Electric Rates and Affordability

OBSERVATIONS ON THE LBNL/BRATTLE STUDY AND FUTURE TRENDS

PRESENTED BY

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PRESENTED TO

GRIDCONNEXT
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Brattle

Agenda

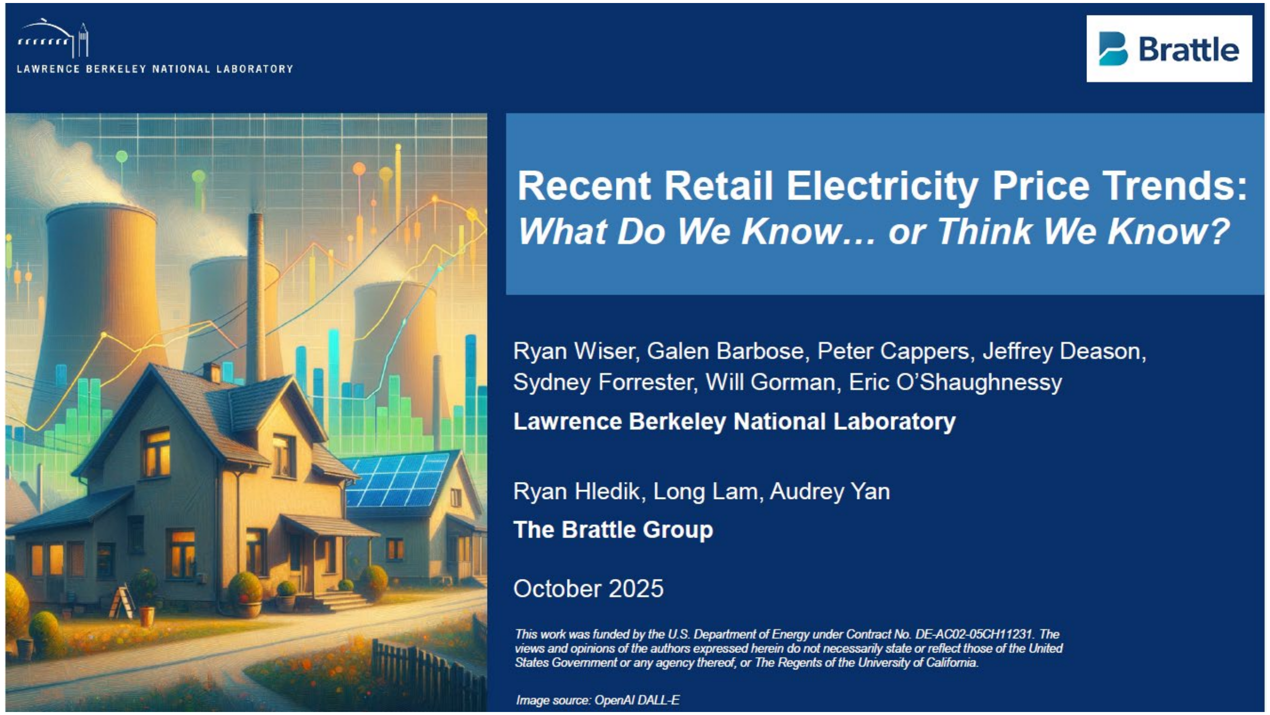
1. Recap **“Recent Retail Electricity Price Trends: What Do We Know… or Think We Know?”** a new study from Lawrence Berkeley National Labs (LBNL) and Hledik/Lam/Yan (Brattle)

2. Pivot to Forward-Looking View of Electric Price Drivers

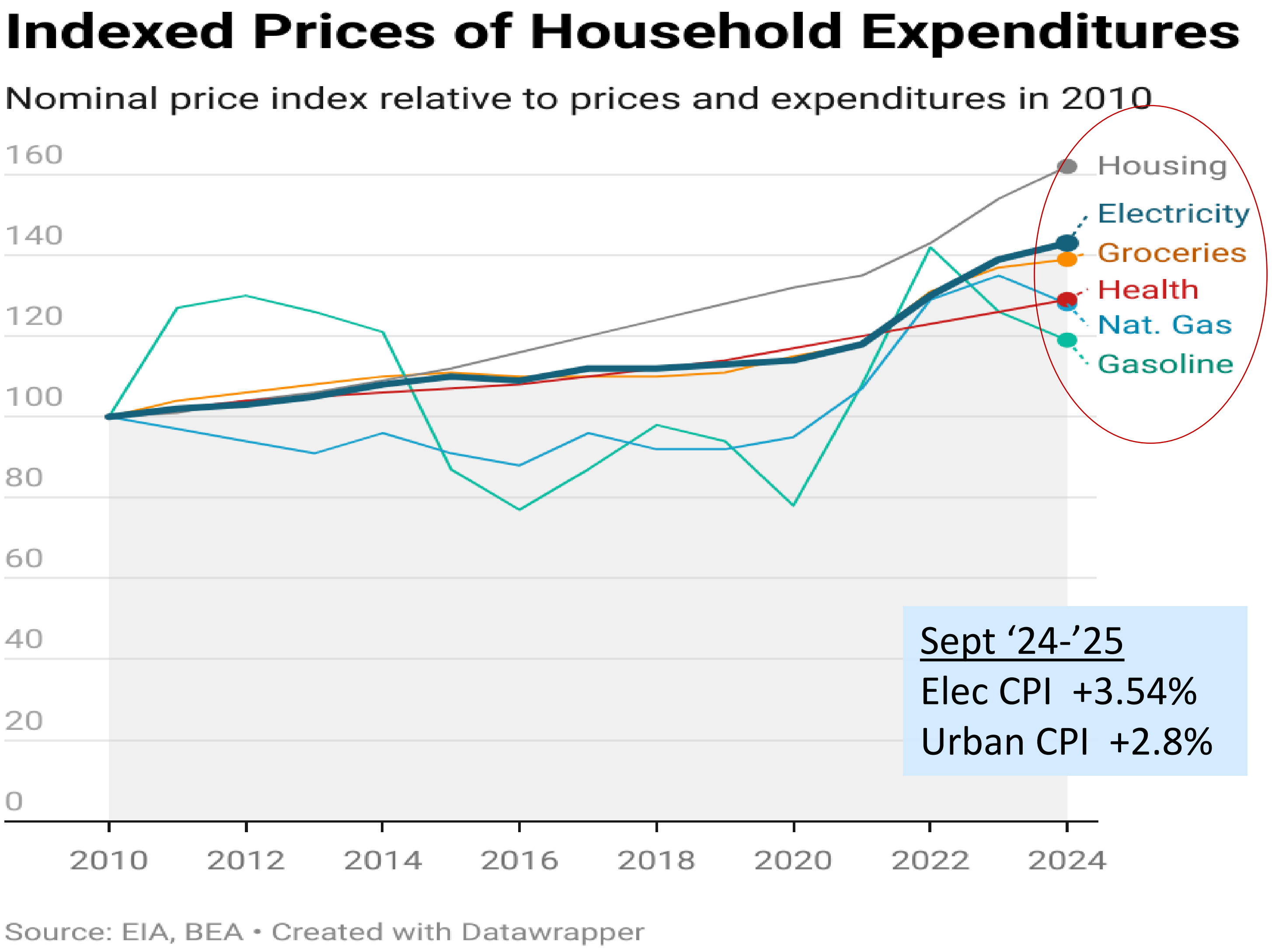
3. Touch on Strategies and Policies That Might Help— many unsurprising yet unsolved or underused

LBNL/Brattle Study of Retail Electric Price Changes

- One of the best analyses of electric rate drivers ever done—careful, balanced.
- Backwards-looking, not a prediction!
- Not all factors can be measured via their framework:
  - Some factors are difficult to quantify due to lack of standard metrics or lack of variation in space/time.
  - Example: suboptimal transmission and distribution planning processes. How much lower might rates have been with a larger, better-planned grid?



National Average Prices in Line with Other High-Inflation Sectors

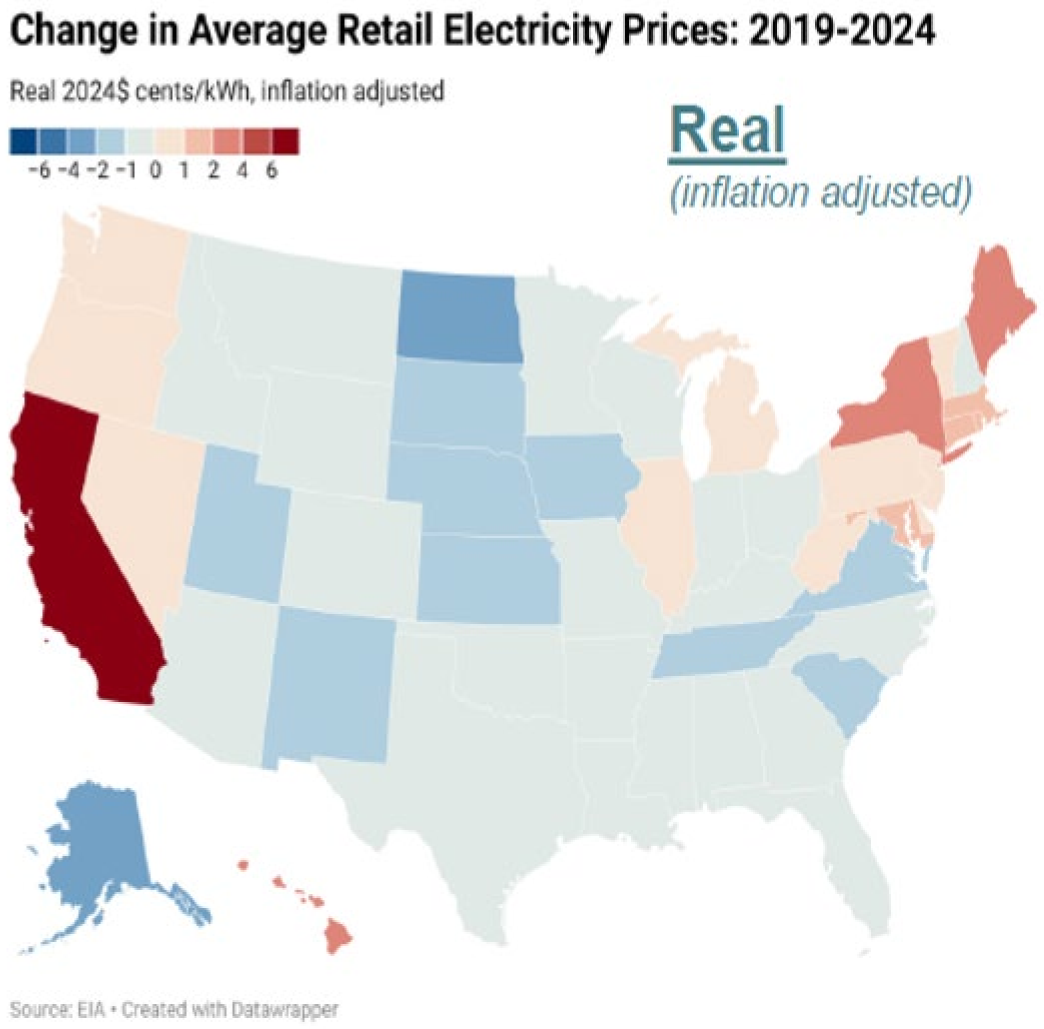


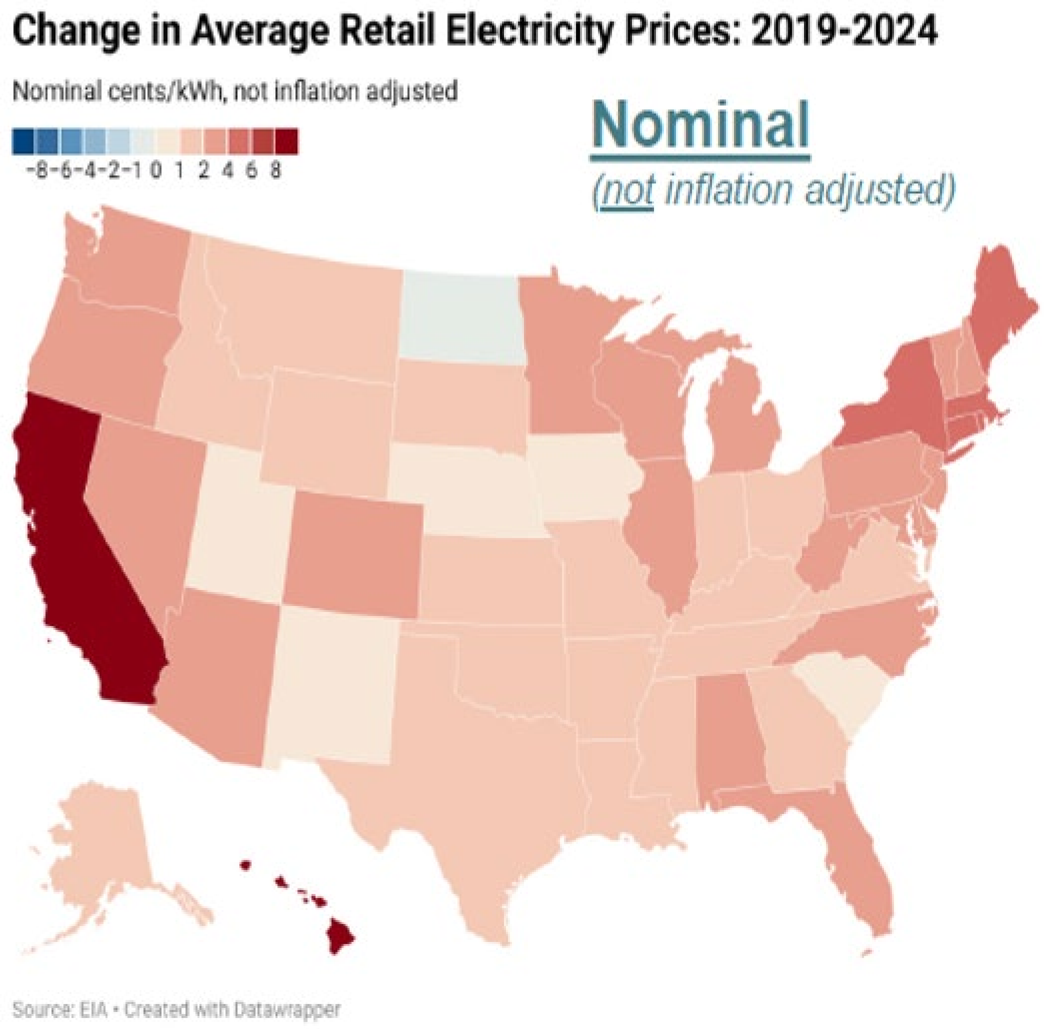
It is not very reassuring to tell consumers that average rate increases since 2010 have "only kept up with inflation" by rising 40% nominal in 10 years.

Similarly, telling consumers that electricity rates have risen "only a little more than groceries, and aren't as bad as housing" isn't too helpful either.

[Brattle Contributes to Berkeley Lab Report Assessing Recent Trends in Electricity Prices Across the US – Brattle](#).

Most Nominal Prices are up, but Regional Disparities are Huge





Brattle Contributes to Berkeley Lab Report Assessing Recent Trends in Electricity Prices Across the US – Brattle.

How are Customers Reacting to these Rate Increases?

Household Concerns About Energy Affordability

A look at the financial strain and hardship faced by some U.S. households due to energy costs.

In the Last 12 Months. . .

34%
of households reduced or forwent basic necessities like food or medicine to pay an energy bill.

22%
kept their home at a temperature that felt unsafe or unhealthy.

24%
were unable to pay an energy bill in full.

In 2024. . .

13%
of households were behind on their electricity bills.

2.7 million
households had their utility service shut-off due to non-payment.

Looking Ahead to 2025. . .

73%
of households are very or somewhat concerned that electric and/or gas bills will increase this year.

Sources: US Census Bureau: Household Pulse Survey (2024); Powerlines (2025).

Personal Observations:

Unlike the 1980s, electric rate concerns are part of a larger affordability crisis.

The electric industry can and should moderate rate increases as much as possible, but that cannot solve the problem alone.

Summary of LBNL/Brattle Conclusions: 2019-24

Key Drivers of State-Level Retail Electricity Price Changes from 2019 to 2024

(beyond economy-wide inflation)

Price Driver	Maximum Size	Geographic Breadth
Natural gas price variability	larger	Large
Extreme weather & wildfires - recovery and mitigation	larger	Medium
Replacement & hardening of aging distribution (and transmission)	medium	Large
Customer load growth	medium	Medium
Utility-scale wind & solar (market based)	medium	Medium
State Renewable Portfolio Standard policies	medium	Medium
Net energy metered solar	larger	Small

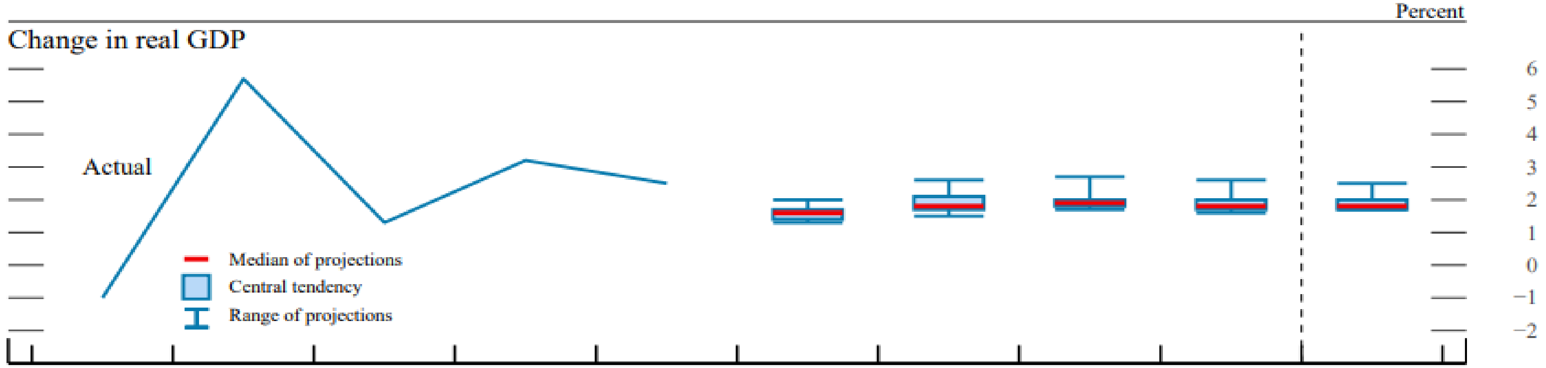
See source for important notes.
Source: LBNL/The Brattle Group, "Recent Retail Electricity Price Trends: What Do We Know… or Think We Know?," October 2025, p. 22.

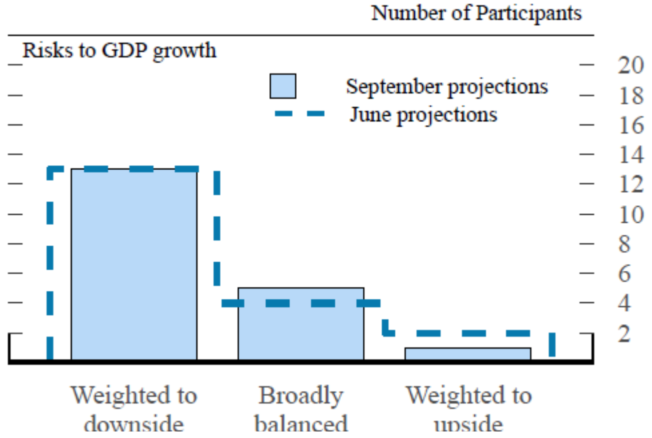
Electric Rate Drivers—
A Forward View

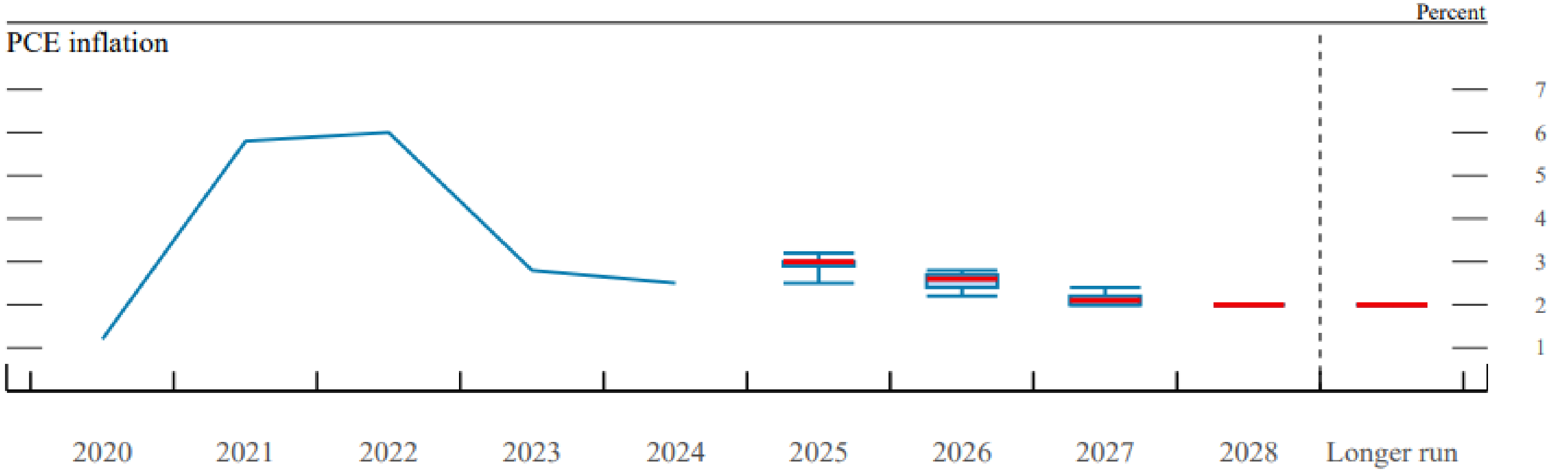
Forward-Looking Drivers to Watch

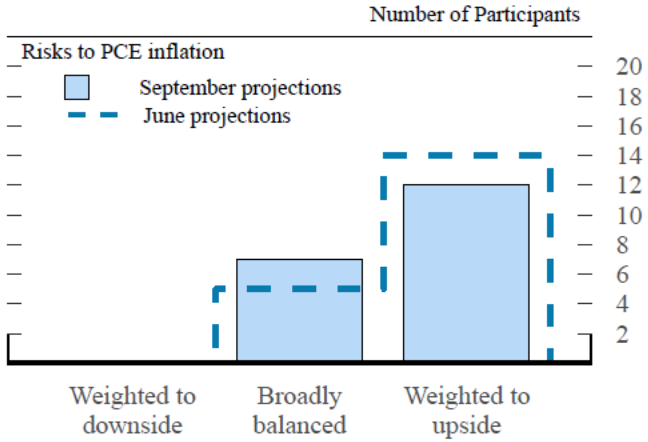
- Distribution Capex & Opex
- Generation & Transmission Policies
- Generation & Transmission Capex
- Gas Prices
- Sales Growth

Macroeconomic Outlook Precarious… Beware the Risks







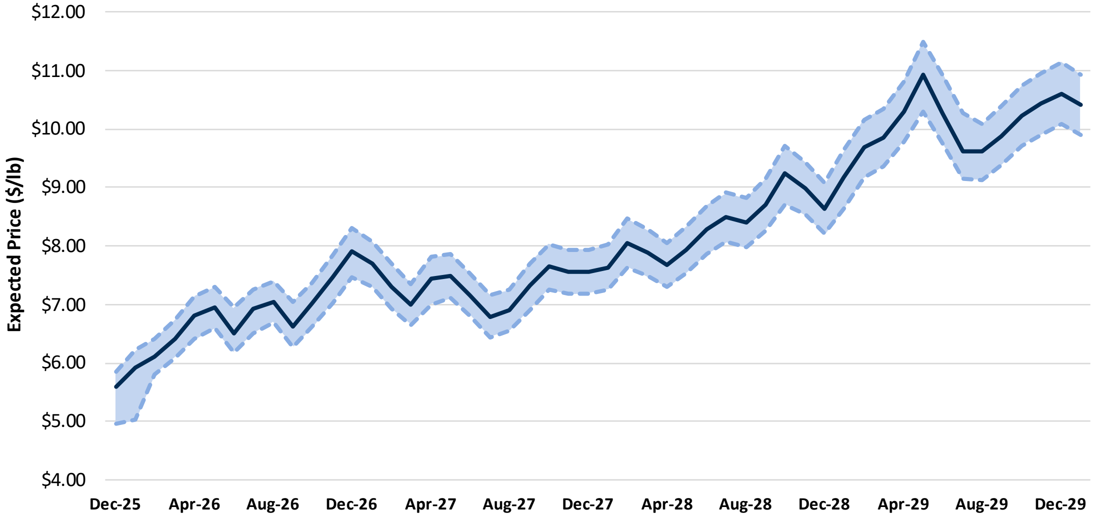


Source: Federal Reserve Board, Summary of Economic Projections, September 17, 2025.

Supply Chains are a Large Risk to Costs

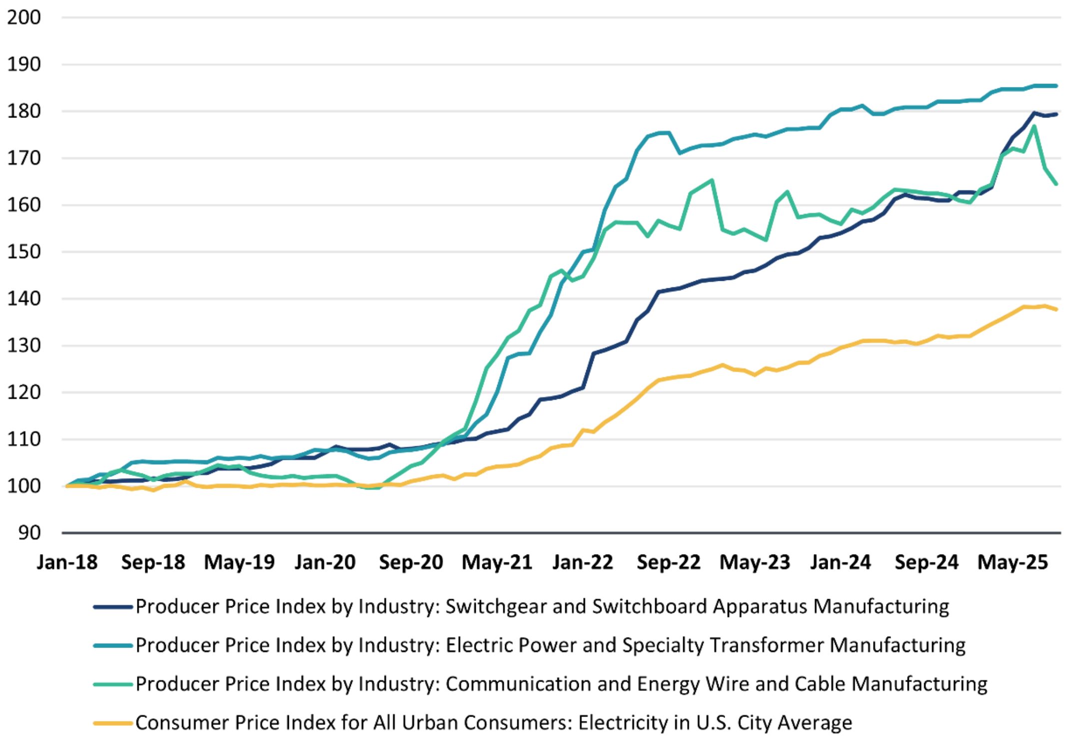
- Raw copper prices + 40% since ’21 & projected to increase.
- Other PPIs for supply chain steadily upward.
- Finished power transformers cost an average of 60–80% more – after as much as a four-year wait.
- Wholesale power costs will increase 19% in the next three years (ICF model).

Copper Price Forecast as of December 2025



Source: Long Forecast, Copper Price Today, accessed December 3, 2025.

Producer Price Index for Critical Power System Equipment

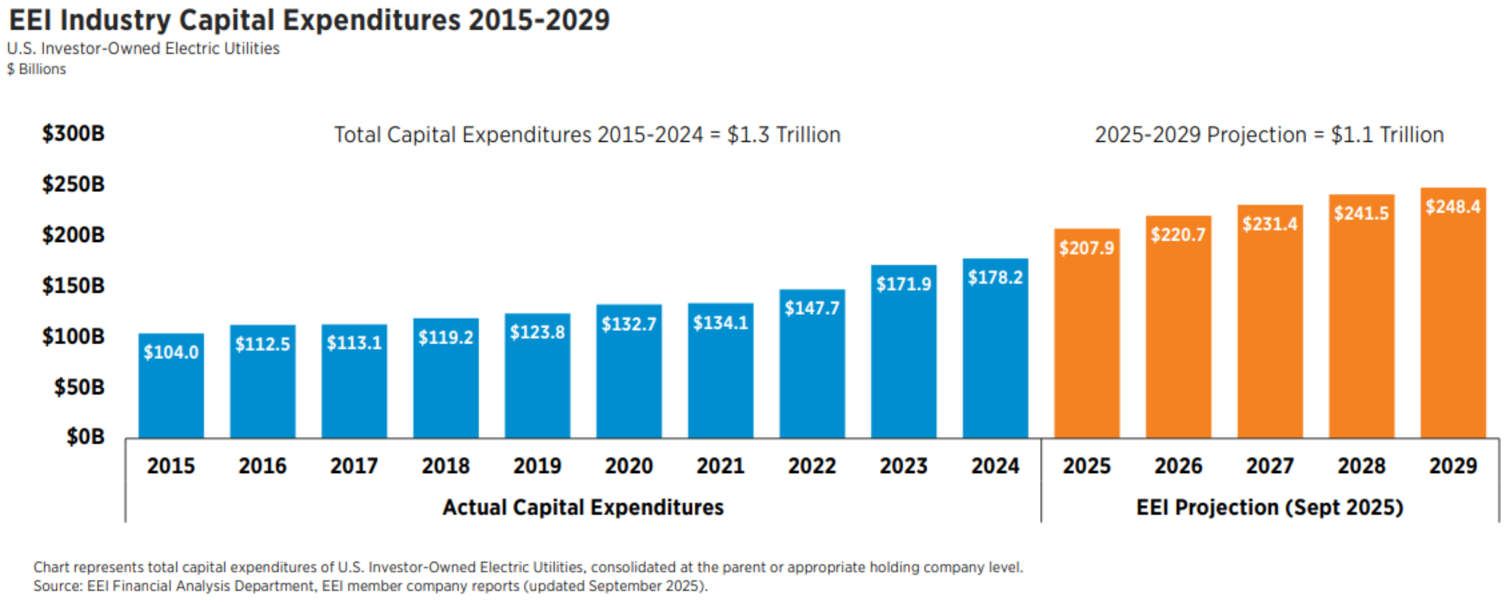


Source: US Bureau of Labor Statistics via FRED, Federal Reserve Economic Data, Federal Reserve Bank of St. Louis.

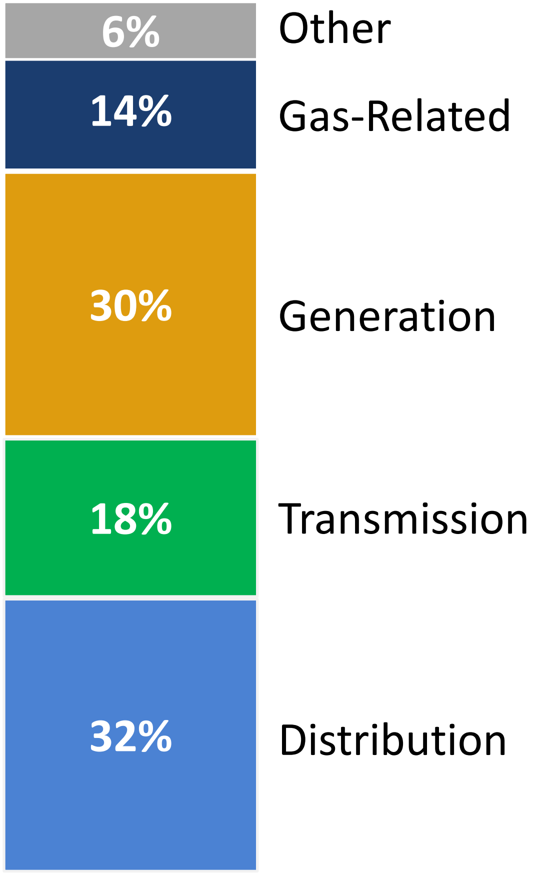
Notes: Data index Jan 2018 = 100. PPI values shown are not seasonally adjusted. CPI is seasonally adjusted.

Capex Spend—Exposed to Supply Chain—is Way Up

- IOU capex doubled 2014-2025.
- Forecasted IOU capex +6.8%/yr 2024–29—$1.1 Tn total.
- Since 2020 G, T, and D have all grown ~equally.
- Distribution remains the highest category; generation outlays have been rising.

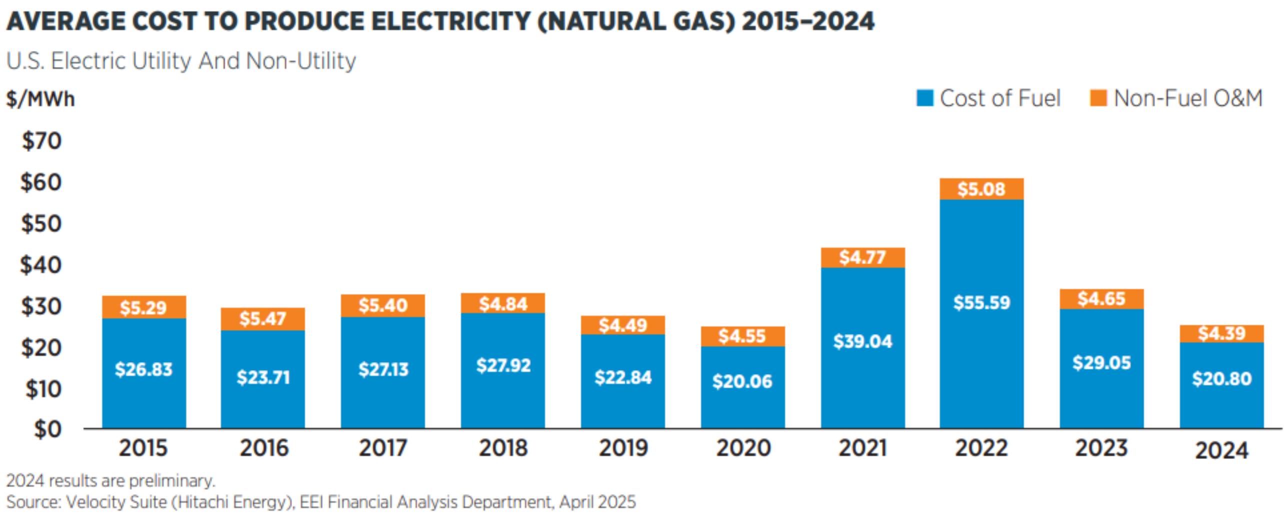


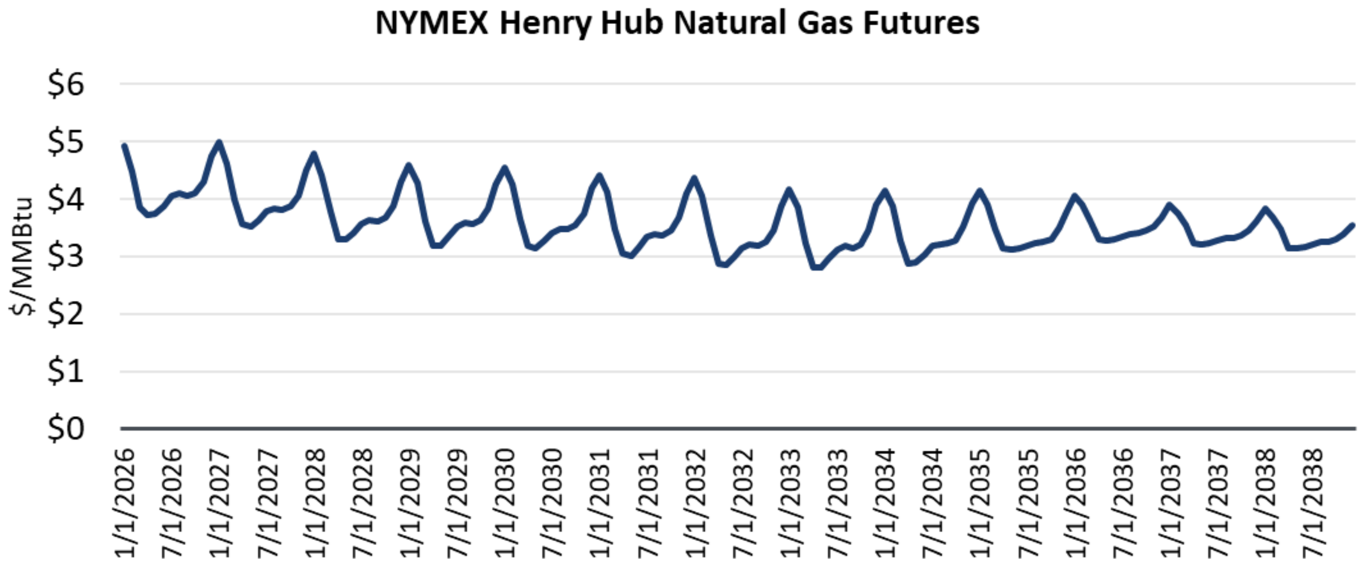
2025 Capex Breakdown



Source: EEI Financial Release Sept 2025 PowerPoint Presentation.

Low Natural Gas Prices after 2022 Are Helping—So Far





Source: S&P Capital IQ with forward strip as of 12/1/2025.

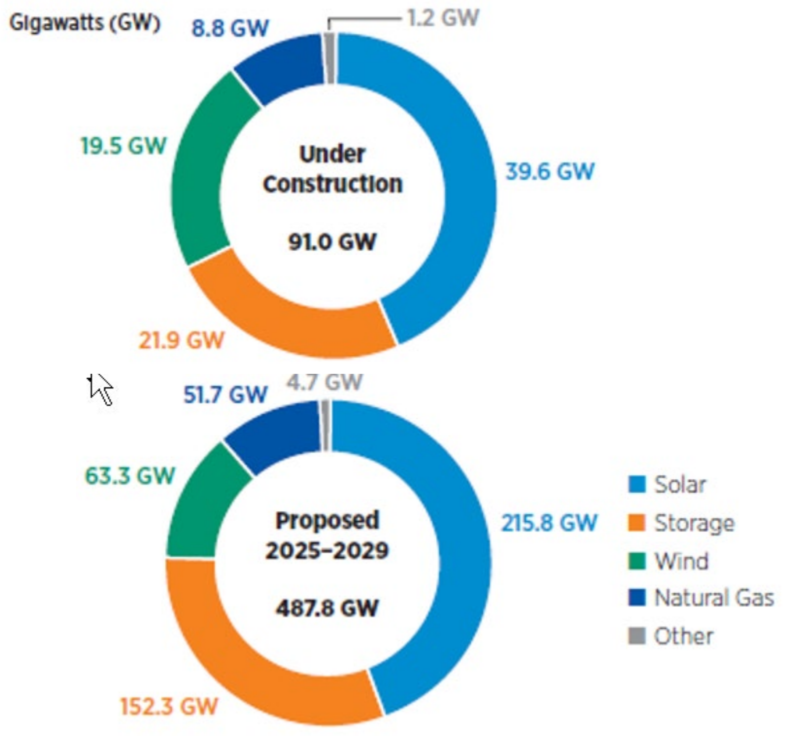
After a major Ukraine war bump, natural gas prices for utilities dropped in 2023-2024, but bumped up again in 2025.

Gas prices are especially important where gas LMPs set spot prices in many hours.

Some analysts projecting return to $4/MMBtu gas in next two years; others predicting $5.

Generation Costs Are a Mixed Picture

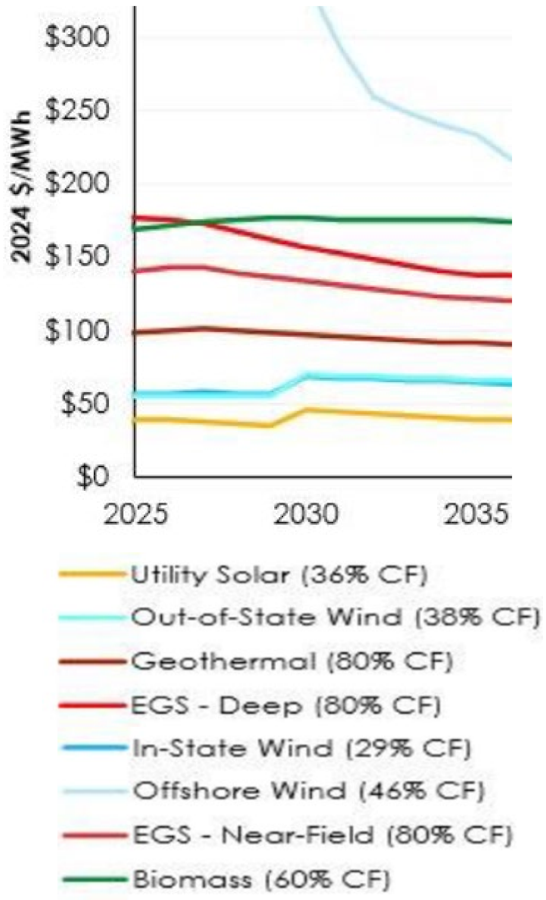
CAPACITY ADDITIONS 2025–2029



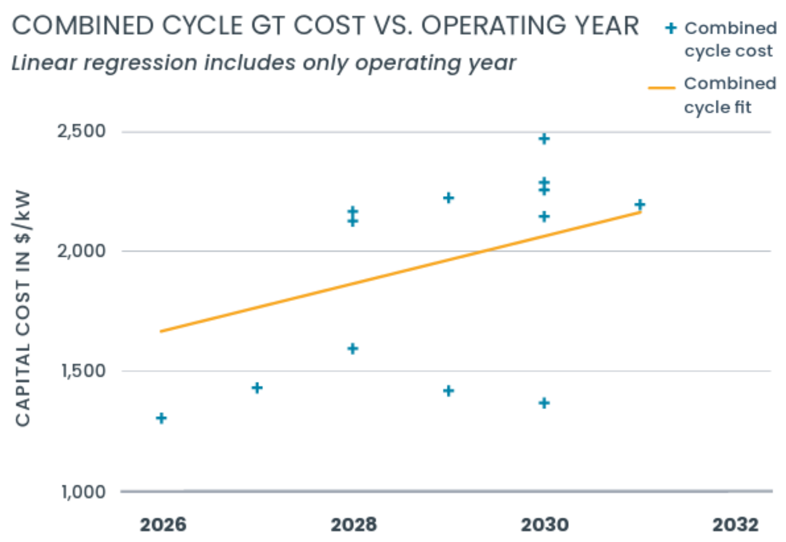
Under Construction status also includes Site Prep and Testing, Proposed status also includes Feasibility, Application Pending, and Permitted. Data includes new plants and expansions of existing plants, including nuclear uprates. Includes projects with an expected online date up to 2029.

Source: Velocity Suite (Hitachi Energy), April 2025.

CA LEVELIZED COSTS



GridLab CCGT Capital Cost ($/kW)



Takeaway:
Do not limit generation choices, especially wind and solar.

Source: EEI Financial Review 2024, CPUC R.25-06-019 ALJ Ruling 9.30.25, ruling_26-27_tpp_results.pdf. GridLab, Energy Futures Group and Halcyon (September 2025), The New Reality of Power Generation - An Analysis of Increasing Gas Turbine Costs in the U.S.

Generation and Transmission Policies

- Holistically improve transmission planning/ permitting:
  - Better integrate local, regional, and interregional planning.
  - Plan additions by studying all measurable benefits, use scenario planning and "least regrets" approach.
  - Consider GETs and Remedial Action Schemes first, then reconductoring/HVDC conversions, and then all new line options.
- Reform interconnection process to "first ready/first connect," "connect and manage," or other accelerations (see appendix).
- Reform RTO governance and markets.

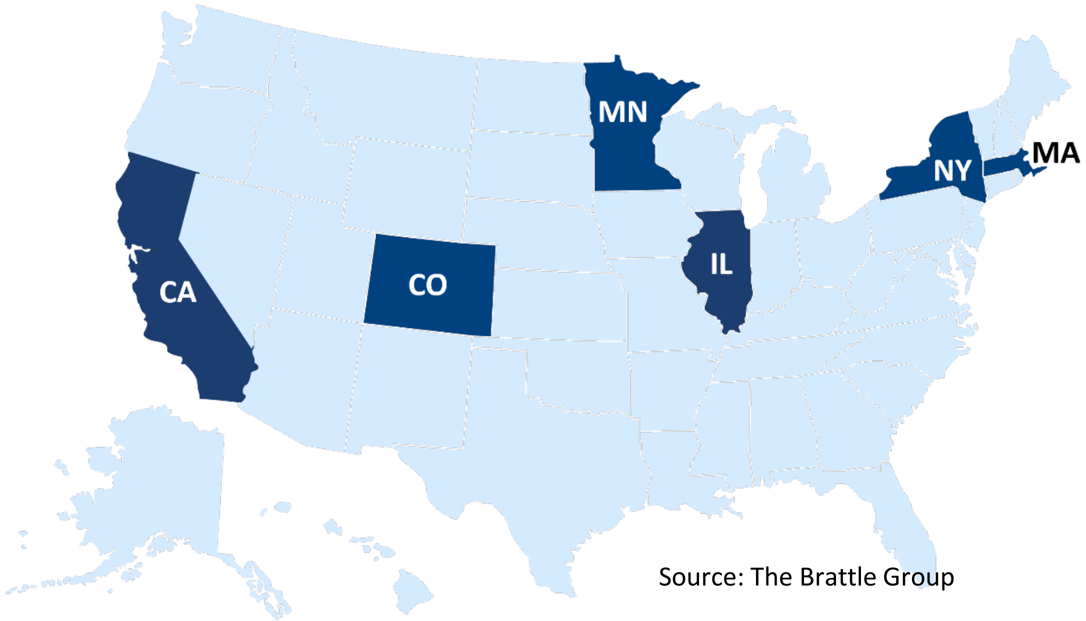
Takeaway:
"A crisis is a terrible thing to waste". Possibly this crisis will spur constructive and collaborative federal and state action.

Source: See Brattle, Order 1920 Compliance: An Opportunity to Improve Transmission Planning beyond Mandates, October 22, 2024.

Distribution Capex and Opex

- DERs, flexible load, and grid-edge tech continue to improve and get cheaper.
- Integrating them into distribution systems where they reduce costs has never been more important.
- The process of distribution system planning and regulatory oversight needs a major overhaul—happening slowly but should be wider and faster.

States with Proactive Distribution Grid Planning Initiatives



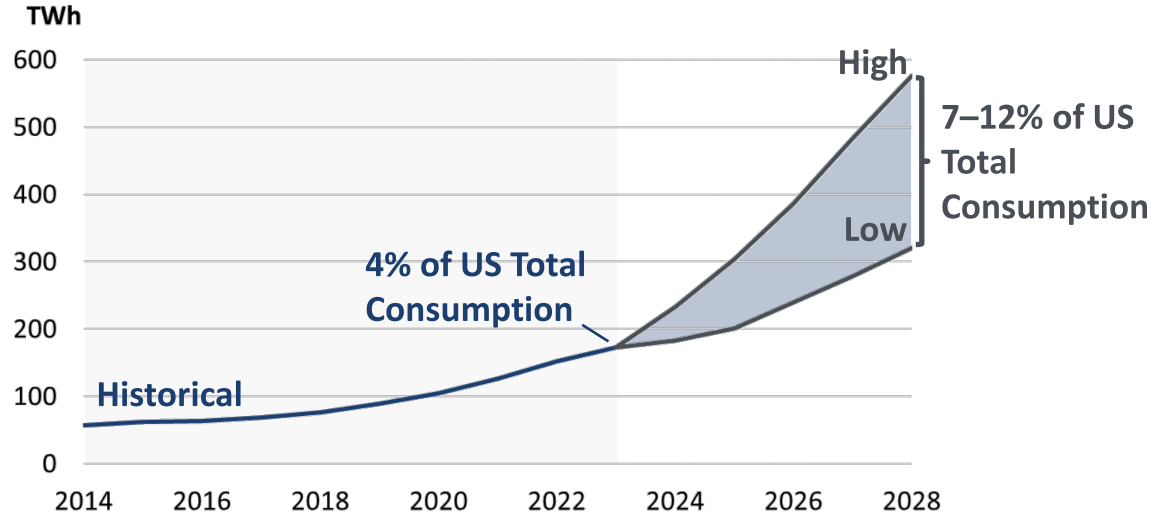
Source: The Brattle Group

Takeaway:
This is important but difficult. Utilities and regulators should lean in. If not now, when?

The $1 Tn Question: Will Sales Growth Offset Cost Increases?

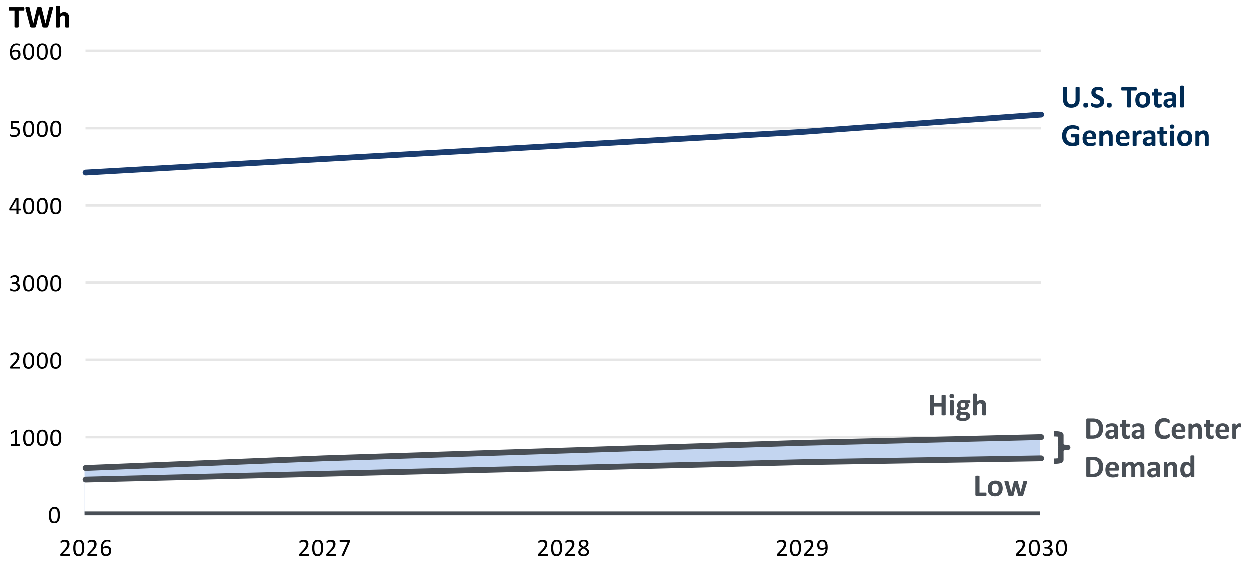
Data center demand expected to rise to as much as 20% of total US use by 2035. Other demand generally rising 1.5% to 3% per year.

LBNL Forecast Data Center Energy Consumption



Source: LBNL, 2024 United States Data Center Energy Usage Report, 2024.
Additional sources: Google's emissions up 51% as AI electricity demand derails efforts to go green, Google, The Guardian. Washington Examiner Daily, Callie Patteson and Maydeen Merino, 7/17/25. Data center carbon, Global data center industry to emit 2.5 billion tons of CO2 through 2030, Morgan Stanley says | Reuters.

Projected US Data Center Demand vs. Forecast Generation



Source: S&P Global Commodity Insights, 2026 US Data Centers and Energy Report, published October 28, 2025.

Will Sales Growth Offset Cost Increases?

The effect of sales growth on rates is highly situation-specific and can be positive/ negative/neutral depending on factors such as:

- Headroom and need for G/T/D expansion
- Global supply chain and local build costs
- Exposure to capacity markets

Obviously, fair cost allocation is extremely important.

Sales below forecasts—unlikely absent a shock—are a significant risk to lower prices.

Summing Up…

Nominal average electric rates will continue to rise, but not much more than inflation if we are lucky. Luck is part of it, because many cost drivers and affordability issues are outside industry control. Regional disparities will vary the intensity of the issue.

Constructive federal and state policies on generation and transmission could help alleviate rate pressures and have many other national benefits (see appendix for longer list).

The effects of sales growth on rates depends on many factors. More sales often reduce rates, but proper polices are needed.

Unlocking efficiencies and lower bills through DERs, load flex, GETs, and grid edge tech has enormous potential, but also real implementation challenges. Realistic updates to distribution planning and operations should be a priority.

It’s hard to think of a more important and rewarding set of challenges to work on together.

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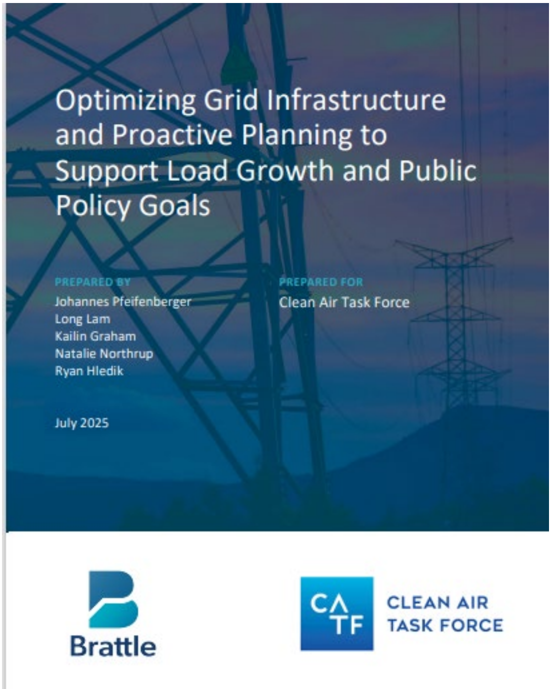
Specializing in the markets, policies, regulation, and transformation of the electricity industry, Fox-Penner advises US energy companies, grid operators, and government agencies. He has testified on energy-related matters in more than 100 proceedings before federal and state courts, the Federal Energy Regulatory Commission, arbitrations, and public service commissions. He has served as a regulatory and strategic advisor to boards and executives and is the author of numerous books and articles.

Acknowledgements: Thanks to Ryan Wiser and Ryan Hledik, Shannon Paulson, Prisha Tiwari, Jack Kalinski, Xander Bartone, Hannes Pfeifenberger, Laura Burns, and Brattle DPS.

Appendix

Suggested Federal and State Policies from Brattle/CATF Report



For additional perspective, see [Affordability, Rates and Clean Capital Efficiency](#) by Fox-Penner et al, 2025.

TABLE ES-1: STAKEHOLDER ACTION MATRIX

Solutions		Regulators	Utilities	Grid planners / operators	Governors and Legislators	Others
Maximize the Value of the Existing Power System *(Section III)*	*A. Enable distributed and demand-side resources*	✓	✓	✓		Third-party DER aggregators
	B. Enhance rate options	✓	✓		✓	
	C. Utilize GETs, ATTs, and RASs	✓	✓	✓	✓	
	D. Capitalize on transmission upsizing opportunities	✓	✓	✓		
	E. Facilitate interregional trade			✓	✓	
Cost-Effectively Accelerate the Grid Connection of New Loads *(Section IV)*	*A. Enable customer-sponsored generation*	✓	✓	✓	✓	
	B. Co-locate new generation and load	✓	✓	✓	✓	Energy park developers
	C. Streamline generator interconnection processes	✓	✓	✓		Transmission owners
Implement Proactive Planning and Procurement Processes to Accelerate the Necessary Investments *(Section V)*	*A. Proactively plan generation and transmission*	✓	✓	✓	✓	Power procurement authorities; State energy offices
	B. Reform generator procurement processes	✓	✓	✓	✓	Power procurement authorities; State energy offices
	C. Proactively plan distribution systems	✓	✓			
	D. Improve load interconnection processes	✓	✓		✓	State energy offices
Introduce Targeted Affordability Measures *(Section VI)*	*A. Offer energy efficiency and bill assistance*	✓	✓		✓	State energy offices
	B. Implement specialized rates for new large loads	✓	✓		✓	
	C. Explore alternative financing	✓	✓		✓	Private developers

Source: The Brattle Group's [CATF report.](#)

Recent Selected Reading from Brattle

- A Decade of Beneficial Electrification: Progress and the Path Ahead, November 2025.
- Recent Retail Electricity Price Trends: What Do We Know… or Think We Know?, October 2025.
- The Demand Side Grid Support Program: An Assessment of Scale and Value, August 2025.
- Optimizing Grid Infrastructure and Proactive Planning to Support Load Growth and Public Policy Goals, July 2025.
- The Challenges and Opportunities of On-site Resources in Accelerating Data Center Interconnection and Reliability, June 2025.
- Affordability, Rates, and Clean Capital Efficiency: A Path for the Power Industry's Turbulent Next Decade, May 2025.
- Are Resource Adequacy Markets Adequate?, May 2025.
- Unlocking Load Flexibility with Rates, May 2025.
- Accelerating Integration of New Co-located Generation and Loads, April 2025.
- Incorporating GETs and HPCs into Transmission Planning Under FERC Order 1920, April 2025.
- Brattle Consultants Examine the Challenges & Opportunities Associated with Meeting Load Growth Surge, April 2025.
- A Wide Array of Resources is Needed to Meet Growing US Energy Demand, February 2025.
- Electricity Demand Growth and Forecasting in a Time of Change, November 2024.
- The Impact of Data Centers on the Grid, November 2024.
- Resource Adequacy Trends of the Energy Transition: Experience from North America, October 2024.
- Unlocking America's Energy: How to Efficiently Connect New Generation to the Grid, August 2024.
- How Resources Can Be Added More Quickly and Effectively to PJM's Grid, OPSI Annual Meeting, October 2023.
- The Benefit and Urgency of Planned Offshore Transmission, January 2023.
- Planning for Generation Interconnection, May 2022.