

AI, Energy Security, and the Strategic Value of Reliable Power

United States Energy Association

BOTTOM LINE UP FRONT

Artificial intelligence is often discussed as a race for chips, models, and computing capacity. It is also a race for electricity, grid capacity, and the ability to deliver reliable power at the scale and speed that advanced computing requires. As data centers expand and digital infrastructure becomes more energy-intensive, the United States faces a competitive challenge that is increasingly related to generation, transmission, permitting, interconnection, and grid reliability.

AI GROWTH HAS BECOME A POWER-SECTOR ISSUE

The growth of AI is now driving a measurable shift in U.S. electricity demand. DOE’s Electricity Demand Growth Resource Hub, drawing on Lawrence Berkeley National Laboratory, says data centers consumed about 4.4% of total U.S. electricity in 2023 and could rise to roughly 6.7% to 12% by 2028. The same analysis estimates that data-center electricity use climbed from 58 terawatt-hours in 2014 to 176 terawatt-hours in 2023 and could reach roughly 325 to 580 terawatt-hours by 2028. Meanwhile, in January 2026, EIA reported that U.S. electricity demand is on track for its strongest four-year growth period since 2000, and for the first four consecutive years of growth since 2007, with large computing centers emerging as a major driver. Its latest April 2026 Short-Term Energy Outlook projects total U.S. electricity demand growth of 1.2% in 2026 and 3.3% in 2027. AI is emerging as a major new driver of electricity demand.

For policymakers and industry alike, the practical question is becoming harder to avoid: can the country deliver enough dependable power, in the right places and on the right timeline, to support the next wave of AI buildout?

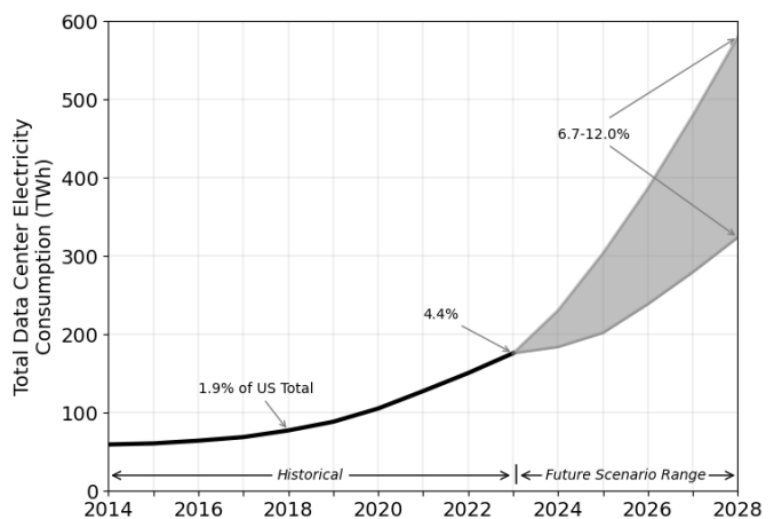


Image 1. Total U.S. Data Center Electricity Use, 2014–2028. Source: Lawrence Berkeley National Laboratory, 2024 *United States Data Center Energy Usage Report*, 2024.

RELIABILITY, NOT JUST ENERGY VOLUME, IS THE REAL CONSTRAINT

The policy mistake would be to treat AI-related load as a routine increase in electricity consumption. Large data centers are concentrated, energy-intensive, and often operationally different from traditional sources of demand. Some AI-related workloads may be more flexible than others, and AI training loads (model training in data centers) may in some cases be scheduled more strategically than always-on computing demand. Even so, the broader challenge remains the same: whether the grid can deliver reliable power, at scale, in the right locations, and under stressed operating conditions.

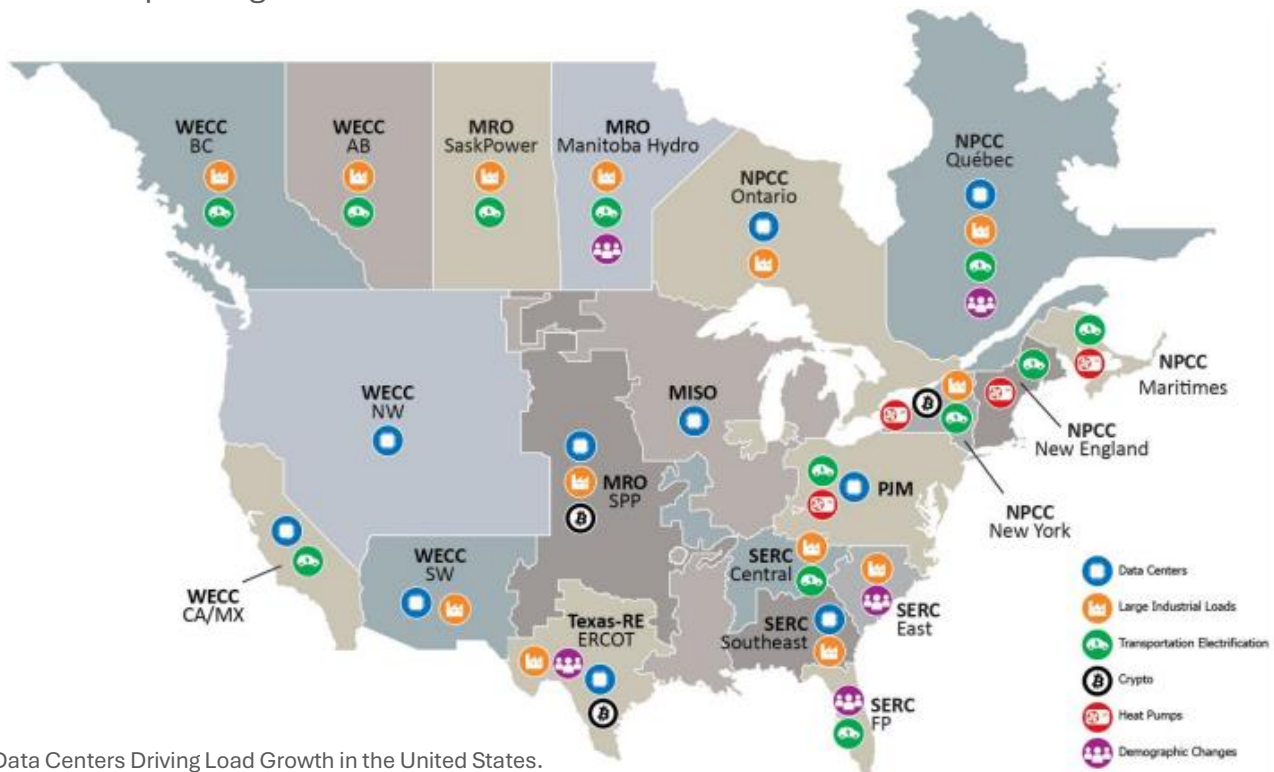


Image 2. Data Centers Driving Load Growth in the United States.
 Source: North American Electric Reliability Corporation (NERC),
 2025 *State of Reliability Overview*, 2025.

The North American Electric Reliability Corporation (NERC) is direct about the operational risks. In its 2025 *State of Reliability* annual report, it warns that large data centers can be developed faster than the generation and transmission infrastructure needed to support them, creating new pressures on grid stability. It also notes that these facilities can be highly voltage-sensitive and capable of sharp, sometimes unpredictable swings in power use. In one 2024 event cited by NERC, roughly 1,500 MW of data-center load disconnected simultaneously following a transmission fault, an abrupt shift comparable to the sudden loss of a large nuclear plant. NERC has since moved from warning to institutional response. In March 2026, it launched a standards project on “computational loads” to address the reliability implications of data centers, AI compute clusters, and other large new loads connecting to the bulk power system at unprecedented speed and scale.

THE CHALLENGE IS REGIONAL, NOT JUST NATIONAL

This is a national electricity-demand issue. It is also a regional transmission, interconnection, and substation-capacity concern. AI-related data-center development is clustering in specific markets, often where land, fiber connectivity, tax incentives, and existing infrastructure align. That geographic concentration means the stress on the power system is highly uneven. In practice, the question is often not whether the United States can produce enough electricity in aggregate, but whether particular regions can deliver enough reliable power quickly enough to accommodate very large new loads without raising reliability risks or shifting excessive costs to existing customers.

U.S. electricity load by region, 2015–2027

billion kilowatthours

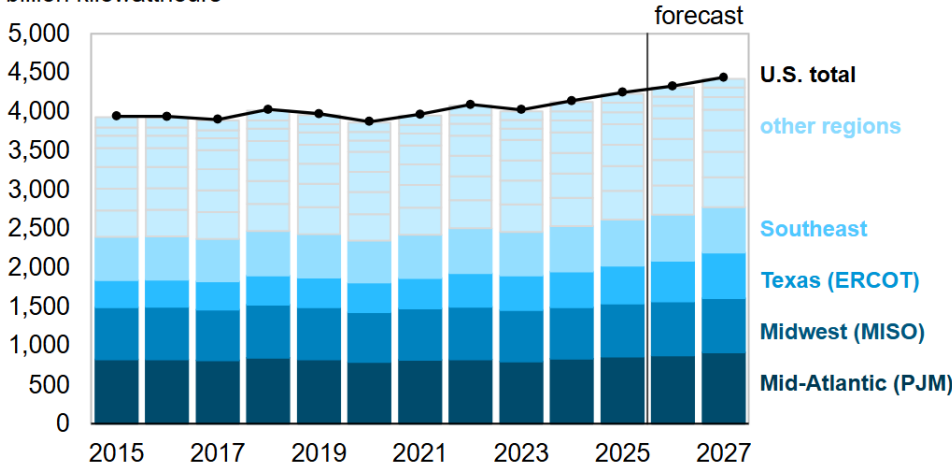


Image 3. U.S. electricity load by region.
 Source: U.S. Energy Information Administration (EIA), ‘Fossil generation could rise with faster-than-expected growth in data center power demand,’ Today in Energy, March 12, 2026

FEDERAL POLICY

Federal policy has started to reflect that reality. Executive Order 14262, signed in April 2025, framed grid reliability and security as a national priority amid rising demand from AI data centers and domestic manufacturing. Executive Order 14318, signed in July 2025, went further by defining a “Data Center Project” as a facility requiring more than 100 MW of new load for AI inference, training, simulation, or synthetic data generation. It also highlighted the supporting infrastructure such projects may require, including transmission upgrades, substations, transformers, pipelines, and dispatchable energy resources needed to serve them.

In March 2026, the White House added a cost-allocation layer through the Ratepayer Protection Pledge, under which participating AI firms and hyperscalers committed to covering required delivery upgrades and coordinating backup generation with grid operators. FERC has moved in parallel: it opened Docket RM26-4 on interconnection of large loads and, in late 2025, directed PJM to establish clearer rules for serving AI-driven data centers and other large co-located loads while protecting reliability and consumers. Together, these steps suggest that AI is no longer being treated merely as a private-sector growth story. It is increasingly being handled as infrastructure with national consequences.

WHO PAYS FOR THE INFRASTRUCTURE MATTERS

As AI-related load grows, cost allocation is becoming a central policy question. Large new loads may support national economic and strategic goals, but they can also require substantial investment in electricity generation, transmission upgrades, substations, transformers, and other delivery infrastructure. Policymakers are increasingly focused on ensuring that ordinary households and existing businesses are not forced to absorb costs that are clearly caused by hyperscale data-center expansion. That is why emerging federal and regional policy discussions are placing greater emphasis not only on how quickly new loads can connect, but also on who pays, under what terms, and with what protections for reliability and consumers.

WHAT MATTERS MOST NOW

For the United States, the immediate challenge is delivering infrastructure fast enough to keep reliability from becoming a bottleneck to AI and data center expansion. That means faster siting and permitting, more timely interconnection, and more buildout of generation and transmission infrastructure. The U.S. must also consider the timing of generation plant retirements. The EIA reported in February 2026 that 6.4 GW of coal-fired capacity is scheduled to retire in 2026, but noted that only 2.6 GW of coal capacity retired in 2025, far less than the the 8.0 GW anticipated at the start of that year, after emergency orders delayed the closure of several plants. The existing fleet cannot operate in perpetuity. But firm capacity cannot retire faster than similar alternatives and the transmission needed to deliver them can be commissioned.

U.S. planned utility-scale electric generating capacity retirements (2026)
 gigawatts (GW)

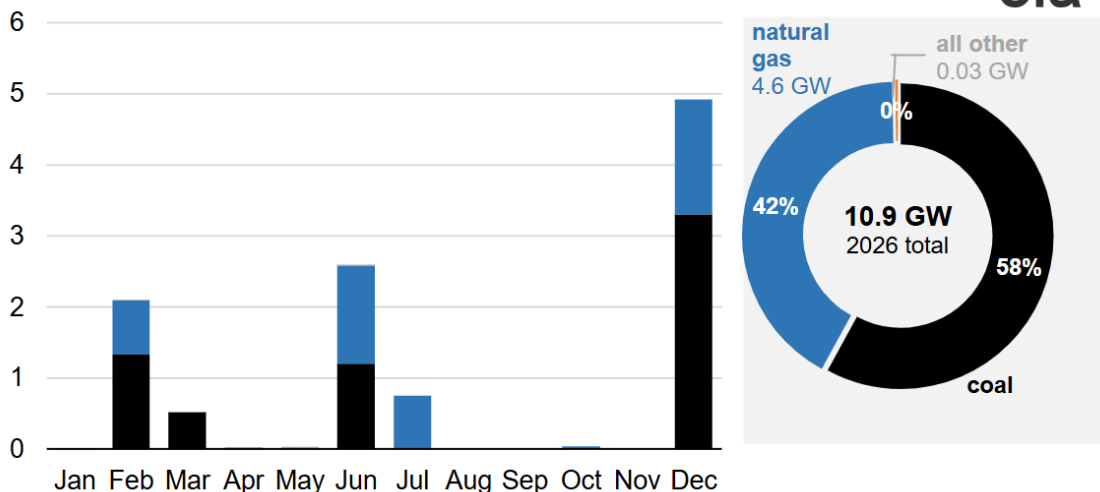


Image 4. Planned U.S. Utility-Scale Electric Generating Capacity Retirements, 2026. Source: U.S. Energy Information Administration (EIA), “Planned electric generating capacity retirements in 2026 at lowest level since 2008,” Today in Energy, February 23, 2026.

SUPPLY CHAINS AND EQUIPMENT LEAD TIMES MATTER

There is also a practical supply-chain dimension. Even where permitting improves, power infrastructure cannot be built on schedule without adequate supplies of transformers, switchgear, substations, turbines, and other critical equipment. In that sense, the AI-power challenge is not only a regulatory problem. It is also an industrial-capacity problem.

AI is putting new pressure on the power system, but it may also help modernize the way the system is planned and run.

AI CAN ALSO HELP MODERNIZE THE GRID

AI may also become part of the solution. DOE states that it is using AI to accelerate grid planning, interconnection, operations, and security. In its February 2026 Genesis Missions announcement, DOE identified “Scaling the Grid to Power the American Economy” as a core challenge area, describing AI as a tool to improve grid decision-making speed, cost, and reliability. DOE’s Office of Electricity strategic plan likewise identifies AI as a tool for improving grid planning, interconnection, operations, and security.

ENERGY SECURITY ALSO MEANS RESILIENCE AND CYBER READINESS

If AI is becoming part of the nation’s critical infrastructure base, then the electricity system supporting it must be evaluated not only for adequacy, but also for resilience and security. Large data centers, advanced computing clusters, and digitally integrated grid operations increase the strategic importance of cyber defense, physical security, and operational resilience across the power sector. A more power-hungry digital economy will require not only more electricity, but a more secure electricity system.

KEY ISSUES FOR POLICYMAKERS

- Accelerating siting, permitting, interconnection, and transmission expansion
- Preserving reliable and deliverable capacity where replacement resources and transmission are not yet ready
- Improving large-load modeling, standards, and operating practices
- Protecting consumers through disciplined cost allocation
- Strengthening domestic energy and equipment supply chains
- Treating electricity security as part of AI security

CONCLUSION

The United States is well positioned to lead in AI, but sustaining that leadership will depend in part on its ability to power it. Chips, models, and software talent remain essential, but they are only part of the broader competitive equation. Long-term advantage will also depend on the ability to pair digital innovation with abundant, reliable, and well-planned electricity infrastructure. That means treating generation adequacy, transmission expansion, large-load interconnection reform, and grid resilience as important pillars of U.S. AI strategy. As AI development accelerates, energy policy and infrastructure planning will play an increasingly important role in supporting the country's technological and economic leadership.

THE UNITED STATES ENERGY ASSOCIATION (USEA) Founded in 1924, USEA is a nonprofit, nonpartisan, and non-lobbying organization that serves as a neutral forum for dialogue across the global energy sector. USEA's mission rests on two pillars: first, convening stakeholders to exchange insights on policy, regulation, science, technology, and finance to advance reliable, affordable energy for economic growth and prosperity; and second, partnering with the U.S. government, members, and international allies to expand access to U.S. energy resources and technology to strengthen energy security worldwide. As artificial intelligence drives rapid growth in electricity demand, data-center development, and digital infrastructure, USEA sits at the intersection of energy expertise and practical dialogue. Through its ability to connect utilities, technology companies, policymakers, government agencies, and research institutions, USEA provides a platform for informed discussion, actionable insight, and partnership on the energy issues shaping America's future.

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