# **Electricity Affordability and Load Growth:** Diagnosing and Fixing the Problem

By **Robin Millican**, **Dr. Douglas J. Arent**, and **David Sandalow**

- Rising electricity prices reflect a convergence of long-standing system weaknesses, including inefficient infrastructure planning, misaligned utility incentives, slow permitting, supply chain inflation, and reactive climate risk management. Increasing electricity demand, or load growth, including from data centers, is accelerating these pressures.
- Whether load growth raises or lowers prices depends on tariff design, cost allocation, and supply availability. Where low-cost supply is available and existing infrastructure is efficiently utilized, additional demand can lower per-unit costs; where supply is constrained or capital needs are high, demand can raise prices.
- Optimization of the existing US power system through grid-enhancing technologies, demand response, and large-load flexibility could quickly unlock supply in the form of underutilized capacity. These efforts could defer costly infrastructure buildout but are under-deployed due to regulatory and incentive barriers that favor capital investment over system optimization.
- Sustained cost control will require structural reforms across three areas: realigning utility incentives with cost efficiency rather than capital investment; ensuring that large new loads bear a fair share of system costs at both the federal and state level; and removing the interconnection and permitting bottlenecks that prevent price signals from translating into deliverable supply.

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Concerns about electricity affordability in the United States have been rising along with prices. The problem reflects a convergence of pre-existing structural failures: inefficient infrastructure planning, utility incentive structures misaligned with cost efficiency, chronic undervaluation of flexibility in grid operations, slow permitting timelines that have not improved in decades, and

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storm damage and wildfire costs—both worsening with climate change. Higher electricity demand, or load growth, including from data centers, is accelerating all of these pressures, and adding some of its own.

This commentary draws on recent research and discussions on electricity affordability, including a new analysis from Lawrence Berkeley National Laboratory (LBNL) and The Brattle Group[1] and a roundtable series the Center on Global Energy Policy (CGEP) at Columbia University SIPA held in New York, Washington DC, and Austin in late 2025 and early 2026.[2] It examines the structural roots of rising electricity prices and identifies near- and medium-term solutions available to federal and state actors as well as the need for long-term proactive storm-, wildfire- and cyber-related risk reductions.

The central finding is that rising electricity prices are driven by structural features of the power system rather than demand growth alone, and that affordability outcomes under increasing load will depend on how effectively supply, infrastructure, and cost allocation are managed.

# Current and Forecast Prices, and Drivers

A new analysis from LBNL provides important grounding on the drivers of electricity pricing in the United States. From 2019 to 2024—a period during which inflation in the United States reached the highest level in 40 years and became a top-tier political issue—average residential retail electricity prices roughly tracked the rate of inflation.[3] Last year marked a departure from this trend, when the average residential retail price of electricity in the United States rose by 6 percent in nominal terms, more than twice the rate of inflation—and by 2.6 percent in real terms.[4]

Primary year-over-year price drivers in 2025, reported in the LBNL analysis, include increases in fuel and wholesale supply costs (a factor in 21 states), distribution cost growth (16 states), generation capital expenditure (11 states), transmission infrastructure costs (11 states), and storm cost recovery (9 states). Annual investor-owned utility (IOU) generation capital expenditure, for example, increased 22 percent in inflation-adjusted terms in 2025 alone, following 13 percent increases in each of the two prior years.[5]

A particularly underappreciated contributor to electricity price increases mentioned in the LBNL study is equipment cost inflation. Since 2019, producer prices for transformers have risen 89 percent, switchgear 77 percent, and wire and cable 152 percent. These cost increases flow directly into utility capital expenditures and, with a regulatory lag, into customer bills over asset lifetimes.

One of the most consequential findings from the LBNL analysis concerns load growth itself: whether load growth raises prices for existing customers is not predetermined. The direction and magnitude of the effect depend on tariff design, cost allocation, and the adequacy of available supply. States with the highest demand growth from 2019 to 2025 generally saw all-sector average, inflation-adjusted prices decline by more than one cent per kilowatt-hour, as fixed infrastructure costs were spread over a larger consumption base. Nebraska, New Mexico, and North Dakota all absorbed large industrial and data center load additions while reducing inflation-adjusted retail prices. Two factors drove this: 1. abundant low-cost wind and solar generation served new load at below-system-average incremental cost, and 2. substantial commercial and industrial growth spread existing fixed infrastructure costs over more demand, reducing per-unit prices for all customers including residential ratepayers.

That said, early 2026 data show prices climbing broadly, with increases particularly concentrated in the PJM Interconnection (13 states in the mid-Atlantic and Midwest, and Washington DC) and the Southeast. LBNL found that IOUs filed $18 billion in rate increase requests in 2025—the highest level since the mid-1980s. Regulators approved, on average, 64 percent of those requests over the past five years, with 2025 running at 66 percent.

Much of that cost has not yet reached customer bills but will in the coming years. That burden has also fallen unevenly: the Energy Information Administration's data show that residential customers saw roughly 27 percent higher bills from 2019 to 2024, compared to approximately 19 percent for commercial and industrial customers—a disparity driven in part by utility cost-allocation methods that have historically shielded large commercial users from proportionate cost recovery.[6]

With roughly one-third of American households dedicating more than 5 percent of their income to electricity, according to LBNL, calls for action are certain to grow.

## Near-Term Opportunity: Optimizing Existing Infrastructure

The aforementioned CGEP electricity affordability roundtables that included stakeholders from government, industry, finance, academia, and think tanks consistently surfaced this multifactor diagnosis of the drivers of price increases. However, a recurring theme from the roundtables, and one with a strong near-term political and economic case, is that the United States has substantial untapped capacity in its existing transmission infrastructure. New supply and delivery infrastructure will require years of permitting, siting, and construction; in the interim, tools including commercially available grid-enhancing technologies (GETs) and demand response can provide a faster and lower-cost path to meaningful capacity increases.

CGEP recently published a white paper examining the evidence base for GETs.[7] A leading GET example is dynamic line rating (DLR), which uses real-time weather and sensor data to determine actual line capacity rather than relying on conservative static assumptions. DLR reduced congestion by up to 65 percent on monitored lines at PPL Electric in Pennsylvania, delivering over $50 million in congestion cost savings.[8]

The UK's National Grid announced deployment of DLR across 275 kilometers of its transmission infrastructure—driven in part by the need to relieve growing congestion on corridors connecting Scottish wind generation to demand centers in London. The company said this deployment has the potential to enable service to approximately 75,000 additional homes and generate an estimated £20 million per year in consumer savings.[9]

Advanced power flow control devices, which reroute electricity from congested lines to underutilized parallel routes, freed 2 gigawatts (GW) of additional capacity on National Grid's UK system—equivalent to roughly two million homes—saving customers £390 million over seven years.[10]

And advanced conductors, some of which replace steel cores with carbon fiber composites, can nearly double line capacity without new towers or rights-of-way, with deployment timelines measured in months rather than the decade-plus required for new transmission.[11]

All told, the savings realized from GETs could be substantial: analysis in *Proceedings of the National Academy of Sciences* projects $180 billion in savings by 2050 from strategic deployment of GETs across the United States.[12]

Grid-enhancing technologies address the supply and delivery side of the equation. On the demand side, large-load flexibility—particularly data center load shaping, or reducing usage during peak periods—offers a complementary lever for managing peak demand without relying on high-cost, low-utilization generation. The DCFlex initiative—a collaboration of 53 utilities, grid operators, and hyperscalers—has completed proof-of-concept pilots in Arizona, North Carolina, and France demonstrating that data centers can curtail or shift computational workloads in response to grid signals during peak hours.[13] The DCFlex Arizona project achieved 10 to 40 percent flexibility in workload during a simulated peak event.

Given the potential benefits to the system, regulators are beginning to evaluate new constructs to drive uptake of GETs, demand response, and flexibility. Near-term actions to mandate consideration of GETs in planning processes—as FERC Order 1920 did in 2024—and to require disclosure of transmission utilization rates would represent meaningful progress toward accountability without requiring fundamental restructuring of the regulatory compact. More broadly, these measures point toward a pragmatic near-term strategy for electricity affordability: maximizing the performance of existing infrastructure while longer-term generation and transmission buildout proceeds.

# Medium-Term Agenda: Structural Reform

The transition from slow or very low growth to a new era of accelerated load growth, particularly driven by data centers and advanced computing, has exposed structural limitations in how the US power system is governed, planned, and operated. GETs and demand response and flexibility address near-term capacity constraints, but affordability over time requires tackling the deeper structural misalignments that the LBNL analysis and the CGEP roundtables identified.

Several reform priorities have emerged repeatedly in both the literature and practitioner discussions: realigning utility incentives, modernizing cost allocation for a new era of large and concentrated loads, and removing the institutional barriers that prevent price signals from translating into deliverable supply.

## Aligning Utility Incentives with Cost Efficiency

The barriers to broader use of tools like GETs and demand response are not technological but institutional and structural. Under traditional cost-of-service regulation, utilities earn authorized returns on equity of approximately 9 to 10 percent—a return structure that applies to transmission owners as well as distribution utilities. This regulatory structure rewards capital deployment more than system optimization. As long as frameworks remain oriented toward proving "need" for new capital investment rather than systematically evaluating lower-cost alternatives, the pace of deployment will lag.

Performance-based regulation (PBR)—which ties utility returns to measurable outcomes like system cost reduction, interconnection speed, and congestion relief—is a commonly proposed structural remedy, including at CGEP's roundtables, but data are still being assembled on its effectiveness at cost management. The UK's experience with PBR under Ofgem's RIIO framework represents the most developed implementation, with some evidence of cost discipline, though results have been mixed and the institutional context differs substantially from the United States.[14] Domestic experience with PBR is limited. New York's Reforming the Energy Vision (REV) initiative is the most prominent US effort, and its track record is still being assessed.

## Allocating Costs Fairly as Demand Patterns Shift

The arrival of data centers and other large, concentrated loads is testing cost allocation frameworks at every level of the system. Whether this new demand raises or lowers prices for existing customers depends not on the scale of the load itself but on how the costs of serving it are structured and distributed, according to the recent LBNL analysis and an earlier paper from the Electric Power Research Institute.[15]

At the federal level, FERC is addressing the transmission side of this question. The Commission's advance notice of proposed rulemaking on large load interconnection (RM26-4) proposes that large-load customers bear the full cost of network upgrades their projects trigger—shifting those costs to the interconnection customers who cause them rather than socializing them across all ratepayers. This approach would shield existing customers from bearing the infrastructure burden of new large loads, though it raises a legitimate design question: how to credit the original payer when upgrades they trigger deliver broader system benefits over time. FERC expects to act on this rulemaking by June 2026.

Separately, state commissions are grappling with large-load retail tariff design. Emerging approaches such as take-or-pay contract structures (which require a buyer to pay for a minimum amount of a product, regardless of actual usage), upfront financial commitments, exit fees, and load flexibility requirements, can in principle protect residential ratepayers while accommodating new large loads.

Early utility projections are encouraging. Indiana utility NIPSCO projects $7 to $9 per month in residential savings by 2032 under its Amazon data center agreements;[16] and Detroit-based DTE estimates a potential 8 percent reduction in residential costs under conditionally approved data center contracts.[17]

But LBNL notes that these are forward-looking projections, not realized outcomes, and that new tariff structures carry a real risk of insufficient cost protection. A 2025 Harvard Law School review of nearly 50 regulatory proceedings on data center rates questioned the ability to isolate data center energy costs from consumer bills and suggested that details of contract structures be transparent and rigorously evaluated.[18] Once established, state commissions will need to actively monitor these structures to verify whether projected savings materialize.

## Translating Price Signals into Deliverable Supply

A third area for structural reform is removing supply delivery bottlenecks. In PJM Interconnection, rapid data center growth is colliding with supply and transmission constraints, driving capacity auction prices to historic highs. According to LBNL, capacity payments alone are expected to add roughly 1.5 cents per kilowatt-hour (kWh) to PJM wholesale costs across 2025 and 2026. Nationally, LBNL estimates capacity payments added nearly 1 cent/kWh to average wholesale costs in 2025, with a further 0.6 cents expected in 2026.

While the capacity market is pricing scarcity correctly, the broader system cannot respond at the required speed. Interconnection and new-build transmission timelines that take years sever the link between price signals and supply entry. Higher capacity prices mostly end up paying existing generators more rather than inducing new construction, and those extra costs are passed on to consumers through their electricity bills over time.

Addressing this bottleneck requires reforms on two parallel fronts: improving the speed and discipline of interconnection processes, while reducing the time required to permit and build new infrastructure.

The interconnection queue—the process by which new generation and storage projects are studied and approved for grid connection—can be reformed through such efforts as readiness-based prioritization, standardized study processes, and enforceable timelines to reduce delays and bring viable projects online faster. Cluster-based interconnection studies—where projects in a geographic area are evaluated together and required system upgrade costs are shared across entrants rather than borne entirely by the first mover—are another structural reform option. Cluster studies and other queue prioritization reforms were incorporated in FERC Order 2023, though implementation has been slow and uneven. The rule is likely to improve queue efficiency over time but will not by itself resolve the gap between demand growth and the pace of deliverable supply.[19]

Texas has moved furthest in the direction of queue reform: ERCOT's SB6 framework passed in 2025 introduced approximately $50,000 per megawatt in non-refundable interconnection fees, financial security requirements, and a tiered queue process designed to prioritize projects with demonstrated readiness and screen out speculative entries that clog studies without ever reaching construction.

More broadly, permitting timelines for new transmission have not materially improved in decades: the average transmission project takes a decade to complete, new high-voltage line construction has fallen to roughly 20 percent of early-2010s levels, and the federal government's authority to site interstate corridors remains limited and contested.[20] Federal and state siting reforms—including streamlined environmental review, categorical exclusions for lower-impact projects, and clearer federal authority for interstate transmission corridors—can help more quickly translate price signals into actual supply additions.[21]

# Long-Term Need: Risk Management

Storm cost recovery is emerging as a meaningful retail price driver across multiple states, with LBNL documenting surcharges of 1–3 cents/kWh in places such as Florida in the 2024–2025 period, and multiyear securitization of storm costs. These are not low-probability events—they are recurring, compounding costs that have been and will be embedded in the rate base for decades.

In California, LBNL finds wildfire mitigation and related costs added about 4 cents/kWh from 2019–2024, making them one of the largest contributors to recent rate increases. However, ex-ante resilience investment is demonstrably cheaper than ex-post investment. For example, an analysis from the Energy Institute at UC Berkeley found that the cost of ignitions caused by vegetation striking powerlines would have been 4.5 times greater in 2022 and 2023 absent the California utility PG&E's proactive risk reduction efforts.[22]

Hardening transmission lines in high-risk corridors and accelerating undergrounding in fire-prone areas can reduce long-run costs to ratepayers by lowering the frequency and severity of damage and associated recovery costs, even if they increase near-term capital expenditure. Similarly, expanding interregional transmission to enable reserve-sharing requires upfront investment and coordination but can reduce system costs over time by improving resource utilization and avoiding duplicative capacity buildout.[23]

Another structural liability affects some Western states: utilities bear wildfire liability even absent negligence, creating a material disincentive to build the transmission infrastructure. Federal reinsurance mechanisms or carefully designed liability caps (limited to cases without negligence and conditioned on demonstrated hardening standards) merit serious consideration—not as regulatory relief for utilities but as a risk-allocation reform that avoids the current dynamic in which ratepayers absorb multidecade recovery costs without any coordination or pooling of risk across jurisdictions.

Cybersecurity presents an additional and growing dimension of system risk and will require ongoing diligence. As the number of interconnected devices ("the internet of energy things")—advanced sensors, distributed energy resources, cloud-based control architectures, and real-time communications networks—expands, vulnerabilities grow exponentially. Ensuring the resilience of these increasingly networked systems will require sustained investment in cybersecurity provisions and ongoing regulatory attention, pafrticularly as grid modernization accelerates the pace of digital integration.

# Conclusion

The central lesson from the LBNL analysis and broader evidence is that electricity price outcomes are not driven by demand growth alone but by how the system responds to it. Prices rise when new demand triggers high-cost infrastructure buildout, reflects inefficient planning, or shifts costs unevenly across customers. They can fall, or grow more slowly, when low-cost supply is available, existing infrastructure is more fully utilized, and cost allocation ensures that new demand contributes to system efficiency.

This framing points to a clear set of policy priorities across time horizons. In the near term, the most immediate opportunity is to optimize the existing system—deploying grid-enhancing technologies, demand response, and large-load flexibility to unlock latent capacity and defer costly new investment. In the medium term, structural reforms are needed: improving tariff design and cost allocation, and enabling new supply to be built and connected at lower cost via reforms to interconnection queues, transmission siting, and permitting for energy projects. Over the longer term, risk management becomes central, as costs related to storm damage, wildfire mitigation, and cybersecurity increasingly shape the trajectory of retail prices.

The most adverse price outcomes are not inevitable. They are the result of policy and regulatory choices. Delivering affordable electricity depends on aligning supply, infrastructure, and cost allocation so that rising demand can drive higher utilization and lower costs—taking advantage of load growth as an opportunity, rather than a liability.

# Notes

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Mr. Sandalow writes and speaks widely on energy and climate policy. In addition to the publications mentioned above, his writings include Data Centers and Their Energy Use: Trends in State Capitals, CGEP (December 15, 2025) (lead author); Can AI Transform the Power Sector?, CGEP (December 4, 2024) (lead author); Using AI to Craft Better Climate Policy, Wall Street Journal (July 20, 2023); Greenhouse Gas Emissions from the Food System: Building the Evidence Base, Environmental Research Letters (June 2021) (co-author); Finding and Fixing Food System Emissions: The Double Helix of Science and Policy, Environmental Research Letters (June 2021) (co-author); Food and Climate InfoGuide, CGEP (May 2021) (lead author); Energizing America, CGEP (September 2020) (co-author); Leveraging State Funds for Clean Energy, CGEP (September 2020) (with Richard Kauffman); Green Stimulus Proposals in China and the United States, CGEP (August 2020) (with Xu Qinhua); China's Response to Climate Change: A Study in Contrasts, Asia Society Policy Institute (July 2020); China and the Oil Price War, CGEP (March 2020) (co-author); Decarbonizing Space Heating With Air Source Heat Pumps (December 2019, co-author); Electric Vehicle Charging in China and the United States (February 2019) (with Anders Hove); A Natural Gas Giant Awakens

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