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SPOTLIGHT REPORT

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The Policy and Politics of Data Centers

What's Happening: Data center investment has contributed more to US GDP than consumer spending through the first half of this year. Accommodating this unprecedented expansion is an increasing difficulty for states, regulators, households, and the industry itself.

Why It Matters: The current AI data center boom is national in scope and essentially historically unprecedented. Simply put, the digital economy "exists on data centers;" in a world where tech is king, the physical facilities that actually comprise the system are being treated like melange from *Dune*, and "the spice must flow." Morgan Stanley predicts that global capital expenditures on AI infrastructure could exceed $3 trillion through 2028. The largest firms intend to spend hundreds of billions individually while specific, singular projects could cost from the tens to over a hundred billion dollars. **The federal government is fully backing the push.** Administration officials are comparing the current AI race to the Manhattan Project and President Trump has called "Continued American leadership in AI is of paramount importance to maintaining the economic and national security of the United States." In pursuit of that goal, the White House is rushing to roll back environmental regulations on both data centers and energy projects that might fuel them; **most states have incentives to encourage center construction** to attract the capital and jobs these facilities create. **But given the sheer scale and scope of the investments involved, it's hardly surprising that the boom is bringing negative consequences** in its dislocations and even running into bottlenecks to sustaining its growth. If AI needs data centers, data centers themselves need a lot to run — land, water, funding, chips — but **the limiting factor is proving to be electricity itself.** Data centers broadly consumed 4.4 percent of all US electricity in 2023 and are expected to grow to between 6.7 and 12 percent of total use by 2028. A Department of Energy report looking at various estimates of how much extra demand data centers will add to the grid found a midpoint estimate of about 50GW over 2024 through 2030. For scale, a ballpark reference for a gigawatt is around the consumption of one million households (think Orlando, FL or New Orleans, LA). The individual strains placed on specific locations by singular projects is even proving to be a hurdle. In just one example, one mega-project in Delaware would use twice as much power as all households in the state combined. **"Data centers could overwhelm the grids if they chose to,"** to quote the president of the largest grid's market monitor. **Things are even worse the closer you look because the data center build-out is disproportionately allocated across the country. The impacts are already showing up as an increase in electricity prices.** Rates for residential customers have risen more than 30 percent nationally since 2020. One analysis of the nation's largest grid projects an extra $163 billion in costs paid by consumers through 2033, adding up to $70 extra a month paid by families in 2028.

Frustration towards centers is being made evident in increasing local pushback to their development.

What's Next: The current administration is poised to continue aiding the construction of data centers how it can; state governments, which have a front row seat to some of the negative consequences, **are becoming more reluctant.** The politics of electricity prices is becoming ever salient and opposition to projects can only be expected to rise. In addition to increased disclosure requirements, some **states and utilities are creating new rate classes for data centers** to pay to compensate for their needed transmission. Federal and state regulators are making reforms that could speed up the lengthy process of connecting new power generation to the grid and by some measures are even making progress. **The tech industry itself has a few suggestions for addressing the energy crunch: co-location, small modular reactors, and voluntary load reductions in times of stress.** The first, in which tech firms bring their own generation by building a new purpose-made powerplant on site, is currently impermissible but is under review by the Federal Energy Regulatory Commission, which has hinted it aims to create a broad framework that permits colocation. **In the meanwhile, the AI boom is bringing many other industries you wouldn't necessarily expect along for the ride.** Companies that produce power and chips are the most obvious beneficiaries, but the rising tide is also lifting the commercial real estate where centers are built, the banks and private credit that finance capex with infrastructure securitizations, and advanced nuclear firms that might power centers one day.

The Size, Scope, and Risk of the AI Building Boom ~~Bubble?~~

The current level of spending and hype being dedicated to **AI** borders on being **A**ctually **I**nane. $2.8 trillion on AI infrastructure spending from just tech giants through 2029, says Citigroup. Almost $7 trillion on data center infrastructure globally by 2030, says McKinsey (both estimates put about half in the US alone). Not only is data center construction set to surpass total spending on general office space, **the dollar value contributed to GDP growth by the build-out is surpassing consumer spending:** 92 percent of GDP growth for the first half of 2025, to be precise, without which would be only 0.1 percent. **Perhaps just as impressive are the commitments being made by a small handful of total firms.** Just four — **Amazon (AMZN)**, **Alphabet (GOOG)**, **Microsoft (MSFT)**, **Meta (META)** — plan to spend $364 billion for FY25. Incredibly, each also intends to spend between $279 and $376 billion *individually* between 2025 and 2027. $600 billion from just Meta on US data infrastructure through 2028. Recent days have seen OpenAI sign one $300 billion deal to build centers with **Oracle (ORCL)** over five years and another $100 billion deal with **Nvidia (NVDA)** to supply it with (possibly leased) chips. **These mega-budgets are trickling down into the ambitiousness of individual projects themselves.** $25 billion for a giant, 1,200-acre complex in Texas from Vantage Data Centers, another $8 billion for a location in Delaware; $10 billion from Meta in Louisiana. **Do you get the picture?**

In fact, the situation is getting to the point that some people are beginning to whisper the "b" word: "bubble." There are reasonable arguments on each side of that debate but the fact of the matter is that **data centers face binding constraints, influenced by policy decisions, that make it such that tech firms may well be unable to build all the things they've "planned."**

AI's Binding Bottlenecks

It would be optimistic to assume that a half-trillion dollar shunting of capital might have some unintended consequences; equally so to believe that there necessarily exists the capacity to easily accommodate it. Unsurprisingly, neither are exactly the case. **If AI requires data centers in order to function, data centers themselves have their own requirements.**

One of these is computer chips, and a lot of them. SK Hynix (KRX: 000660) said that its high-bandwidth memory (HBM) chips used in AI applications were almost sold out through 2025 — in May 2024. Much of the competition among memory suppliers has centered on becoming a key HBM supplier to Nvidia. The release of DeepSeek, a Chinese AI model that requires much less computation to train in January, temporarily abated the trend. But **even partially snagging onto its coattails is turning once obscure companies known mostly by sector experts into firms with the market cap of Disney (DIS) or Blackstone (BX).** Aforementioned Hynix, whose shares are up 130 percent YTD and now boasts a similar valuation, rose further last month on news it had completed development of its latest generation of HBM. **Micron (MU)**, one such competitor, raised revenue estimates last month on the strength of AI demand. OpenAI's aforementioned deal with Nvidia has been complemented by three further initiatives this week: CEO Sam Altman's global fundraising tour seeking financing and manufacturing to meet its computational needs, a multi-billion dollar deal with **AMD (AMD)**, and a letter of intent with Hynix and **Samsung (KRX: 005930)** — all of which indicates that there are still less chips than the market demands. **Changing, specific chip needs and overreliance on Nvidia is leading all of the big players to attempt to build their own chips in-house.** Nvidia's deals with OpenAI and xAI (the latter announced just Tuesday) indicate that they're loath to let the opportunity slip through their fingers. **It still may not be enough.** An analysis from London Economics International finds that even if AI chip manufacturing were to rise significantly, data center projections would still require more than 90 percent of all that new supply through 2030. They conclude that this "sanity check" of the "reasonableness" of estimates shows that they are largely "not credible."

Yet another is land and water. An analysis by the nonprofit Alliance for the Great Lakes found data centers may withdraw as much as 150 billion gallons of water nationally over the next five years, the equivalent of water consumed by 4.6 million households. In 2024, one data center in Iowa consumed 1 billion (3.8 billion liters) gallons of water – enough to supply all of Iowa's residential water for five days. Compounding the issue: many facilities are being placed in areas that are already under high water stress.

But perhaps the most limiting factor is power — the electricity needed to operate the data centers themselves. Just this week, **Dell (DELL)** CEO Michael Dell related that **"It's the clear constraint that we hear about from our customers, including OpenAI. Many customers, in fact, will tell us, 'Well, don't deliver it until this day because we won't have power in the building to support it.'"**

In many ways, the problem is even worse than it sounds. The overall scale is already a challenging obstacle. A Department of Energy report looking at various estimates finds a midpoint of approximately 50 extra GW in data center demand added to the grid through 2030, roughly akin to 50 million more households. But to compound the issue further, t**he overarching trend is towards gigantic, individual facilities that themselves are**

disproportionately allocated throughout the country. There are numerous projects in the works that individually require a gigawatt or more of electricity. Furthermore, about 80 percent of the 2023 data center load was concentrated in 15 states, primarily Virginia and Texas. The problem is particularly acute for Northern Virginia, known as "Data Center Alley," which hosts 70 percent of the world's internet traffic and a quarter of the country's data center energy load. The sub-grid covering this region, **Dominion Energy (D)**, currently projects peak demand to approximately triple from current levels in 15 years. **One report holds that "some regions may miss out on economic development opportunities because the grid can't keep up."** The electricity problem makes other seemingly more simple tasks, like finding the right spot for a data center, more difficult. There's plenty of space in the US that can accommodate the size of a data center. But how many also feature local grid conditions that have the extra capacity to supply the needed power reliably and cheaply? 72 percent of data center and power executives believe that meeting load growth will be very or extremely challenging for data center infrastructure buildout. When Stargate says it reviewed over 300 proposals in more than 30 states to identify just five sites, this is why.

Forget fulfilling the needs of hundreds of billions of dollars worth of planned, future infrastructure. Data centers are having impacts on electricity prices and grid reliability *today*. The cost per kilowatt-hour for residential customers has risen more than 30 percent nationally since 2020 but as emphasized above, that average obscures some parts of the country that produce more power than they need and other parts where data centers are taking their greatest toll. A Bloomberg analysis of 25,000 nodes on the national grid found that three-quarters of those facing price increases are within 50 miles of significant data center activity and that wholesale electricity costs as much as 267 percent more than it did five years ago in areas near data centers. Take the largest and oldest electrical grid in the US — PJM, which covers 67 million Americans across 13 Eastern states. The total price for the energy procured at its annual capacity auction in July was a record breaking $16.1 billion: eight times the 2023 sale. This alone will further increase utility bills by up to another 5 percent starting next year, even as electricity prices across PJM have already risen 30 percent over the last year. The grid's independent market monitor, analyzing the auction, said: **"It is misleading to assert that the capacity market results are simply just a reflection of supply and demand.** The current conditions are not the result of organic load growth. **The current conditions in the capacity market are almost entirely the result of large load additions from data centers, both actual historical and forecast.** The growth in data center load and the expected future growth in data center load are unique and unprecedented. . ." Another analysis finds that PJM customers paid $4.3 billion in transmission upgrades solely attributable to data centers, on top of the $9.3 billion in extra electricity costs to be paid between 2025 and 2026. **Ditto for grid reliability**: in February, 1.8 gigawatts of data centers tripped offline because of voltage issues.

Demand and price projections are no less dire. Data centers are expected to drive up electricity bills on average by 8 percent nationwide through 2030, according to an analysis from NC State University and Carnegie Mellon University, but as previously established, some regions will have it harder than others. Thirty GWs of a projected 32 total GWs of load growth across PJM through 2030 are expected to come from data centers. **Residential utility bills under PJM could rise another 30 to 60 percent by 2030.** The National Resources Defense Council reports data centers add up to an extra $163 billion in costs paid by PJM consumers through 2033, adding up to $70 extra a month paid by families in 2028. The Electric Reliability Council of Texas (the suite of another construction

hotspot) estimates that demand on its grid specifically will grow 75 percent over the next five years. To quote the president of PJM's market monitor, **"Data centers could overwhelm the grids if they chose to."**

What's the Trump Administration Doing About It?

The federal government is both least sensitive and least able to address electricity prices. This means that the White House is the most gung-ho in supporting data center development but its ability to aid the industry is mostly limited to other channels. The Department of Energy (DOE), for instance, can offer up some of its lands to house data centers and the Environmental Protection Agency can streamline Clean Air Act permitting for construction. However, most of its capacity to aid on the energy front is primarily indirect.

In some ways, the Trump administration is expanding energy production in the US. Fossil fuel plants are being prioritized for permitting, are largely seeing restrictions on their activity removed, and large portions of the US are being opened to drilling. **The White House is similarly pulling out all the steps to encourage nuclear development**, distributing money and fuel across the industry and launching a pilot project for advanced reactors whose approval would be handled solely by DOE, not the Nuclear Regulatory Commission (NRC). A representative from DOGE recently told the NRC's chair and top staff that they would be expected to "rubber stamp" approvals to reactors already tested under DOE and the White House is separately heavily leaning on the NRC to speed up its processes. By directly firing the heads and Democratic commissioners of independent agencies like the NRC and the Federal Energy Regulatory Commission (FERC), Trump is establishing more direct control over these organizations than any recent president. **One area we expect to see further activity is the use of emergency powers to keep retiring gas and coal plants online.** Trump has directed three coal plants to maintain operating thus far but it would not be surprising if this turns into a regular, assumed occurrence.

But in other ways, the administration's war on renewables means taking steps backwards. The imposed deadline on tax credits for wind and solar projects (and the restrictions placed on any developers hoping to utilize them before that date) as part of the One Big Beautiful Bill Act **removes a significant tailwind for the overwhelming majority of new generation coming online. Wind, solar, and batteries represented 94 percent of all new capacity added in 2024.** Other actions include revoking permits for most offshore wind projects, the Grain Belt Express transmission initiative, and billions further in grants and loans towards green energy. **The White House is setting up the legal ability to block all new wind and solar development in the US via the denial of required permits. When President Trump says that his administration will not approve new solar or wind projects, take these threats seriously.** Staff shedding across the government could compromise the DOE or NRC's capacity to operate.

What are the States Doing About It?

States are conflicted. Both they and localities are ground zero for rising opposition to rising electricity prices and data center development. Spiraling power costs are now a major political issue in the US, just like inflation (particularly around energy and gas prices) was a few years ago. The consequences are only just starting to be felt. **At the same time, they desperately want to get on the AI train, mindful of the investment**

and jobs that data centers bring.

Let's start with the carrots. Forty-two states have laws providing full or partial tax exemptions. Others have incentives on use, property, or income taxes. The requirements, eligibility, timeline, and amount of these breaks vary widely by state. **Carrots are still regularly being added or modified.** The past year has seen new exemptions in Massachusetts and West Virginia, expansions of pre-existing exemptions in Kentucky and Arkansas, and extensions of on-the-books benefits in Florida. Some of these come with strings attached: in Michigan, new approved sales exemptions come with requirements to use municipal utility water and clean energy, meet energy-efficiency measures and ensure that it pays for its own electricity; in Kansas, an exemption added in May requires a certain amount of new jobs and investment. There are other goodies too: Pennsylvania is working on legislation that would fast-track the permitting process. **Companies are making good use of these benefits.** Most states don't publicly calculate or disclose the precise revenue forgone from tax breaks but a report from Good Jobs First finds published data indicating at least $3 billion in costs per year, with ten states giving up more than $100 million.

Now the unpleasant medicine. Even red states that prize a pro-market operating environment are having to take a hard look at the industry amid creaky grids that are struggling to cope with new demand and rates going up for consumers. One report by Wood MacKenzie found that the money that large energy users paid to electric utilities would not be enough to cover the cost of the equipment needed to serve them. The rest of the costs would be borne by other utility customers or the utility itself. Less than half of data center operators believe that residential affordability concerns will *not* constrain development. By one count, **almost half of relevant state subsidies do not require any job creation whatsoever,** and those that do typically require only a nominal amount.

Texas Governor Greg Abbott (R) signed a bill over the summer instituting a flat $100,000 fee for initial screening studies for interconnection requests, a voluntary demand response procurement program, and mandatory curtailment during load shedding events. Minnesota and Oregon have passed bills of their own, requiring that their states Public Utility Commissions create a new classification for high-use customers, targeted at data centers. In Oregon, large energy use facilities would have to sign a decade-long contract with utilities so the latter can recoup infrastructure costs associated with servicing the facility. Unsurprisingly, the state with the largest YoY increase in electricity prices (12 percent) was the Beaver State. Amazon suspended plans for a center in Minnesota as the state legislature considered its bill, which also repealed a tax exemption for electricity sales (while extending an exemption for software and IT equipment); the eventual law also created a new permit for titanic users of water, a requirement that data centers cover their own costs and pay a fee that goes towards lowering costs for lower-income households. **Indiana created a process that expedites approval of power meant to serve large load users but with requirements that such users reimburse at least 80 percent of the costs.** A Utah law left the rate structure unchanged but permits large customers to contract with generation providers directly, breaking the utility's monopoly. Both Virginia and Georgia have seen bills imposing new requirements on data centers or pausing tax breaks for them, respectively, pass the legislature but be ultimately vetoed by the governor.

In the case that states are unwilling to directly and financially go after data centers just yet, they're expanding disclosure requirements and researching the topic on their own. One bill on the desk of the governor of New Jersey would require operators to

publicly and quarterly disclose their electricity and water utilization; another two on the Californian governor's desk would mandate water disclosure and assess the electricity costs directly attributable to centers.

New Jersey, whose gubernatorial race is preoccupied with the issue, issued $430 million in direct relief to customers to lower their bills. Bills for some ratepayers in Maryland would have gone up $21 a month if the state hadn't stepped in to order the utility to spread out the increase. Eleven states, both Democratic and Republican, intend to form a "governors' collaborative," to coordinate a response to PJM issues. That record-breaking auction in July would have been higher if Pennsylvania hadn't demanded that the grid set a price cap, which the market easily hit. **Virginia and Pennsylvania have both explicitly threatened to leave the regional grid if their concerns can't be addressed.**

Local pushback against development at the municipal- and county-level is where opposition is at its strongest. In many cases, local officials are directly making the decision to approve or deny developer proposals. There's little research comprehensively cataloging these actions but a basic search indicates that **dozens of cities and counties have or are considering moratoriums, ordinances, and requirements** of various sorts. **Around the country, $64 billion in data center projects were blocked or delayed by local opposition from May 2024 through March 2025.** A cursory inspection ballparks that since March, another $30 billion has been deferred or canceled (counting only projects with public estimates as to their capex). On the other hand, West Virginia passed a law in April banning local governments from creating rules that restrict data center development.

What are Utilities, Regulators, and the Tech Industry Doing About It?

There are a couple fundamental problems haunting utilities. First, projections. Power generation, transmission, and distribution are not industries that can afford to be fickle. It takes several years to build a new power plant or transmission line and costs associated with such projects can easily stretch into the billions. California's largest utility, for example, revealed a plan last month to spend $73 billion on transmission upgrades, partially to support data centers. **Managing a titanic portfolio of long-term grid infrastructure is like steering a cruise ship** where the consequences of overbuilding are billions of dollars in useless assets customers are made to pay for and underbuilding means prohibitively high energy costs across your regional economy for a protracted period of time. Utilities have to project energy needs many years in advance in order to adapt to them in time. **In a world where national electricity demand has been largely stagnant for two decades, their previous approach of estimating demand is falling apart.** To oversimplify, utilities have typically reviewed their list of grid interconnection requests from prospective customers and added up their needs. However, in many cases, **developers are peppering multiple utilities with interconnection requests for a single data center project,** seeing which locations around the country can accommodate their needs, on what timeline, and at what price. The result is that the center is counted multiple times, which, given the electricity needs of individual projects, can be substantial. Utilities are given the risk of overbuilding if the data center does not actually materialize and underbuilding if it does. This isn't to say that there's not a lot of building going on. **American Electric Power (AEP)**, a large grid covering 11 states and almost 6 million customers, has signed agreements with clients asking for 24 GWs by the end of the decade; AEP's total current system is 37 GW. But AEP is also fielding requests for an additional 190 GW, a difference

between a 65 percent increase and a 500 percent increase. **Across the country utilities are guessing that only about one-fifth of the required demand will actually materialize.** Other estimates put the overcounts from 50 to 500 percent.

To this end, Texas' new $100,000 flat fee for interconnection requests is meant to screen these "phantom" centers out. Other actions from utilities to address the problem include a required multi-year contract regardless of whether a center gets built, a study fee, and more information from applicants (including if they've applied elsewhere).

Let's say a data center does end up getting built. The second problem is that existing payment structures pass on the costs of accommodating data centers to everybody. Utilities cannot arbitrarily refuse service to a customer asking for access to the grid. If a large load wants to join, the utility conducts studies about what is required (if anything) to accommodate the request: transmission upgrades, increased generation, etc. In many cases, these costs have been rolled into the rates that all customers pay. One study looking at seven states found 130 projects connecting private data centers to the high-voltage transmission system in 2024; the $4.3 billion in costs associated with these upgrades were paid for by increasing rates for all payors. Less than five percent of projects identified did not pass on all of their connection costs in this way.

Where states aren't passing laws requiring or permitting utilities to create separate rate categories for data centers or other large load users, utilities themselves are going ahead. Separating out large energy users and charging them a different (higher) electricity rate is a running trend across states. Examples include Dominion, which covers much of Data Center Alley, and California's largest utility.

Another leading proposal to address the issue is to permit data centers to build their own power generation on-site (known as co-location). A contract for energy directly from a power plant (and not bought freely on the grid) is referred to as behind-the-meter. Along these lines, West Virginia approved a bill this session permitting data centers to create their own microgrids free from local zoning and electric rate regulations; Oklahoma and Utah passed laws of their own facilitating similar agreements. **The tech industry really likes the idea.** From their perspective, dedicated generation means consistent, predictable energy prices and guaranteed supply that ensures servers always stay online. The president of PJM's market monitor even suggests making the procurement of new generation mandatory for new data center owners. **Co-location is broadly impermissible under current conditions but is under review by FERC, which is expected to create a new framework that would allow such arrangements to go forward. However, behind-the-meter agreements with pre-existing generation face significantly more scrutiny than with new power generation.** Under the former situation, a data center would be taking away electrons already on the grid, leaving less for everybody else; the latter scenario reads more as creating purpose-built power that wouldn't have been built otherwise. For its pro-business bent, the Texas law requires that all large behind-the-meter agreements with existing generation be disclosed and approved by the state Public Utility Commission. A report from RAND predicts that new behind-the-meter capacity additions will approximately equal those of new generation capacity added the "traditional" way through the decade.