Data Center Development in Northwest Pennsylvania: Energy, Economic and Policy Considerations

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Key Takeaways

- The last few years has seen historical, unprecedented growth and investment in artificial intelligence (AI) and data centers
- This growth has not been matched by a coordinated, well-planned approach to meeting the energy (and water) demands of these centers
- While most data center development in recent years has relied on existing electrical grid capacity to meet energy demand, this is becoming increasingly untenable as demand growth begins to outpace supply
- Increasingly, data center developers are opting for the simultaneous development of their own electrical generating capacity (i.e., behind-the-meter), or partnering with electric utilities to bring additional capacity online, to meet demand
- The most common options under consideration for new electrical generating capacity to meet data center demand include natural gas turbines, solar photovoltaic (often with battery storage), and nuclear (both conventional and small-scale, modular reactors)
- Beyond electrical generation, the growth of data centers is raising important questions – and generating new ideas and approaches – about how "large load" demand can be better integrated into management of the electrical grid
- The rapid growth of data centers in many states is resulting in both a policy / political response as well as in increasing scrutiny and skepticism from the general public about the relative costs and benefits of this form of development
- Conditions in northwest Pennsylvania with regards to the state of the electric power grid, potential for new generating capacity, water availability, and proximity to fiber optic networks, suggest a somewhat favorable climate for data center development in this region.

Introduction - The Rise of Artificial Intelligence and Data Centers

The Brookings Institution has described Artificial Intelligence (AI) as the "transformative technology of our time," with critical applications in sectors as diverse as health care, transportation, e-commerce, education, finance and national defense (Lee and West, 2025). Spending on AI infrastructure bears this out, with an estimated $1.5 trillion invested worldwide on AI-related projects in 2025 (Gartner, 2025). Global AI investments are projected to increase to more than $2 trillion by 2026 and to anywhere between $4 trillion and $7 trillion by 2030 (Mickle, 2025; Knight Frank, 2025; Schlotterback, Pasqualichio and Bond, 2025).

A critical component of the current AI boom is the need for AI-specialized data centers. Data centers are designed to "host a large number of file servers and networking equipment that can store, process, and analyze text, images, code, and other information sources" (Lee and West, 2025). So-called Hyperscale data centers (or Hyperscalers) have greater than 5,000 file servers and provide critical cloud computing and data management services. Amazon, Microsoft, Google and Meta combine for over 60% of global hyperscale data center capacity, and these four companies alone are set to spend over $350 billion on data centers in 2025 and another $400 billion in 2026 (Schlotterback, Pasqualichio and Bond, 2025).

Globally, the U.S. leads the data center market with over 4,000 data centers nationwide as of September 2025. Within the U.S., Virginia is the leading state housing hyperscale data centers, with significant planned investments in Pennsylvania, Georgia, Texas, Ohio and a number of other states (see Figure 1) (Deloitte, 2025).

Data Centers Driving Growth in Electricity Demand

The unprecedented growth in the adoption and use of AI applications and the associated growth in the construction and operation of data centers, has resulted in a surge in demand for electricity in locations where data centers are concentrated. Data center electricity demand has tripled in the U.S. in the last ten years and is forecast to double or triple again by 2028 (see Figure 2). Whereas data centers accounted for 4.4% of total U.S. electric demand in 2023, that is projected to increase to between 6.7% and 12% by 2028 (U.S. Department of Energy, 2024). Overall, it is expected that electric utilities in the U.S. will need 38 gigawatts (GW) of new power production (equivalent to roughly 34 new nuclear power plants) to meet data center demand by 2028 (Schlotterback, Pasqualichio and Bond, 2025). This increased demand comes at the same time that recent policy changes associated with the 2025 federal budget bill will result in the rollback of as much as 344 GW of clean power projects slated for development (Lee and West, 2025).

Despite an awareness for some time that the use of AI in a number of applications was poised to grow dramatically, the electric power industry in the U.S. was not prepared for the recent explosive growth in demand for electricity from data centers. Electric utilities in the U.S. have been described as "being caught flat-footed" in the face of rising power demand (Seiple and Hertz-Shargel, 2025), and as "flying blind" in trying to anticipate how to respond to future increases in demand for electricity. This situation is in part due to the fact that electric power demand in the U.S. had been relatively flat for 10-15 years leading up to 2020, and also because electric power companies typically adopt a 20-30 year planning timeframe while the rapid buildout of AI and data centers has been happening in only a few years time.

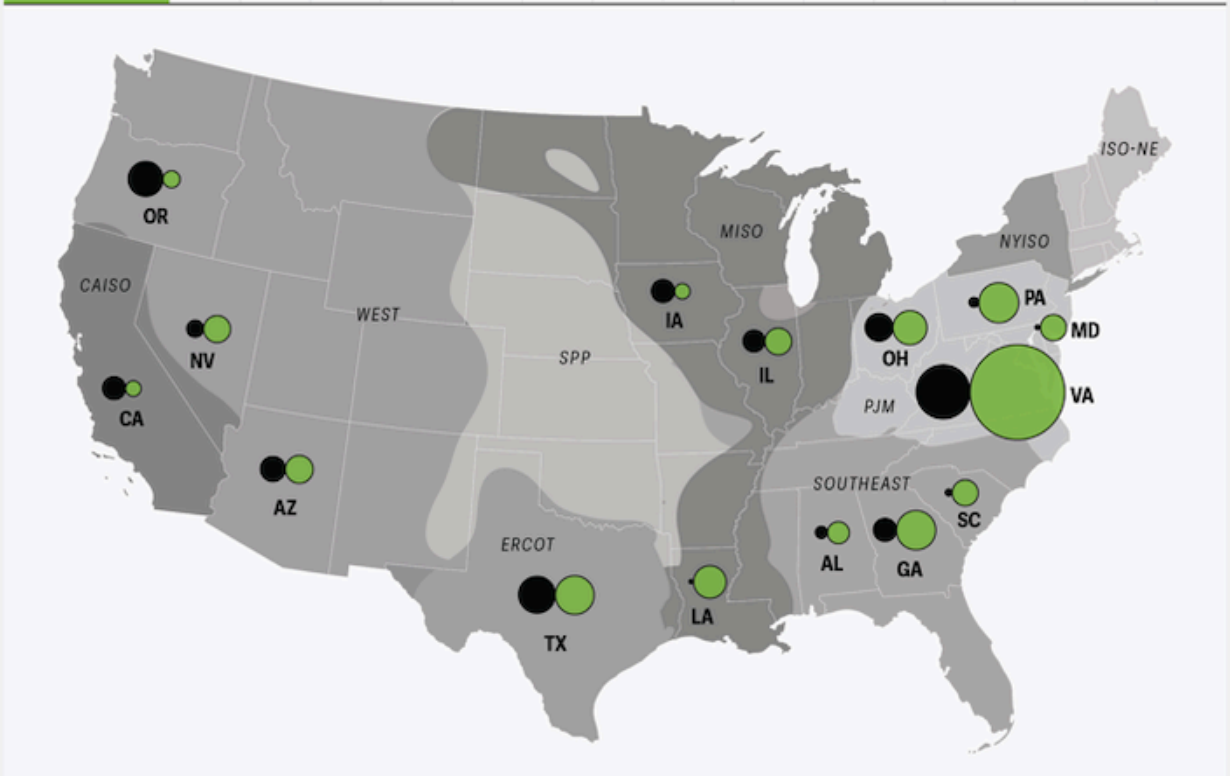
As electric utilities adapt to these changing circumstances they will encounter a number of challenges in meeting anticipated demand for electricity from data centers (Seiple and Hertz-Shargel, 2025). First, residual supply chain disruptions from the COVID-19 period combined with uncertainties and changes in U.S. trade policy (i.e., tariffs) have resulted in procurement bottlenecks for certain critical electrical power generation equipment, especially in the natural gas turbine industry. Second, the planned retirement of a significant number of large coal-fired and nuclear baseload power plants coincided with increased power demand from data centers. Third, utilities are facing longer and longer wait times to get approval for new power generation projects, especially for additions and upgrades to the transmission system.

Figure 1

Data center markets with existing or expected gigawatt capacity

Data center capacity (GW) and RTO/ISO regions

	VA	TX	OR	OH	AZ	CA	GA	IA	IL	NV	AL	PA	SC	MD	LA
Current capacity	6.0	2.9	2.3	1.6	1.3	1.1	1.1	1.1	1.0	0.6	0.2	0.2	0.1	<0.1	<0.1
Capacity under construction and planned	16.8	3.1	0.6	2.4	1.6	0.5	3.2	0.5	1.5	1.5	1.0	3.2	1.4	1.5	2.2



Notes: The map shows data center markets with at least a gigawatt in existing or planned capacity; circle size represents 1 GW of IT capacity—that is, the net power capacity that can be provided to computer servers and their supporting mechanical and electrical support equipment. CAISO: California Independent System Operator; ERCOT: Electric Reliability Council of Texas; ISO-NE: Independent System Operator New England; MISO: Midcontinent Independent System Operator; NYISO: New York Independent System Operator; PJM: PJM Interconnection; SPP: Southwest Power Pool.

Source: Deloitte analysis of DC Byte data as of June 2025.

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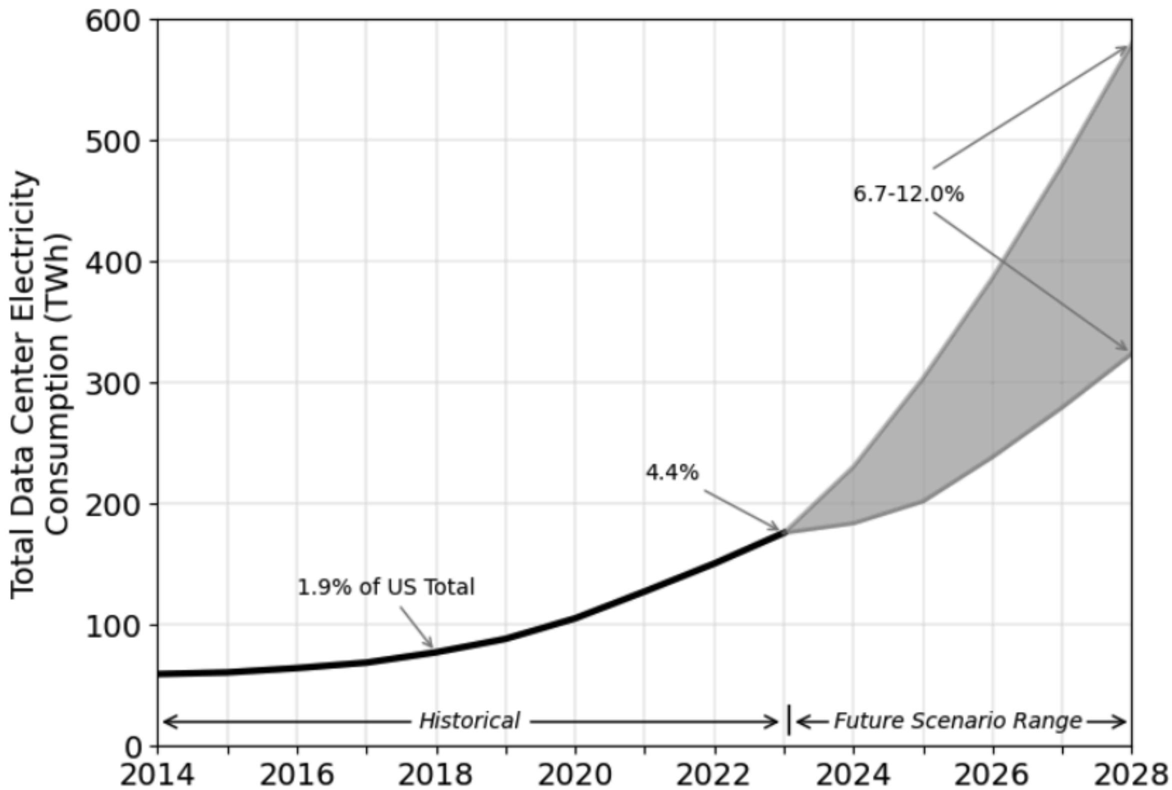
(Source: Deloitte, 2025)

Figure 2 - Total U.S. Data Center Electricity Use From 2014 Through 2028



(Source: Shehabi, et al. 2024)

As a result of these challenges, data center developers are beginning to rethink their approach to meeting their "large-load" energy demands. Until recently, nearly all data center power demand has been met from existing grid connections. But in the face of the challenges to electric utilities described above, more and more data center developers are considering "off-grid" or "behind-the-meter" approaches to meeting power demand (McKinsey & Company, 2024; Robb, 2025). A recent 2025 State of the Data Center report estimates that close to two-thirds of data centers are exploring on-site power generation, and nearly one-fifth were already implementing some form of behind-the-meter or "bring your own power" (BYOP) solutions (Robb, 2025).

Meeting Data Center Energy Demand: Natural Gas, Nuclear, and Solar+Storage Approaches

A June 2025 report from the professional services company Deloitte, identified a series of gaps or challenges to meeting the infrastructure and workforce needs of projected AI and data center development in the U.S. (Deloitte, 2025). In terms of energy infrastructure, these challenges include:

- Electric power and grid capacity constraints to meet demand mismatches between data center development (short) and power supply development (long) timeframes;
- Supply chain disruptions affecting critical equipment and materials;
- Difficulty in securing necessary permits.

These challenges have been exacerbated by the planned retirements of a number of coal, gas and nuclear generating stations nearing end of life (see Figure 3). As a result, it's estimated that the lack of availability of electric power could be extending data center construction timelines from 24 to 72 months (Goldsmith and Byrum, 2025).

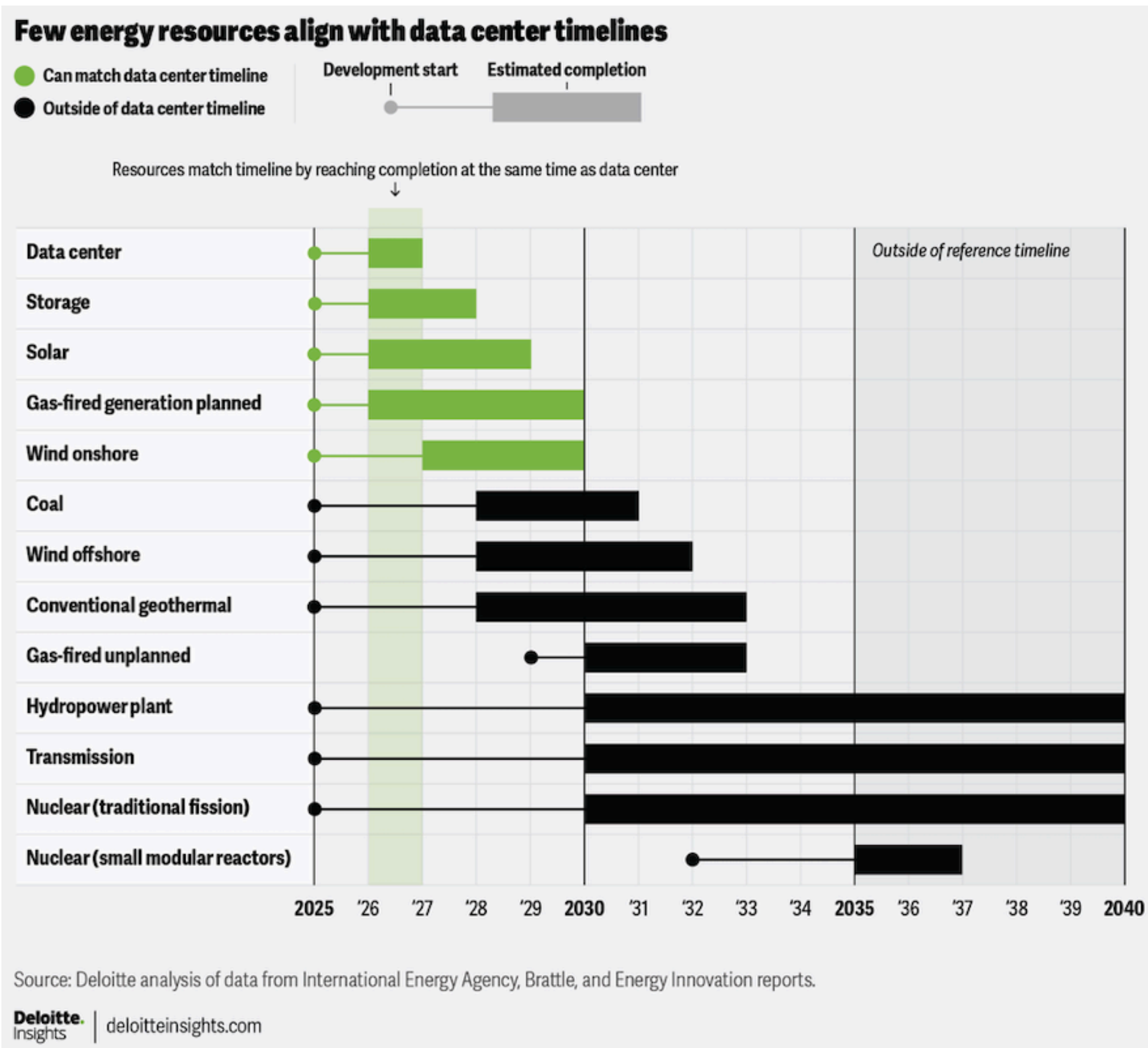
The disconnect between the time needed to build a data center and that needed to provide the electric power needed to operate it is referred to as the "time to power" challenge. At first glance, this time to power challenge would seem to favor the adoption of renewable energy sources (such as solar photovoltaics or PV) plus storage. But as analysts at the strategic investment firm Brown Advisory (Schlotterback, Pasqualichio and Bond, 2025) put it:

> *The data center power challenge is not merely a fossil fuels versus renewables debate. The practical reality is that grid operators and utilities need to adopt an "all-of-the-above" energy expansion strategy – deploying every available power source from natural gas and nuclear to solar, wind and emerging technologies such as geothermal and small modular reactors (SMRs). The sheer scale of electricity demand accelerated by AI infrastructure exceeds what any single generation type can provide within required timeframes. This requires bringing*

more energy online, optimizing how we use it, and advancing innovative energy solutions.

With that context in mind, it's worth taking a closer look at some of the advantages and disadvantages associated with three potential sources of electrical power most commonly considered by utilities and data center developers for meeting this sector's growing energy demands: natural gas, nuclear, and solar + storage.

Figure 3



(Source: Deloitte, 2025)

Natural Gas

At a July 2025 Energy and Innovation Summit event in Pittsburgh, President Donald Trump hailed roughly $90 billion in corporate investments to make Pennsylvania an AI and data center hub, fueled by natural gas (Lavelle and Bense, 2025). Just 50 miles from Pittsburgh, the Homer City Redevelopment project is converting a former coal-fired power plant into a natural gas-fired, 4.5 GW, $10 billion data center campus (Howland, 2025a). In Texas, data centers are building their own gas-fired power plants to meet energy demand, and Chevron is building between 2.5 and 5 GW of gas-fired power capacity to support AI data centers in the western gas fields region (Baddour and Martin, 2025).

Given Pennsylvania's status as the second largest natural gas-producing state in the nation, it would seem to make sense to look to this energy source to power the growth of data centers in the commonwealth. Indeed, one of the largest energy infrastructure companies in the U.S., NextEra Energy, is pursuing a strategy that will "build renewables for energy and storage and gas-fired generators for capacity" according to its CEO, John Ketchum (Jenkins, 2025). However, assuming that gas-fired power generation can meet what appears to be a fast-approaching electricity shortage for data center development regionally comes with risks. First, there is relatively little in the way of gas-fired power capacity currently in the interconnection queue, a collection of power generation and storage projects that are undergoing review before being approved (Newell, Hledik and Pfeifenberger, 2025). Second, rising prices and supply chain shortages for critical gas-fired power equipment (specifically combustion turbines and transformers) are slowing development of these projects (Goldsmith and Byrum, 2025). The combined impact of these factors is that natural gas-fired electrical generation for data center operation runs into the "time to power" problem (Robb, 2025). Nevertheless, and as the strategy pursued by NextEra Energy seems to bear out, natural gas-fired power generation will almost certainly be critical to building "capacity" for data center development in Pennsylvania over the next 5-10 years.

Nuclear

A number of recent reports and news stories suggest that nuclear power might play an increasingly important role in meeting data center electricity demand going forward. For example:

- In September, 2024, Microsoft reached a deal with Constellation Energy to restart the Three Mile Island nuclear plant in Pennsylvania (Penn and Weise, 2024);
- In October, 2024, Google reached a deal with energy start up Kairos Power for nuclear energy from "small modular reactors" (SMRs) by 2030, while Amazon reached a similar deal with a different start up, X-Energy (Penn and Weise, 2024);
- Meanwhile, Meta is investing $10 billion in an AI data center in Louisiana designed to run on a combination of renewable energy and between one and four gigawatts of new nuclear generation (Chernicoff, 2024);
- In October, 2024, the U.S. Department of Energy extended a $1.52 billion loan guarantee to restart an 800-megawatt nuclear plant in Michigan (Allsup, 2024);
- In June, 2025, New York Governor Kathy Hochul announced plans for at least one gigawatt of new nuclear power production in that state (Dezember and Hiller, 2025);
- In May, 2025, the Tennessee Valley Authority submitted a construction permit application to the U.S. Nuclear Regulatory Commission to build a new SMR at its Clinch River site (McDermott, 2025);
- In March, 2025, Holtec International announced plans for the construction of two SMRs at the site of the Palisades nuclear plant in Michigan (Klein, 2025);
- In August, 2025, the U.S. Department of Energy announced the selection of 11 projects for a new nuclear reactor pilot program (Dalban, 2025);
- And in October, 2025, Westinghouse Electric Co. announced an $80 billion commitment from the U.S. government to build new nuclear reactors in the country (Litvak, 2025).

Despite all of this interest and hype surrounding the possible contribution of nuclear power to the AI data center boom, energy experts caution that there remain a number of serious challenges to this approach, especially in the short- to medium-term. First, as with natural gas, powering data centers with nuclear energy will run into the “time to power” challenge (Talbot et al., 2025). Even new small modular reactor (SMR) designs, which are significantly less complex than traditional nuclear power plants currently in operation, are not expected to be in widespread use until some time in the 2030s (U.S. DOE – Office of Nuclear Energy, 2025). Second, development of nuclear power, even SMRs, is capital-intensive and subject to significant regulatory headwinds and public opposition (Hardick, 2024; Allsup, 2024). Third, while nuclear power provides predictable, constant baseload power generation, data center electricity demand has been observed to fluctuate dramatically over a 24-hour period (Seiple and Hertz-Shargel, 2025). This “firm fixation” problem could be addressed by using nuclear power not as a specific behind-the-meter source of electricity for data centers, but as part of a wider grid capacity and reliability addition (Gimon, 2025). Likewise, there is growing interest in and recognition of the potential for battery storage of electricity on-site at data centers to help better align stable electrical output from nuclear reactors with fluctuating data center electricity demand (Electric Power Research Institute, 2024).

Regardless of these challenges, growing interest and investment in nuclear power appears here to stay. While it is unlikely that new reactor designs and SMRs will make direct and immediate contributions to data center energy demands over at least the next five years, restarted reactors in places like Three Mile Island will make an impact. The extent of nuclear power’s future contribution to meeting data center electricity demands will most likely be determined by a combination of economic costs, regulatory, and public perception / opinion considerations.

Solar + Storage

An interesting perspective on the potential for meeting at least a portion of data center energy demands from renewable sources like solar and wind comes from NextEra Energy CEO, John Ketchum. NextEra currently owns and operates 19 gas-fired power plants in the U.S., but when asked recently about strategies to meet data center energy needs, Ketchum offered the following thoughts:

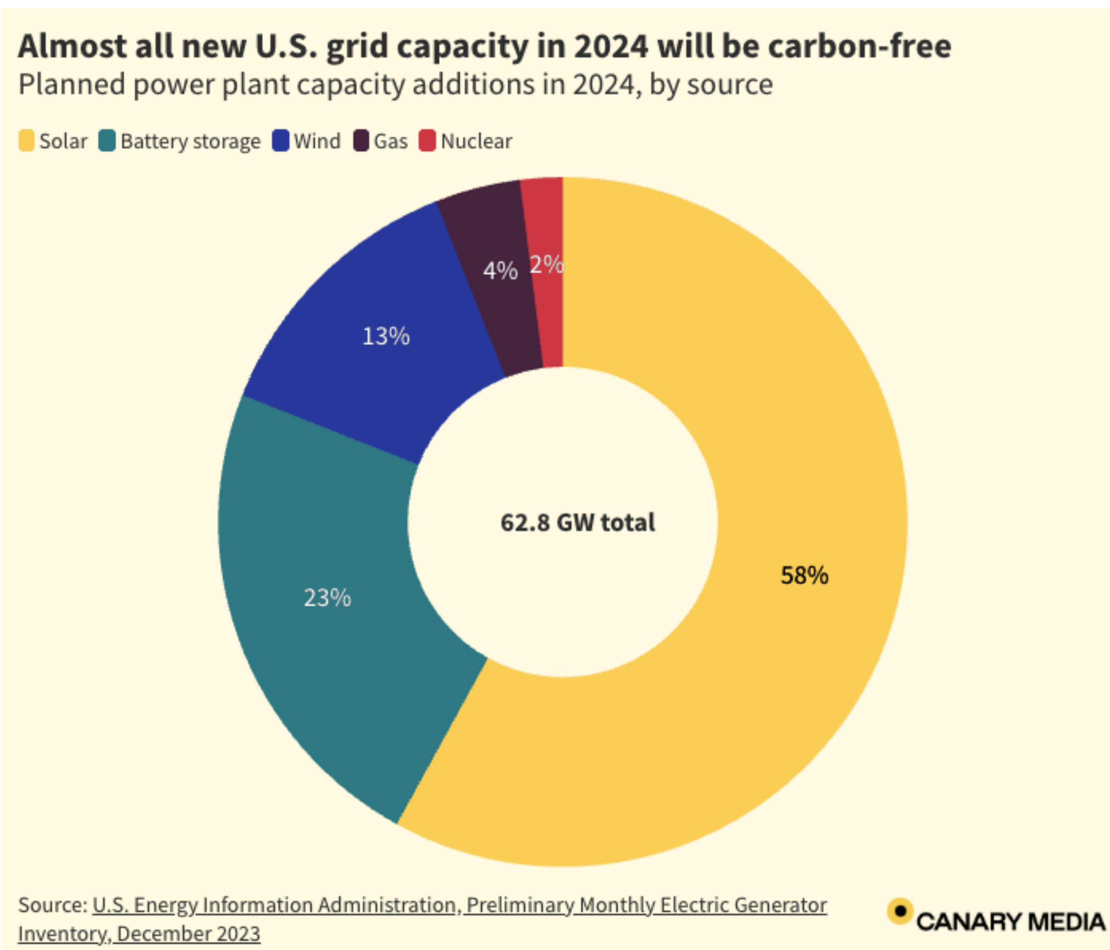
> *Look, nobody's built more gas-fired generation in the last 20 years than we have, and we agree we're going to need more gas. But there's a time problem and there's a cost problem. So our message is, don't pull away from renewables, because they're the only thing we have as a country that we can build to meet demand that's here right now and that's really low cost (Plumer, 2025).*
>
> *Renewables are here today. You can build a wind project in 12 months, a storage facility in 15, and, you know, a solar project in 18 months. We need shovels in the ground today because our customers need the power right now (Jenkins, 2025).*

What Ketchum is referring to as a "time problem" and a "cost problem" relates to the time to power concept discussed above and the rising cost of gas-fired power generation. Power companies are experiencing wait times of up to five years on gas turbine orders and these supply chain disruptions are already estimated to have extended some data center construction timelines by 24 to 72 months (Plumer, 2025; Goldsmith and Byrum, 2025).

Meanwhile, many solar and wind projects can be built within 12 to 18 months, and while gas power plant construction costs have nearly tripled in the last few years, wind and solar prices have increased only slightly. This has led companies like Meta to incorporate significant levels of renewable energy into its $10 billion project in Louisiana (Schlotterback, Pasqualichio and Bond, 2025), and Google to partner with Total Energies in the development of a 50-megawatt solar facility in Ohio (Martindale, 2025). It also led Virginia's Dominion Energy (with amicus brief support from the PJM Regional Transmission Organization) to file a lawsuit challenging the Trump administration's moratorium on offshore wind power development right when data center electricity demand is surging in that state (Boudreau, 2026).

Solar, wind and battery storage are already dominating recent additions to electric grid capacity in the U.S. These three technologies accounted for 94% of new U.S. grid capacity in 2024 (see Figure 4) (Spector and Olano, 2024). However, because of their intermittent nature, solar and wind power are mostly viable when paired with battery storage. Additionally, solar and wind probably could not be relied upon to provide truly stand-alone, behind-the-meter electric power to a data center disconnected from the regional electric grid. As such, solar and wind need to be considered alongside a suite of approaches and for specific applications. For example, a solar + battery storage system could provide an already grid-connected data center with critical backup and peak-load power supply in place of what is currently used in many places – noisy and polluting diesel generators (Electric Power Research Institute, 2024; Martin, 2025).

Figure 4



(Source: Spector and Olano, 2024)

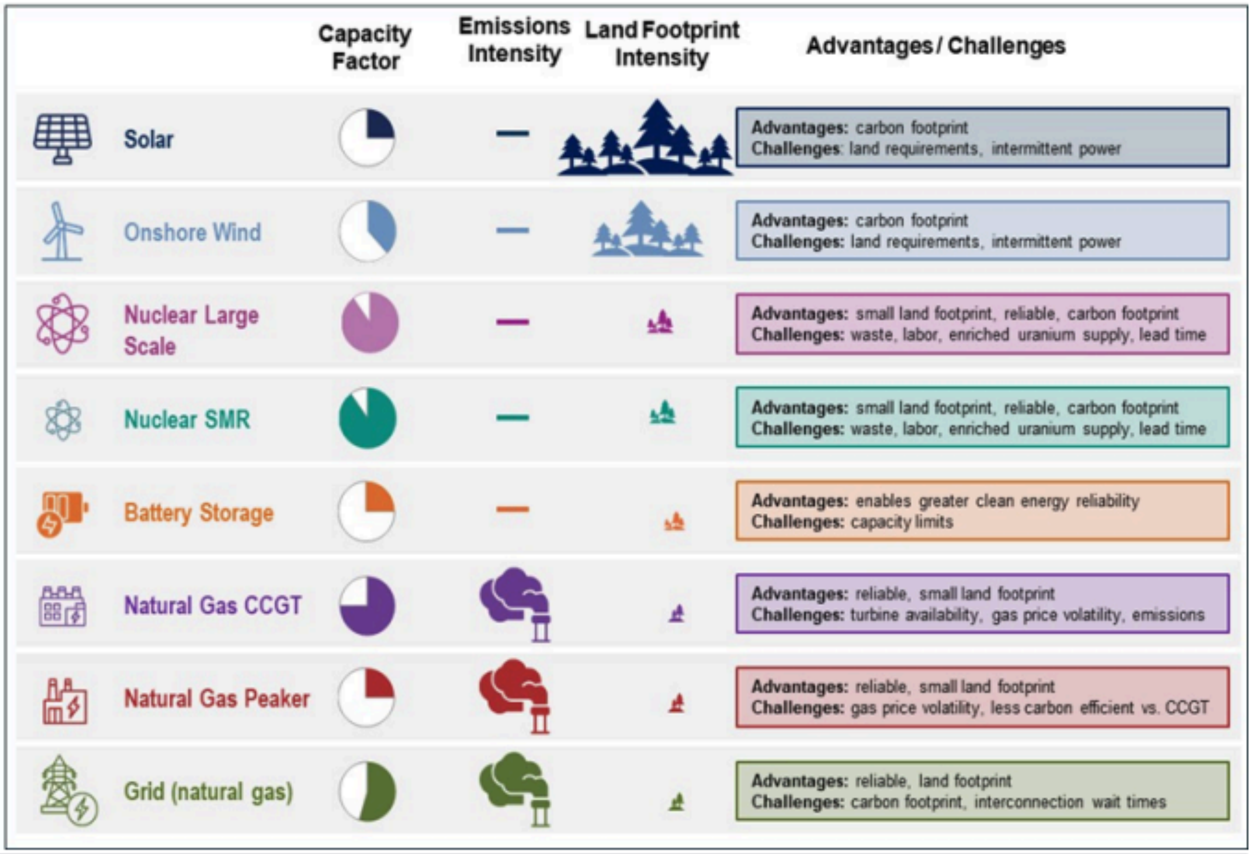
Comparative Assessment of the Three Approaches

Figure 5 presents a summary of some of the key advantages and challenges associated with meeting data center energy needs from sources like natural gas, nuclear power, and solar + storage. This demonstrates that no single energy source is currently perfectly suited for this purpose on a stand-alone or behind-the-meter basis either because of capacity / intermittency issues (as with solar and wind) or because of time to power issues (as with natural gas and nuclear). As a result, the global research and consulting firm, Wood Mackenzie (Seiple and Hertz-Shargel, 2025), concludes that because data center electricity demand:

> *[C]an vary from minute to minute … a grid is better suited than most other options to dealing with such fluctuating demand. Relying on resources with no grid connection introduces enormous engineering complexity and risk, for which data center companies have limited appetite.*

To make matters more complicated, the market monitor for the PJM Interconnection, the independent system operator (ISO) and regional transmission organization (RTO) serving 13 states in the mid-Atlantic region (including Pennsylvania and Virginia), just filed a complaint on November 25, 2025 regarding data center connections to the power grid. The complaint, filed with the Federal Energy Regulatory Commission (FERC), focuses on whether continued data center connections to the PJM grid would result in periodic blackouts and other reliability issues, in violation of PJM's responsibility to maintain a reliable grid for its customers (Howland, 2025b). As Figure 6 illustrates, this impasse could be critical to data center development in the region since the PJM Interconnection represents the largest concentration of data centers in the country. With this context in mind, the next section considers ways in which data centers could combine grid connection with self-generation of power plus electricity storage and flexible load management to help meet the power demand challenges looming over this sector.

Figure 5 - Advantages and Challenges Across Various Technologies Which Can Provide Capacity for Data Center-Driven Power Demand

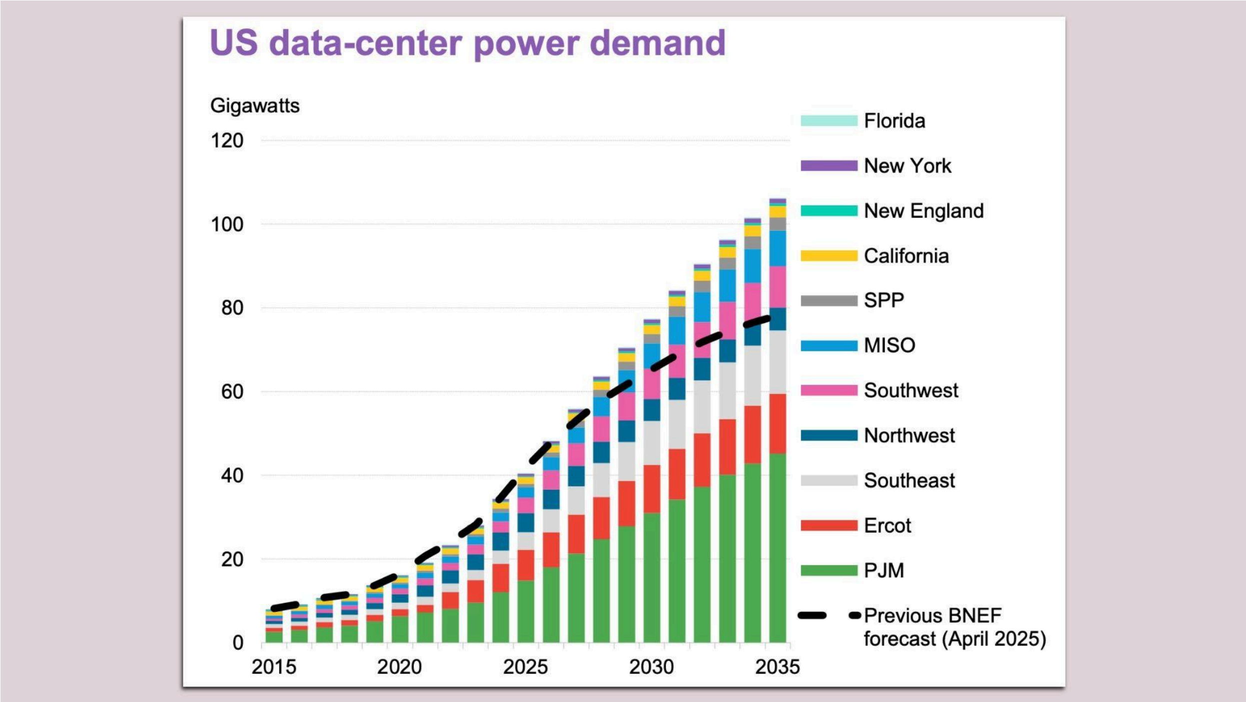


(Source: Goldman Sachs, 2025)

Opportunities for Greater Integration of Power Demand Between the Electric Grid, Data Centers and On-Site Generating Facilities

In 2025, Tyler Norris and other researchers at the Duke University Nicholas Institute for Energy, Environment & Sustainability released a report titled *"Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in US Power Systems"* (Norris, Profeta, Patino-Echeverri and Cowie-Haskell, 2025). The report generated a lot of attention and discussion because it focused on what seemed a fairly simple way to address at least a portion of the data center energy demand challenge. Norris and his team proposed that if data centers could be just a little more flexible in when they use electricity, then the existing grid with some capacity updates over time would likely be able to meet their demand.

Figure 6



(Source: Geman and Tsiaperas, 2025)

Shannon Osaka (2025), a science reporter for The Washington Post, used an analogy of a restaurant to illustrate the idea behind the Norris report. The US electric grid, Osaka writes, is like a restaurant that stays open with a full staff 24 hours a day, 7 days a week, even if the restaurant is only truly busy on weekend nights and during weekday lunch hours. This is because our electric grid is built to meet what's known as "peak demand" even if such levels of demand are only experienced during a handful of really hot days in the summer or cold days in the winter. In other words, the electric grid is designed to stand up to some of the most extreme demand periods, even if these only account for 1, 2 or 3 percent of the time it's in operation.

The basic idea behind data center flexibility (or DCFlex as the idea is now called) is for data centers (and potentially other large users of electricity) to be willing to lower their power usage during those periods of peak demand. This could involve a number of different approaches. For example, data centers could simply scale back on compute demand during peak demand periods, they could move that compute demand to other data center locations in areas not experiencing peak demand, or they could draw electricity from on-site generation or energy storage (e.g., batteries) systems in order to maintain compute levels during the peak demand period (Gaster, 2025).

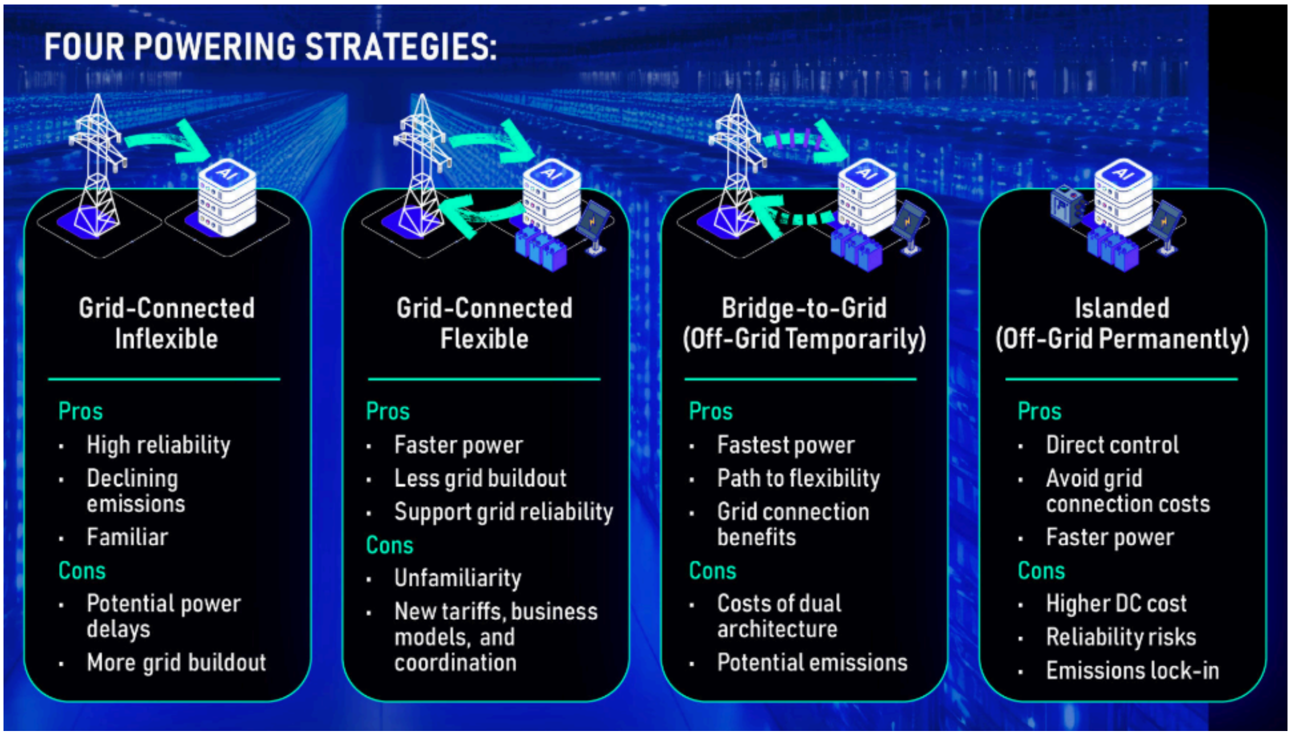
Norris and his team estimate that by adopting DCFlex approaches just 0.25 percent of the time, roughly 22 hours a year, current data center electricity demand could largely be accommodated without burdening residential electricity users. In fact, since data centers represent a new consumer of existing electric power production, this has the potential to distribute the costs of the electric power system over a larger base of customers, potentially lowering electricity rates (Zeitlin, 2025a). It is for this reason that proponents of the DCFlex approach view data centers as a potential grid asset rather than a liability (Gaster, 2025).

Expanding on the DCFlex idea, the Electric Power Research Institute (EPRI) released a 2025 white paper on grid interconnection and speed to power (EPRI, 2025). The EPRI report describes four strategies for powering new data centers and provides a detailed review of the advantages, limitations and opportunities for each approach. These four strategies include (see Figure 7 for a visual summary of each approach):

1. Grid-Connected Inflexible: this is currently the dominant approach where data centers rely almost entirely for their power on grid connections with limited diesel generator backup for emergencies. This approach is also characterized by no flexibility in adjusting power demand.
2. Grid-Connected Flexible: this is roughly the approach advocated for in the Norris report. Data centers potentially work to add at least some new generation and/or storage capacity to the system while also being willing to reduce compute demand or move it to other locations in periods of peak demand.
3. Bridge-to-Grid (Off-Grid Temporarily): in this approach, data centers seek to start up operations using temporary or permanent on-site, behind-the-meter power capacity while awaiting grid connection.

4. Islanded (Off-Grid Permanently): this approach involves data centers being powered entirely by their own on-site resources with no plans for eventual grid connection.

Figure 7



(Source: EPRI, 2025)

The EPRI report points to a number of advantages associated with both the Grid-Connected Flexible and Bridge-to-Grid approaches, and lists examples of where these approaches have already been demonstrated. For example, OpenAI's Stargate data center in Texas combines a 1.2 gigawatt (GW) grid interconnection with 360 megawatt (MW) of onsite natural gas generation and 1,000 MW of battery storage, allowing it to act as a flexible "controllable load resource" for the regional grid. While the Islanded approach offers some key advantages, the report highlights a significant number of limitations to this approach, mainly associated with costs and reliability.

Given that research institutes like EPRI and leading consulting firms like Wood Mackenzie still highlight the key advantages to planning for data centers to depend primarily on a grid connection, it would seem that the DCFlex approaches described in the Norris and EPRI reports would hold a lot of potential. Despite this, the independent market monitor for the largest regional transmission organization (RTO), PJM, referred to large-load flexibility as a “regulatory fiction” and an unproven reliability gamble (Allsup, 2025b). The fact that this generated a furious backlash and defense from DCFlex proponents just goes to show how rapidly evolving is the data center – energy landscape.

Large-load or data center flexibility has the potential to make better use of existing electric power infrastructure, in the process potentially lowering costs to residential and other consumers. However, given the newness of this approach and its potential impacts on grid reliability, significantly increased cooperation, planning and coordination is called for between data center developers, operators and the electric power industry (Zeitlin, 2025a). A similar conclusion was reached in a massive, 300+ page report put out in 2025 by the International Energy Agency (IEA, 2025). The IEA report, and another paper put out by researchers at Columbia University’s Center on Global Energy Policy, also highlight the potential for AI and data center development to actually accelerate the adoption of clean energy technologies like solar, wind, nuclear, geothermal and battery storage (Bordoff and Andreasen-Cavanaugh, 2025).

If anything, this section highlights that the simple logic of “more data centers = more energy demand = higher energy prices” is not a foregone conclusion. However, avoiding this outcome does require a greater degree of flexibility, planning and cooperation than has generally been the case up until now, and that has resulted in a growing backlash to data center development. That will be the focus of the next section.

Political and Public Opinion Challenges to Data Center Development

A handful of recent headlines summarizes the rapidly changing public opinion landscape surrounding AI and data center development. These include, “From Mexico to Ireland, Fury Mounts Over a Global A.I. Frenzy” (Mozur, Satariano and Rodriguez-Mega, 2025), “The Data Center Rebellion is Here, and It’s Reshaping the

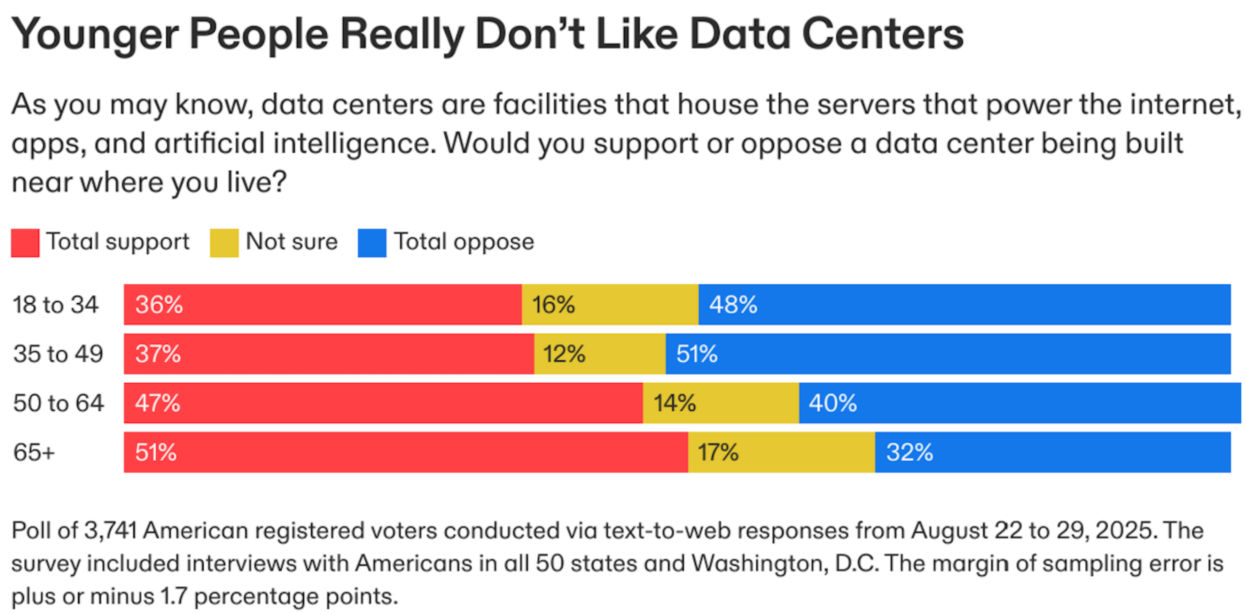
Political Landscape" (Halper, 2026), and "A New Unifying Issue: Just About Everyone Hates Data Centers" (Gearino, 2025). These stories highlight how rising electricity prices, pressure on water supplies, loss of open space and other concerns around data center development have galvanized opposition in red and blue states, among young and old voters, and how this rising opposition is threatening billions and billions of dollars in data center investment.

A public opinion organization focused on energy issues known as [Heatmap Pro]() has been tracking views of AI data centers in recent years and has recently concluded that "activists on both the left and right are pushing back against AI development" (Holzman, 2025). Recent Heatmap surveys (sample size > 3,700 people) have examined public opinion around data center development by age (Figure 8), on reasons to "love" a data center (Figure 9), and on reasons "not to love" a data center (Figure 10). The results of these surveys show that younger people in age groups 18-34 and 35-49 hold significantly more negative opinions of data centers than people aged 50 and up. Results also show that significant majorities (over two-thirds) of all respondents are either very or somewhat concerned about the impacts of data centers on electricity demand, the environment, water demand, local infrastructure and land use. At the same time, slight majorities also recognize the potential benefits of data centers in terms of job creation, local tax revenues, essential infrastructure and powering the digital economy.

Overall, the Heatmap surveys find the public roughly evenly split on the question of whether they would support (43%) or oppose (42%) a data center being built near where they live (Figure 11) (Zeitlin, 2025b). In comparison, the Heatmap surveys found greater levels of public support for other energy-related projects such as solar PV farms (59%), natural gas power plants (56%), wind farms (51%), geothermal power plants (48%), and nuclear power plants (44%). They summarize this comparative analysis this way:

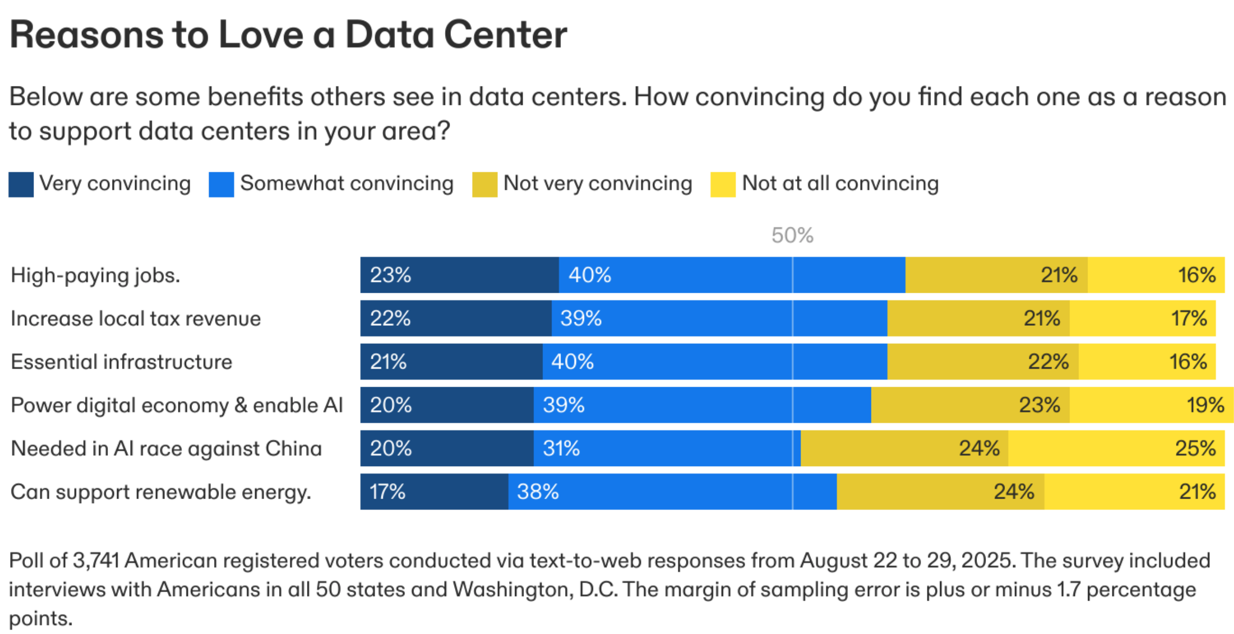
> *They oppose data centers more than they do wind farms with their towering turbines and mechanical hum; more than they do battery storage facilities which can erupt into super-hot fires; or even nuclear power plants, long the go-to reference for "scary energy facility."*

Figure 8



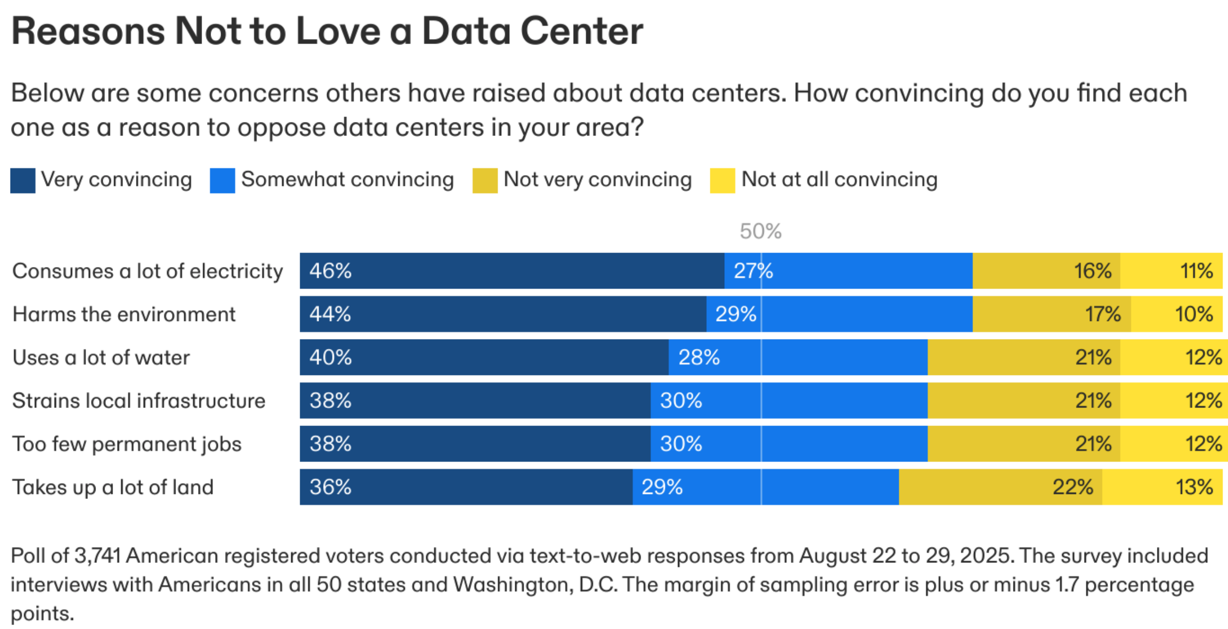
(Source: Holzman, 2025)

Figure 9



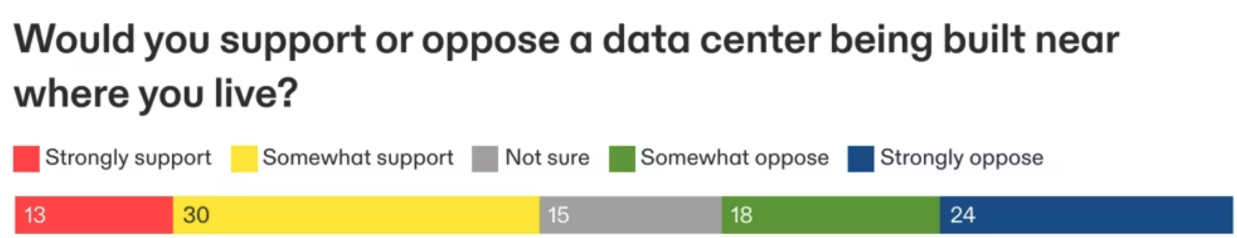
(Source: Holzman, 2025)

Figure 10



(Source: Holzman, 2025)

Figure 11

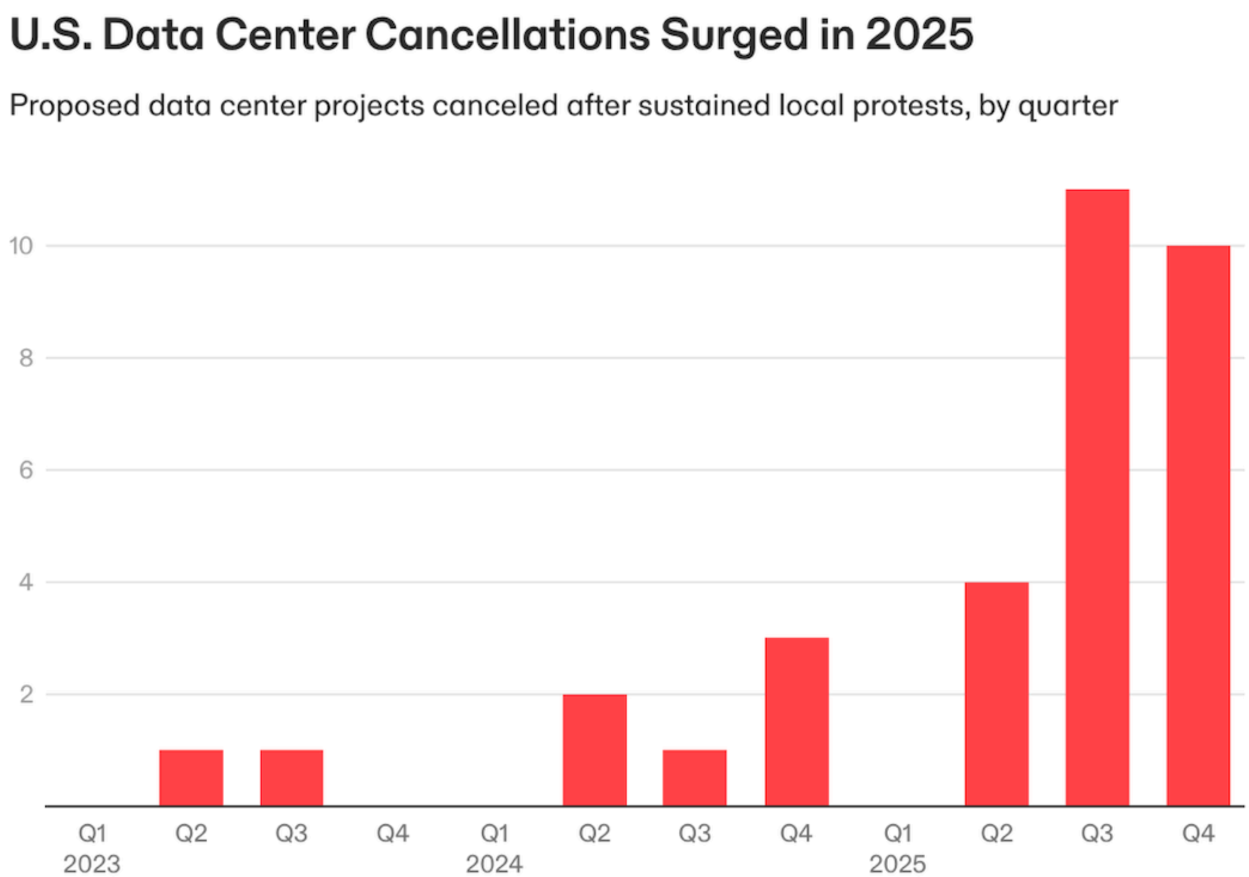


(Source: Zeitlin, 2025b)

Heatmap Pro also just completed an analysis showing that 25 data center projects were cancelled in 2025 after local opposition, four times as many project cancellations as in 2024 (Figure 12) (Meyer, 2026). They project that this figure could grow even more in 2026 with 99 data center projects currently being contested by local residents out of roughly 770 planned data centers across the country. Data center project cancellations were concentrated in the Mid-Atlantic and upper Midwest regions (Figure 13), perhaps related to recent electricity price increases in those regional transmission organization areas (Mid-Atlantic: PJM, upper Midwest: MISO).

In a similar vein, Data Center Watch, which describes itself as a non-partisan, objective research firm tracking opposition to data center development in the U.S., estimates that $64 billion in data center projects were blocked or delayed in the 11 months from May 2024 to March 2025. Furthermore, in the second quarter (April - June) of 2025 alone there were $98 billion of data center projects blocked or delayed by local opposition.

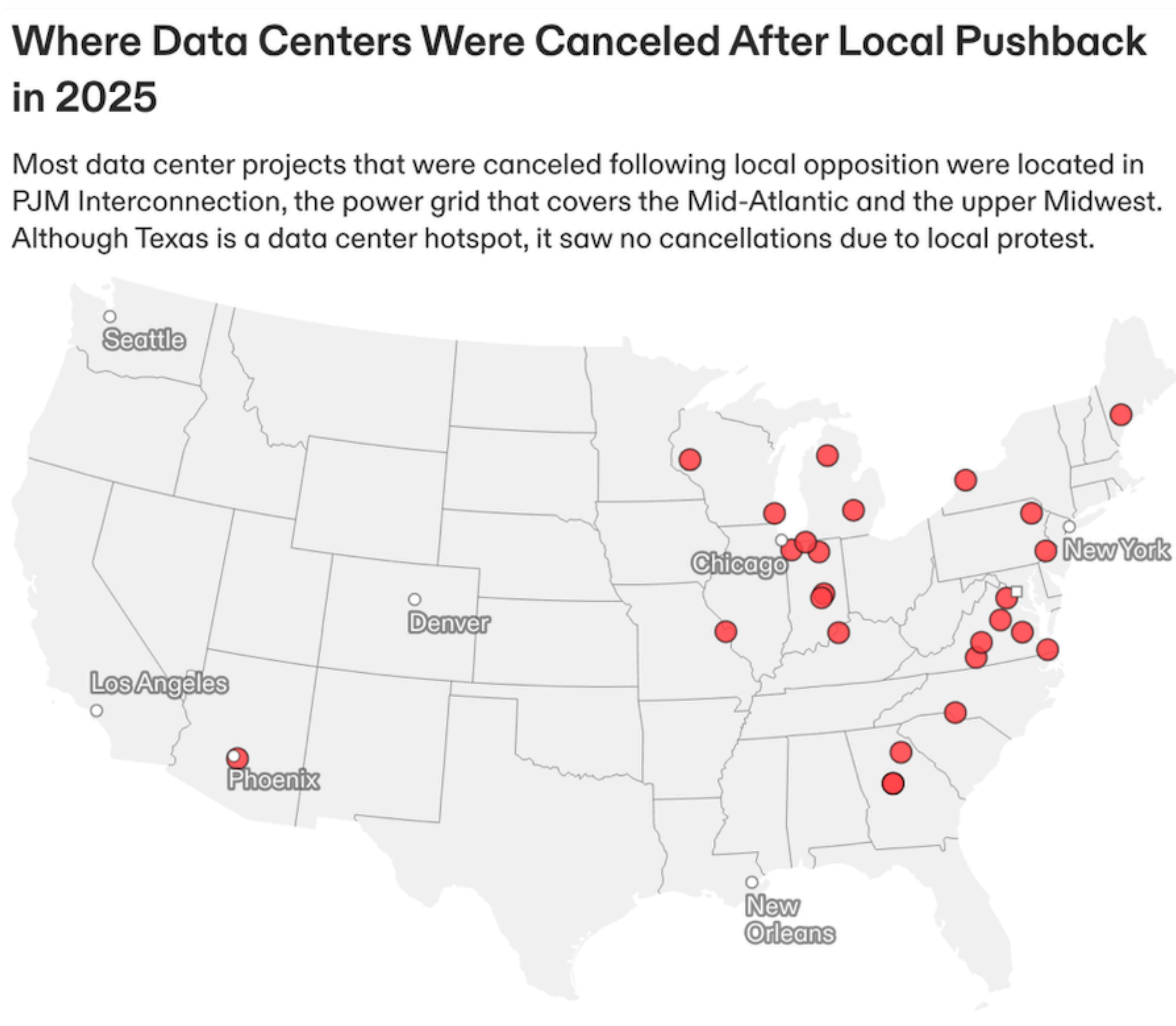
Figure 12



(Source: Meyer, 2026)

Public opposition and growing concerns over the impact of data centers on electricity prices, water supply and local environmental conditions is not lost on politicians at either the state/local or national levels. Researchers at the Columbia University Center on Global Energy Policy identified more than 190 bills on data centers introduced in state legislatures in the first 11 months of 2025 alone (Sandalow, McCormick, Jacobson, Bostwick, Yuan and Zorofsky, 2025). This was nine times as many bills as were introduced in all of 2024. The bills focused on a range of issues, from economic development to electric power rates and environmental impacts, with over 25 of them enacted into law. More specifically, roughly 50 of the 190+ bills examined focused on offering tax and other incentives to attract data center development; more than 40 of the bills focused on electric power rates; roughly 30 bills were focused on water consumption and environmental impacts; and roughly 40 bills aimed to require data centers to disclose their energy and water use to state authorities.

Figure 13



(Source: Meyer, 2026)

There appears to be a growing awareness in the tech/AI/data center sector that they are "losing the narrative" around data center development. Some of this is clearly self-inflicted. Data centers have impacted local/regional energy and water supplies with relatively little in the way of long-term planning or consultation with local stakeholders (Milman, 2025). Widespread use of massive banks of diesel generators for backup power supply has angered local residents in many locations (Martin, 2025). Perhaps with this in mind Microsoft just recently announced a five-point plan to assure that their data centers would not burden local communities (Fried, 2026). The five points are that Microsoft will:

1. Pay its fair share of electricity bills
2. Minimize its water use and replenish supplies
3. Create jobs and training programs for local residents
4. Add to the local property tax base and not ask for tax incentives
5. Strengthen the community through such things as investments in local nonprofits.

It remains to be seen whether other tech and data center leaders will follow Microsoft's lead or whether such gestures will have much of an impact on public opinion and attitudes. For now, at least, the siting and development of data centers has become increasingly challenging in the face of widespread and bipartisan concerns over the impacts of such projects.

Opportunities and Limitations for Data Center and Electric Power Expansion in Northwest Pennsylvania

Data center developers need to consider numerous factors when deciding where to best locate their projects. Obvious considerations include access to energy, water, fiber optic networks and the details of local regulatory restrictions and public opinion. In late-2025, the consulting firm ICF released a report on how to locate the "sweet spots" for data center development based on these and other factors (Parmar, Diller, Chandramowli and Clinger, 2025). The discussion below will take the four main criteria identified by ICF as critical to data center siting decisions and attempt to determine how overall conditions in the northwest Pennsylvania (NW PA) region align with those factors.

Energy Infrastructure

ICF identifies energy as the factor carrying the most weight in data center siting decisions. Energy considerations are further broken down into parcel-specific factors that include:

- Power access / existing electricity supply
- Grid capacity or "withdrawal capability"
- Grid stability and substation-level reliability
- Interconnection process and costs
- Existing natural gas infrastructure and capacity
- Power price outlook and regional power market dynamics

Fiber Optic Network Infrastructure

Data centers require high speed, high bandwidth, reliable internet connections and should consider two related factors in this regard:

- Proximity to long-distance fiber optic network cables, and
- The potential for data center clustering to allow for benefits from colocation and shared infrastructure

Environmental and Permitting Requirements

ICF considers environmental and permitting requirements and community sentiment under this category. Specific considerations include:

- Water access for data center and any onsite power generation cooling needs
- Long-term weather risks from flooding, wildfires or other extreme weather events
- Ecological impacts and proximity to sensitive habitats or threatened species
- Land availability and zoning for industrial and mixed use purposes
- Permitting complexity and its impacts on project costs and timelines

Regulatory and Policy Environment

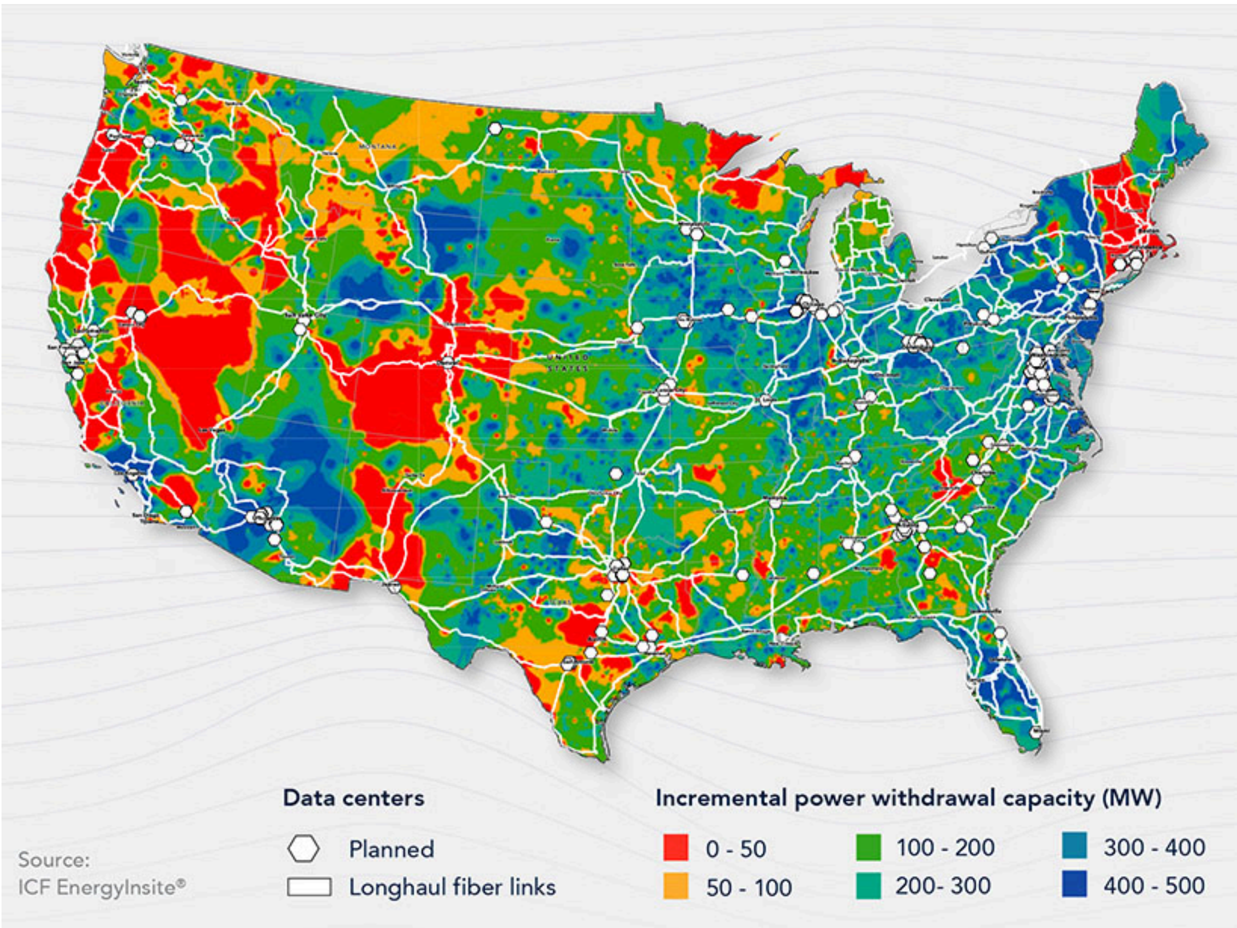
Factors considered under this section include:

- Programs or policies that incentivize data center development (or restrict it) at specific sites and locations
- The power market structure and how ITO or RSO rules affect interconnection requests and timelines
- Tax incentives and financial support
- Local community acceptance

An analysis of Loudon County, Virginia by ICF described data center sweet spots as "industrial/mixed use zoned parcels within 1,000 feet of fiber optic lines and located close to substations with 100+ MW of incremental grid capacity and minimal flood hazard risk" (Giacobone, 2025). Figure 14, taken from the ICF report, illustrates at the national level the interaction of just two key factors discussed above, specifically grid withdrawal capacity (available power from the grid) and the location of fiber optic networks. While the resolution of this image does not allow for detailed analysis, it does suggest that the NW PA region qualifies as having 100+ MW of incremental power withdrawal capacity and fiber optic network infrastructure.

A full review of all of the other factors to consider in identifying whether a data center sweet spot exists in NW PA is beyond the scope of this paper, but we can comment on at least some of them. First, figures 15 and 16 represent a relatively crude but accurate mapping of natural gas pipeline infrastructure in the NW PA region. While these figures show the presence of numerous natural gas pipelines, they say nothing about available capacity. Second, the ICF report highlights data center clustering or the potential for clustering as a factor favorable to development. Figures 17 and 18 show the proximate locations of data centers in Pennsylvania and western PA, respectively as reported by [Data Center Map](). These make clear that data center development in NW PA would likely not experience any benefits from clustering, at least not initially. Third, water access, long-term weather risks, ecological impacts and land availability would all seem to be favorable factors for data center development in NW PA.

Figure 14 - Planned Data Centers, 2030 Incremental Grid Withdrawal Capacity, and Long-Haul Fiber Optic Network



(Source: Parmar et al., 2025)

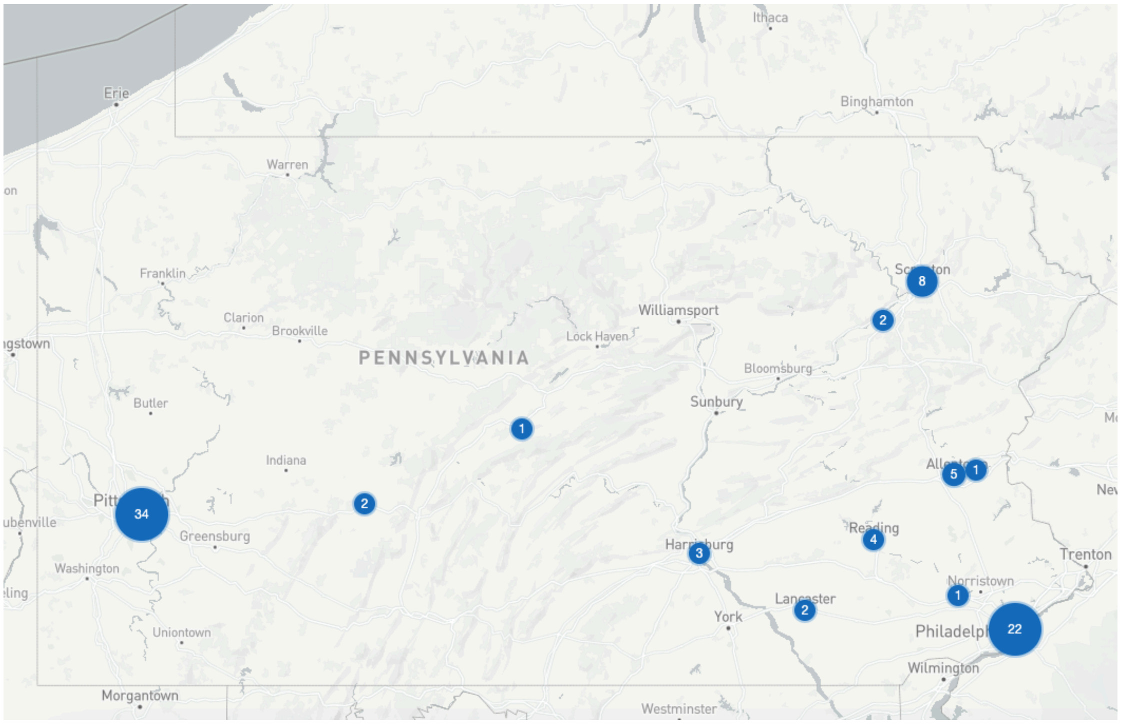
Fourth, and lastly, while detailed community-level public perceptions and attitudes about data center development were not available for this report, a 2025 survey of state resident attitudes toward data centers by Emerson College Polling (2025) suggests that the NW PA region is more favorably inclined to data centers than anywhere else in the state. Specifically, figures 19 and 20 show responses to two data center questions broken down by region. Figure 19 shows results from a question asking if you support or oppose data centers being built in or near your community, with the NW PA region being the only part of the state to reach 50% strongly or somewhat supportive. Figure 20 shows results from a question focused on whether data centers will create a significant number of jobs, again showing more optimism among NW PA residents with 73% of them believing that it is very or somewhat likely that this will happen.

Figures 15 and 16 - natural gas pipelines in the NW PA region

*(Source:
https://maps.fractracker.org/latest/?webmap=a00c3b5cee4e4fe0b238b5e05ed80204 and
https://www.arcgis.com/apps/mapviewer/index.html?webmap=955b05489a5c45a886c75e9eae4623cb)*

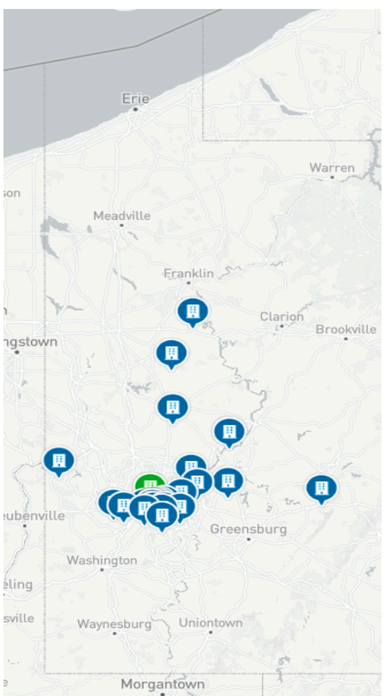
Taken together, it appears that at least some of the important factors favorable to data center development exist in NW PA. But if anything, this paper has shown that the data center – energy landscape is complex and changing all of the time. Whether to site a data center or centers in the NW PA region requires more detailed, community- and parcel-scale analysis. It also requires a more thorough analysis and consideration of what the potential is for adding natural gas, nuclear, solar and wind electrical generating capacity (along with battery storage) to the regional electric grid.

Figure 17 - Data Center Locations in Pennsylvania



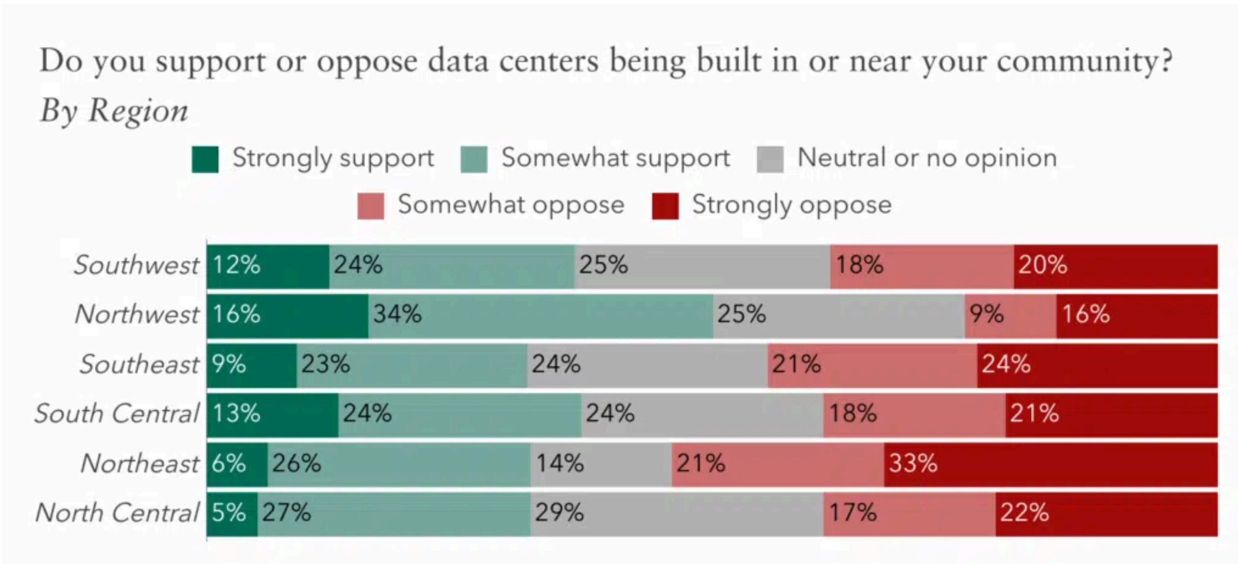
(Source: https://www.datacentermap.com/usa/pennsylvania/)

Figure 18 - data center locations in western Pennsylvania



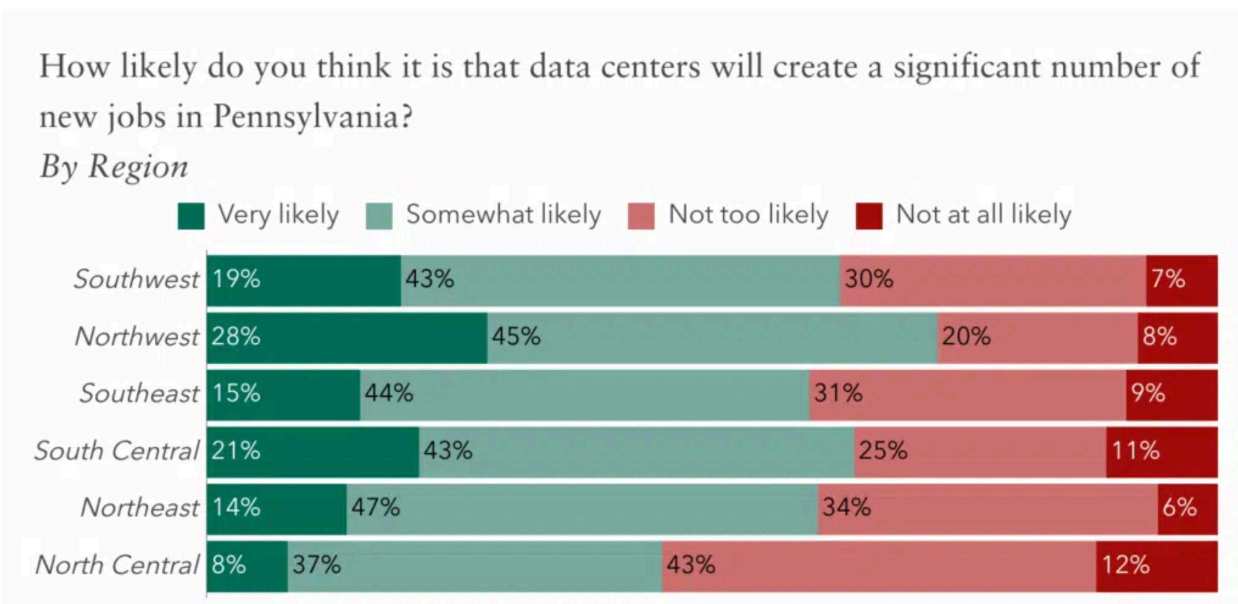
(Source: https://www.datacentermap.com/usa/pennsylvania/)

Figure 19



(Source: Emerson College Polling, 2025)

Figure 20



(Source: Emerson College Polling, 2025)

Conclusion

The recent boom in investment in Artificial Intelligence (AI) and the associated buildout of large numbers of hyperscale data centers needed to carry the global AI compute load has, by most accounts, caught the electric power industry in the U.S. off guard. After decades of virtually flat growth in demand for electric power, rapidly increasing electricity use by data centers is exposing both supply and distribution gaps in a number of regions, and resulting in higher electricity prices for millions of consumers.

In order for the AI data center buildout to progress without even more serious disruptions to the electric power grid and increases in electricity prices, a number of things need to be considered. First, it's apparent that additional electric power generating capacity needs to be added to the grid, especially in key locations like the mid-Atlantic region where large numbers of data centers are planned, under construction, or already in operation. What form that generating capacity takes will vary based on cost, the local policy and public opinion environment, and time-to-power issues, but hyperscale companies like Meta, Google and Amazon are already pouring billions of dollars into natural gas-fired power plants, nuclear power projects, solar PV + storage, geothermal energy and large-scale, long-duration battery storage.

Second, 2025 saw the emergence of a technical and policy debate over the possibility of avoiding the need for a large-scale increase in electrical generating capacity by having data centers be more flexible in the timing of their electricity use. The idea, now referred to as DCFlex for data center flexibility, has only been pilot tested in a few locations, but it appears to offer some promise. However, until the DCFlex concept can be tested and proven to be effective at scale, it will have its skeptics in the data center and electric power industries.

Lastly, public opinion and a political response to the rapid increase in AI data centers lagged actual growth in this sector, but that's clearly no longer the case. Data centers are now described as a "unifying issue" that "just about everyone" hates, and as resulting in mounting "fury" in a number of countries around the world because of its impacts on things like energy and water supply. On the political front, legislators at the local, state and national level are jumping into the act with efforts to both incentivize data center development and restrict it. There's evidence that the AI and data center industry now recognize how widespread the negative views are about them, and there are early attempts to both counter these perceptions and address some of the issues that created them in the first place.

By the end of 2025 there was apparently only one AI data center under construction in northwest Pennsylvania (in Venango County) and none in actual operation. In order for further development of data centers in this region to take place, more detailed research into available electric grid capacity, proximity to energy infrastructure such as gas pipelines and high-voltage transmission lines, proximity to fiber optic network cables, and access to adequate water supplies for cooling, will need to occur.

Likewise, local public opinion and the political/regulatory climate will need to be taken into consideration. Proponents of such developments could perhaps learn from the strong backlash against data centers happening in other parts of the country. Adopting a more transparent approach to planning and siting a data center, including opportunities for meaningful public input into the process, would seem to be called for. While AI data centers have been observed to offer significant benefits to some host communities in terms of local tax revenue, their employment impacts are somewhat less transformative once the construction phase is over. Data center developers and proponents should be level with the local population about this and not over-promise on the possible benefits of this form of development.

If approached in the right way in terms of integrating new electric power generation and data center development, it’s possible to imagine positive contributions of this sector to the often overlooked northwest corner of the state of Pennsylvania. At the same time, the AI data center landscape is becoming increasingly contentious and so a thoughtful and thorough approach to planning and implementation is called for if an opportunity like this is to succeed in our region.

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