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Load Bearing

AI data centers, the end of flat demand, and the remaking of the utility planning order

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DECISION BRIEF

US Power and Utilities

Liam Kranenburg

Kranenburg Power Advisors

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KEY IMPLICATIONS

US retail electricity sales reached a record 4,058 terawatt-hours (TWh) in 2025, after 14 years in which they barely moved. In times past, growth of this kind would have been absorbed by a familiar machine: utilities would forecast it, regulators would approve the plants and wires to serve it, and every customer would share the cost. Yet the machine is jamming. PJM's capacity price has risen elevenfold in two auctions, Texas has 474 gigawatts (GW) of large loads waiting to connect, and on 9 October federal regulators declined to let PJM decide whose power is cut first. KPA analysis shows why. Data centers accounted for roughly all US demand growth between 2014 and 2023, and the plants that would serve them now take longer to arrive than the forecasts that justify them. The question is no longer only how much to build, but who bends when the system runs short.

- **The utility does not, cannot, and will not always be able to build ahead of the load.** The largest gas turbines now take more than five years from order to delivery. One ordered today would, on average, not run until 2031—after the end of the 2025–30 window over which utilities forecast the demand it is meant to serve.
- **The balancing role is shifting, even if temporarily, to the large loads themselves.** By this brief's arithmetic, if data centers gave up 0.5% of their potential annual energy use, the existing grid could, nationally and on paper, absorb all of the data center growth utilities forecast for 2025–30. It could not absorb total growth, and in Texas forecast growth is five times that headroom. Flexibility under contract today covers about 1% of it.
- **The planning order is strained, though it could yet reinvent itself.** Even the data center requests judged likely to proceed are about three times forecast data center growth. The bill, meanwhile, is landing on regions rather than host states: across 44 states, data center share of load tracks sales growth closely but bears no relation to household price increases. The utilities that price firmness and flexibility separately will set the terms of the next decade.

—October 2026

Load Bearing: AI data centers, the end of flat demand, and the remaking of the utility planning order

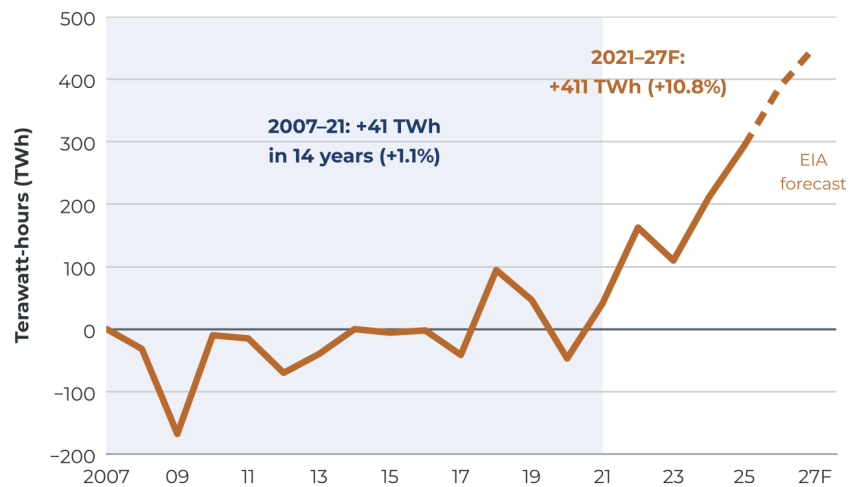
Liam Kranenburg¹

Data centers, the planning order, and the end of flat demand

For 14 years the US power sector lived with a number that did not move. Retail electricity sales were 3,765 TWh in 2007 and 3,806 TWh in 2021, a gain of 1.1%. Utilities adjusted. Capital shifted from power plants to wires, some regulators decoupled earnings from sales, and load forecasting became a quiet discipline. Then the number moved. Sales reached a record 4,058 TWh in 2025, and the US Energy Information Administration (EIA) expects 4,217 TWh by 2027—a gain of about 411 TWh in six years, or ten

FIGURE 1

Cumulative change in US retail electricity sales, 2007–27



Source: KPA analysis of US Energy Information Administration data; 2026–27 are EIA forecasts.

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times the gain of the previous fourteen (see Figure 1).² The forecasts moved faster still. Utility filings compiled by Grid Strategies put expected five-year growth in summer peak demand at about 23 GW as of 2022 and at 166 GW in November 2025, roughly seven times as much in three years. "We haven't seen that kind of load growth since the 1980s," John Wilson of Grid Strategies said in 2024.

KPA analysis of federal data shows how narrow the source of that growth has been. Between 2014 and 2023, US data centers increased their electricity use by about 118 TWh, from 58 TWh to 176 TWh, according to Lawrence Berkeley National Laboratory (LBNL). Over the same nine years, total US retail sales rose by only about 110 TWh. On this arithmetic, data centers accounted for roughly all of the net growth in US electricity demand, and everything else combined was essentially flat, within 1% (see Figure 2).³ The comparison is approximate. Depending on which estimates are used, data centers account for 73–108% of the growth, and 2014 was the coldest winter of the past 15 years, which flatters the starting point. Since 2023, the rest of the economy has started to grow again: ending the comparison in 2025, data centers account for about 60% of growth. That they drove most of the decade's growth is not in doubt.

1. Kranenburg Power Advisors. Researched and drafted with AI assistance. All calculations in this brief use the public figures listed under Sources.

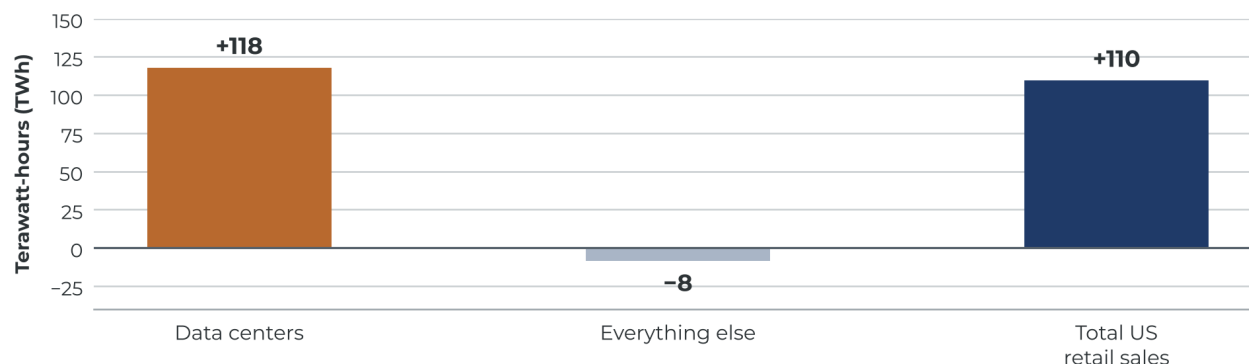
2. EIA Annual Energy Review values for 2007–09; Monthly Energy Review values for 2010–25; October 2026 Short-Term Energy Outlook for 2026–27. The 2018 and 2022 highs partly reflect weather.

3. LBNL counts all electricity used by data centers; EIA retail sales exclude power generated and used on site. On EIA's total end-use measure, which includes it, US use grew by about 108 TWh over the same period. With EPRI's lower 2023 estimate (about 150 TWh), data centers are 84% of growth; with LBNL's earlier 2014 estimate (about 70 TWh), 97%. Including cryptocurrency mining (25–91 TWh in 2023, per EIA) alongside data centers, everything else fell 0.9–2.7%.

The order that this growth is testing goes back more than a century. Under the regulatory compact, a utility receives a monopoly franchise and the opportunity to earn a regulated return. In exchange, it accepts an obligation to serve every customer in its territory at just and reasonable rates. Planning follows from that bargain: the utility forecasts the demand of millions of small customers, builds the supply and wires to meet it, and recovers the cost from all of them. The arrangement worked because new load arrived in small increments, predictably, and from customers who had nowhere else to go. AI data centers are none of these things.

FIGURE 2

Change in US electricity use, 2014–23: data centers against everything else



Source: KPA analysis of Lawrence Berkeley National Laboratory (data centers) and EIA (retail sales) data. "Everything else" is the difference.

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Among other reasons the old order is straining are the following:

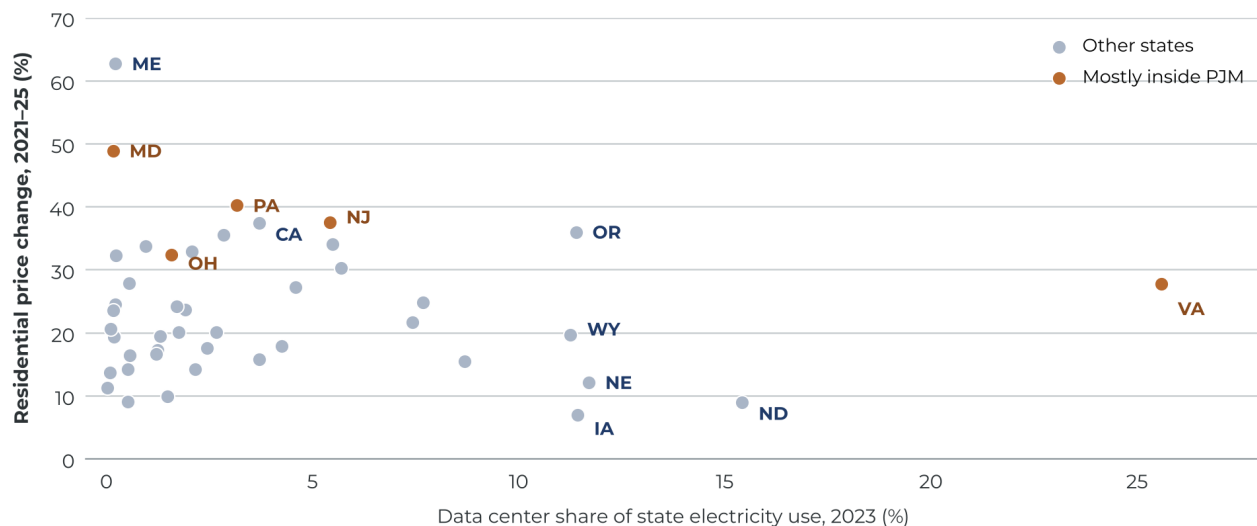
- Size and concentration.** A single hyperscale campus can now rival the peak demand of an entire utility. Meta's Hyperion campus in Louisiana is described at 5 GW or more, while Entergy Louisiana's peak in the record heat of August 2023 was about 10.3 GW—one customer, roughly half a utility. AEP reported 69 GW of contracted load growth through 2030 in July 2026, more than the roughly 65 GW system peak it projected for 2030 in late 2025.
- Lead times longer than the forecast.** A data center shell takes 18–24 months to build. A large gas turbine does not. EPRI wrote in March 2026 that the largest units now take more than five years from order to delivery, so one ordered today would, on average, not begin operating until 2031. That is beyond the 2025–30 window over which utilities forecast the peak it is meant to serve. GE Vernova disputes the bottleneck, putting new heavy-duty orders at about three years, but Mitsubishi says its order book is full through 2030.
- A price signal that arrives all at once.** In PJM, the largest US grid, the capacity price rose from \$28.92 per megawatt-day (MW-day) for 2024/25 to \$329.17/MW-day for 2026/27, an elevenfold increase in two auctions. It has cleared at the cap of a price collar in each of the last three. PJM's independent market monitor has said that \$29.4 billion, or 46%, of the \$63.6 billion cost of the last four auctions is attributable to data center load.
- The bill lands on the region, not the host state.** EIA expects the average US residential price to reach 18.7 cents per kilowatt-hour (¢/kWh) in 2027, up from 17.3¢ in 2025. KPA analysis of 44 states finds that data center share of load tracks sales growth closely (correlation 0.63) but bears no relation to how fast household prices rose from 2021 to 2025. Being inside PJM does: those states' residential prices rose a median 37%, against 20% elsewhere. Maryland, where data centers use 0.2% of power, saw prices rise 49%; Virginia, where they use 26%, saw 28% (see

Figure 4).⁴ Power bills featured prominently in the November 2025 elections in Virginia, New Jersey, and Georgia, and 36 states elect governors on 3 November.

- **The queue is not the load.** Wood Mackenzie counts 1,066 GW of US data center interconnection requests, duplicates included. Even the 28% it expects to be served, about 300 GW, is more than three times the roughly 90 GW of data center growth in utilities' own forecasts for 2025–30. Only the firmly committed 12% comes close.⁵
- **New reliability risks.** On 22 July 2026, a fault on a 230-kilovolt line in Northern Virginia caused about 3.8 GW of data center load to switch to on-site generation, even though the fault was cleared. The North American Electric Reliability Corporation (NERC) had already issued a Level 3 alert, its most serious category, on large loads earlier in the year.

FIGURE 4

Data center share of load against residential price change, by state



Source: KPA analysis of EPRI (2023 data center shares, 44 states) and EIA (residential prices, 2021 and 2025) data. "Mostly inside PJM": MD, NJ, OH, PA, VA shown; DC, DE, WV lack EPRI shares.

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The balancing role shifts to the load

For all these reasons, the job of balancing supply and demand is shifting, even if temporarily, from the supply side to the large loads themselves. If the shift holds—and that is far from assured—it would reverse the industry's oldest habit: treating demand as a given and supply as the variable to be adjusted.

The rules are already moving. Texas Senate Bill 6, signed in June 2025, requires new loads of 75 megawatts (MW) or more to let the grid operator curtail them, or order them onto backup generation, during emergencies. In December 2025, federal regulators directed PJM to create new trans-

4. EPRI 2023 data center shares; EIA residential prices. In a regression on both, location in PJM adds about 17 percentage points ($p = 0.002$) and data center share has no significant effect. The association is descriptive, and PJM states share other cost drivers. It is consistent with Lawrence Berkeley National Laboratory (2025) and EPRI (2026) studies finding that load growth has, so far, tended to lower average prices.

5. KPA calculation from Wood Mackenzie (25 August 2026) and Grid Strategies (November 2025). The comparison is not like-for-like, since requests carry no common date. Against the raw total the ratio is about 12 to 1; against requests with firm service commitments, about 1.4 to 1.

mission services for co-located loads, including a non-firm option that trades interruptibility for speed of connection. And in March 2026, the White House asked large customers to "build, bring, or buy" their own new generation and to make backup generation available during shortages.

KPA analysis suggests the physical case for flexibility is stronger than the policy debate implies. A February 2025 study from Duke University's Nicholas Institute estimated that the existing US grid could absorb about 76 GW of new load if that load gave up 0.25% of its maximum potential annual energy use, 98 GW at 0.5%, and 126 GW at 1%. Set against the roughly 90 GW of data center growth in utilities' forecasts for 2025–30, those figures equal 84%, 109%, and 140% of the need (see Figure 3). In other

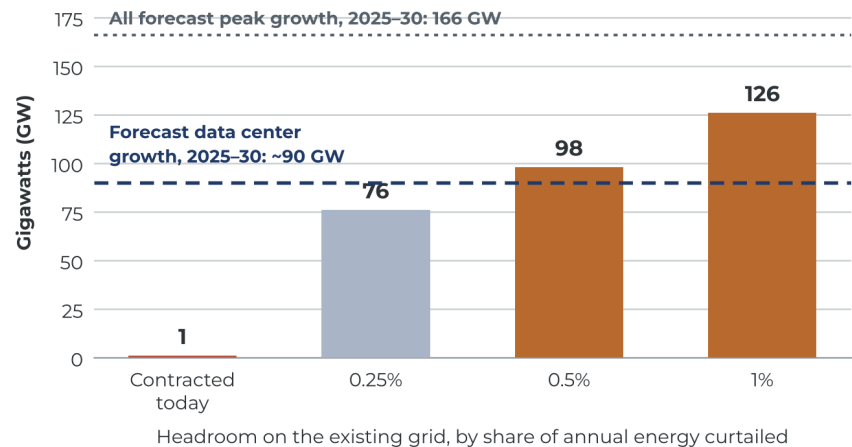
words, curtailment of 0.5%, in interruptions averaging about two hours, would match the entire data center forecast on paper. The caveats are real. Duke's headroom assumes no other load grows, yet total forecast growth is 166 GW, more than even the 1% case. And the headroom is spread across the country, while data centers are not: in Texas, five-year forecast growth is about five times the region's 0.5% headroom.

The market has barely begun to use that headroom. Google had contracted about 1 GW of data center demand response across six utilities by March 2026, roughly 1% of the most conservative headroom figure. EPRI's DCFlex program is testing the idea at nine sites. Where flexibility is not enough, the largest customers are becoming their own utilities at the margin. xAI holds a permit for 1.2 GW of gas turbines in Southaven, Mississippi, and the Stargate campus in Abilene, Texas, has 360 MW of on-site generation installed and about 1.2 GW planned. Behind-the-meter supply is no longer an exotic arrangement; it is a condition of speed.

Yet replicating the utility's balancing role will be difficult. There is no single mechanism by which hundreds of data centers can act as one swing resource. On 9 October, the Federal Energy Regulatory Commission (FERC) rejected PJM's plan to connect new large loads quickly on condition that they be curtailed first, holding that the choice of which retail customers to curtail belongs to the states. And the July event in Virginia showed that loads islanding themselves without coordination are a hazard, not a resource. So a measurable change in how large loads behave at the margin may not be evident until the 2027–28 planning cycle.

FIGURE 3

Flexible headroom against forecast data center growth



Source: KPA analysis of Duke University Nicholas Institute (2025), Grid Strategies (2025), and Google

(2026) figures. Duke headroom covers the 22 largest balancing areas, 2016–24.

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The utility order is strained but could yet reinvent itself

Load forecasts have broken before, and the last time they broke in the other direction. From 1960 to 1973, US electricity demand grew 7.3% a year, doubling roughly every decade. After the 1973 oil shock, growth fell to 2.5% a year through 1985. Utilities kept building to the old curve. More than 120 reactor orders were eventually cancelled, and regulators disallowed more than \$19 billion of utility costs between 1981 and 1991, over 95% of it nuclear. In July 1983, the Washington Public Power Supply System defaulted on \$2.25 billion of bonds, at the time the largest municipal default in US history.

The information age has misled forecasters once already. In 1999, a widely cited magazine article claimed the internet consumed 8% of US electricity and that half the grid would soon power the digital economy. Researchers at LBNL later measured the internet at about 1%, and all office and network equipment at 2–3%. The same laboratory now puts data centers at 4.4% of US electricity in 2023 and projects 11.8% by 2030, within a range of 9.5–15.3%. The growth is real this time. Its size is not settled.

The risk is therefore symmetrical. Build too little, and prices and reliability suffer, as PJM's auctions already show. Build too much, and stranded costs land on households, as they did in the 1980s. Large-load tariffs are the industry's first answer. The Smart Electric Power Alliance counts 77 such tariffs pending or in place across 36 states, 29 of them approved in 2025 alone. Their effect is immediate. After AEP Ohio required data centers to pay for at least 85% of their contracted demand, its large-load forecast fell from about 30 GW to 13 GW. ComEd now expects only 22% of its 65 GW pipeline to materialize, and Exelon has cut its pipeline by about 40%.

What must be remembered is that the utility still owns something no data center can build around: the wires. CoBank argues that large, mobile loads have "decisively shifted the balance of bargaining power." Perhaps. But a campus cannot connect without a substation, and it cannot export its backup power without a transmission line. Real US spending on transmission nearly tripled between 2003 and 2023, to \$27.7 billion, and distribution spending rose 160%, to \$50.9 billion. The utility's role is narrowing toward the network, and the network is becoming more valuable.

Nor is the pressure uniform. New England, where the region's first large-load forecast includes just 285 MW of data center and other large projects, faces a different problem: electrification. ISO New England expects the winter peak to rise about 30%, from 20.5 GW to 26.7 GW, by 2035/36, roughly matching the summer peak on a net basis. Connecticut's governor, Ned Lamont, has said of giant AI data centers, "We're the wrong place for that." The region's balancing challenge is winter heat, not compute.

The balance will shift again. Once speculative requests are purged, turbine factories expand, and the first flexible-load contracts are tested in a real emergency, utilities may reclaim much of the planning role—but on new terms, with large customers paying for firmness and being paid for flexibility. For now, the arithmetic is sobering. Of the 474 GW in the Texas queue, only about 6.6 GW—1.4%—had passed the grid operator's stability study by August 2026, and none had been approved to switch on.

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