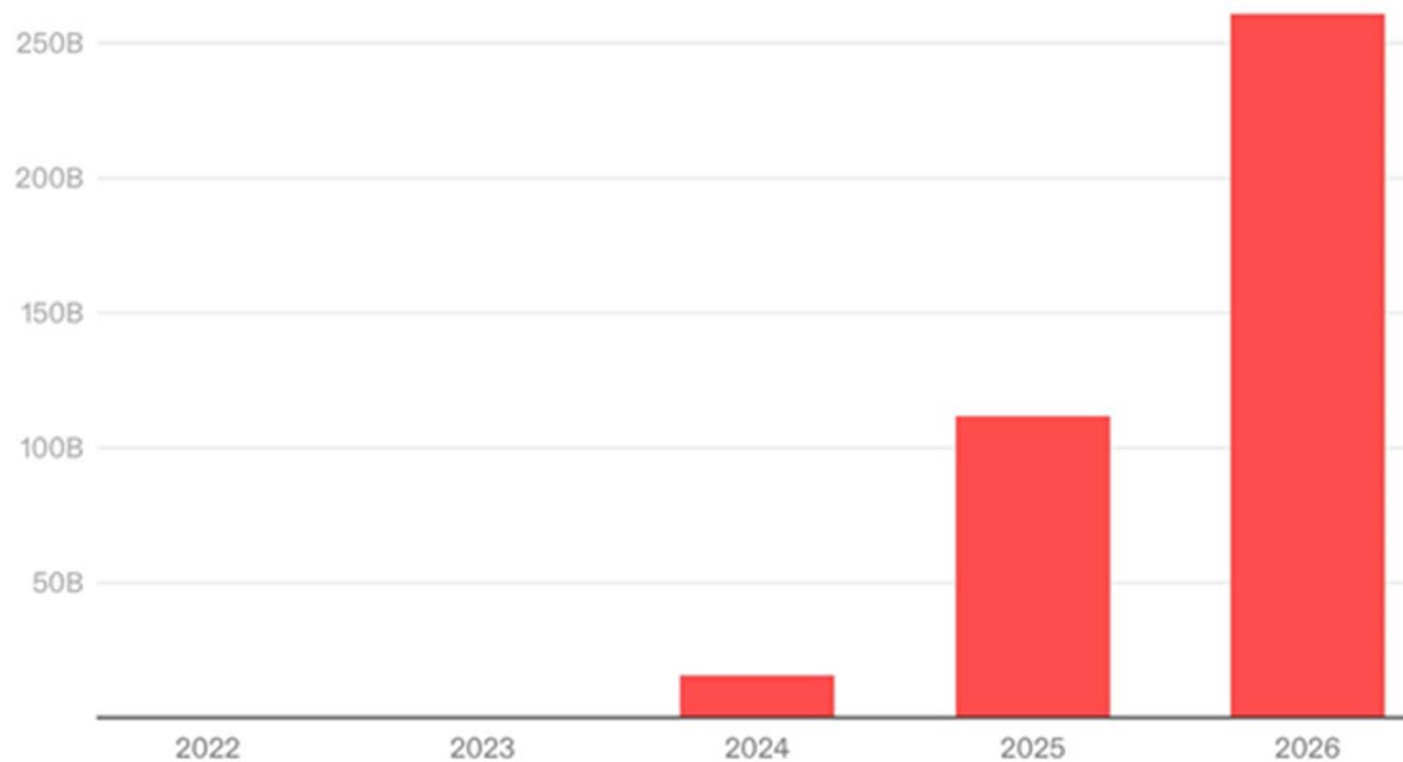
Lowell, MA ~50 MW (residents ~ 120,000)
Brian Snyder, REUTERS
USA Today, August 19, 2026



Vernon, CA 49.5 MW (residents ~220)
Mario Tama, Getty Images
USA Today, August 19, 2020

The Surging Expense of Data Center Backlash

More than \$260 billion in data center projects have been canceled in 2026 following sustained local opposition. About half of that sum was terminated in the third quarter.



Source: Heatmap Pro



October 6, 2026

How Meta Uses A.I. Data Centers to Avoid Billions in Federal Taxes

Meta is exploiting a lucrative tax break intended to support research and experimentation. Its own accountants say the gambit is risky. (New York Times, October 1, 2026

How Meta Got Everything It Wanted in a Secret Louisiana Data Center Deal

A Times examination details how the Silicon Valley giant used private talks with local officials to start a project big enough to cover nearly six square miles. NY Times July 27, 2026 (online)

Tech Giants Face Questions Over Secret AI Data-Center Deals

Democratic Rep. Jamie Raskin seeks information from Amazon, Google, Meta and Oracle. Wall Street Journal, September 30, 2026

11 Q27. DO THE AGREEMENTS INCLUDE ANY DAMAGES-RELATED CAPS?

12 A.

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Governor Healey Halts Data Center Tax Incentive and Calls for Strict Guardrails to Protect Ratepayers, Environment & Public Health

Governor releases one of the most comprehensive frameworks in the nation, covering cost, energy, water, air, noise, jobs and other impacts

June 25, 2026

Governor Healey: No Data Centers Without Local Approval

Governor Healey is requiring data centers to receive local approval before seeking state permits, pay for their own clean energy or pay fees to ratepayers, and adhere to water, air and community engagement standards

September 8, 2026

Amazon's New Push to Get Buy-In for Data Center Build-Out

Company pledges transparency—and extra \$1 billion in community support—to woo skeptics

By

[Isabella Simonetti](#)

Oct. 2, 2026 5:00 am ET, WSJ (online)



Amazon's data center in New Carlisle, Ind. Jim Vondruska/Reuters

Google Takes the A.I. Data Center Race to Outer Space

Next Thursday, Google is sending an experimental satellite into orbit that will have enough computing power to answer simple A.I. queries from space. NY Times September 24, 2026

The New Push for Underwater Data Centers

Exploratory projects are making a splash in Maine and Alaska

Heatmap Plus October 2, 2026