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Factors Impacting Retail Electricity Prices in the United States

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Image source: OpenAI DALL-E

Objectives and Scope of Study

Context: Retail electricity prices have recently increased nationally in concert with economy-wide inflation, but with significant differences among states

Study Scope

Summarize recent retail electricity price trends

- Focuses on national- and state-level price trends, rather than utility- or sector-specific trends
- Data sometimes presented in nominal terms and in other cases in real (inflation-adjusted) terms

Assess drivers of recent price changes

- Explores some of the most-likely drivers of state-level price changes from 2019 to 2024
- Focuses on general trends more-so than state-specific results; effect of drivers vary by state

Study Limitations

- Is not definitive: analyzes subset of drivers from available data, **emphasizes need for continued research**
- **Does not analyze drivers in each individual state**; analysis focuses on broader trends
- Scope **is centered on retail prices**; studying bills, and costs and benefits derived from price increases, are also important but not covered
- **Does not predict future** price trends or assess possible future price drivers
- Focuses on understanding the nature and scope of price changes, **not measures to ameliorate any increases**

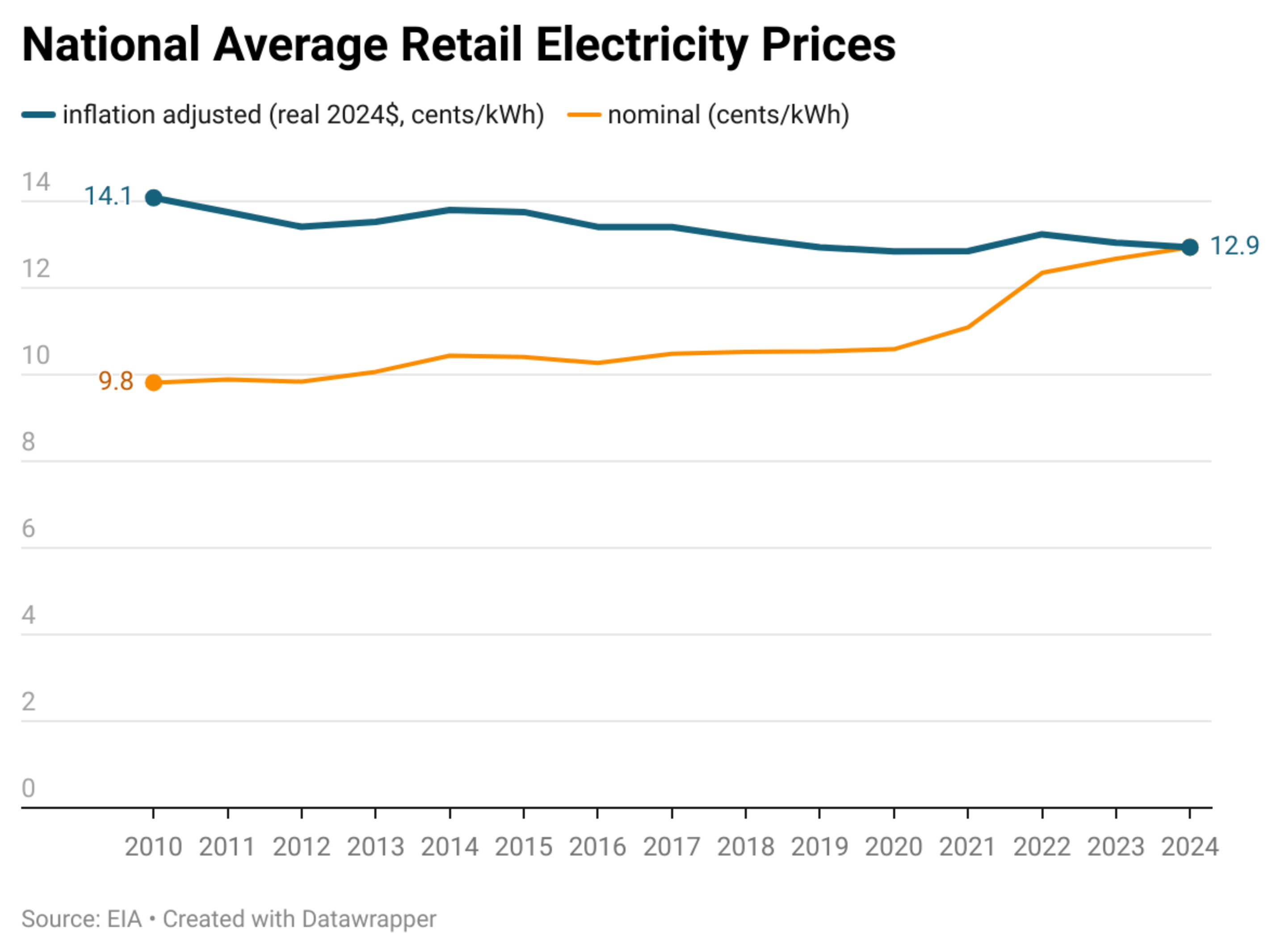
Findings underscore the **diverse set of retail price determinants** and highlight the need for continued efforts to inform policy and ensure affordability

Trends – *Level-setting on historical data*

While national-average nominal retail electricity prices have increased in recent years, the increases have largely tracked inflation

- In nominal terms (not inflation-adjusted), national-average prices increased **23%** from 2019 to 2024, **32%** since 2010
- Adjusting for inflation, real prices in 2024 were the **same** as 2019, **8%** lower than 2010
- **Key takeaway**: Retail prices at a national level have largely tracked economy-wide inflation in recent years

Represents the "all-in" price, equivalent to total customer bills (including volumetric, demand, and fixed charges) divided by total retail electricity sales, and covers all costs associated with the provision of retail service (generation + transmission + distribution)

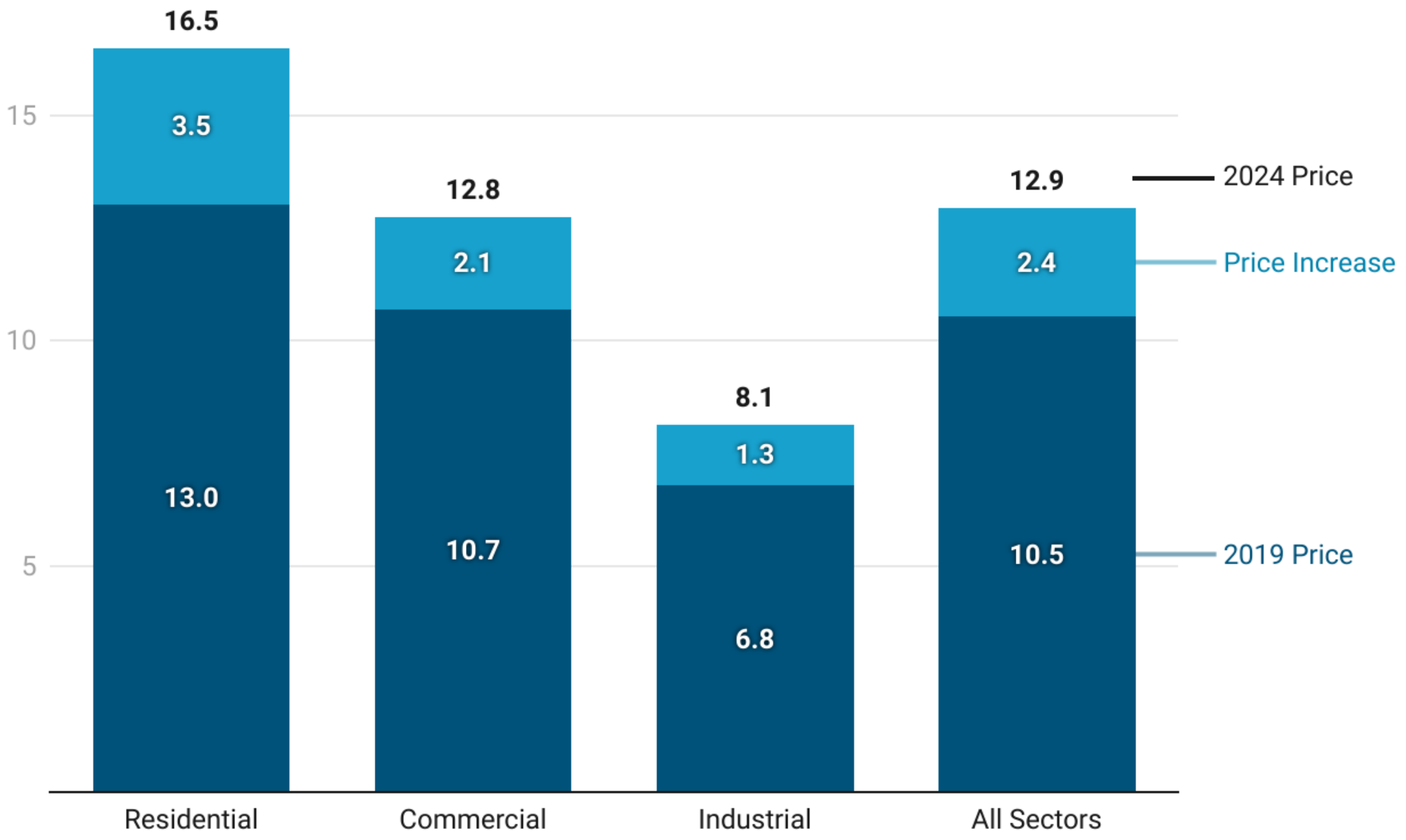


Residential customers have faced larger recent retail electricity price increases than have commercial and industrial customers

- Residential prices are higher and have risen faster than C&I prices
- From 2019 to 2024 (nominal$):
  - Residential up: 3.5 ¢/kWh – 27%
  - Commercial up: 2.1 ¢/kWh – 19%
  - Industrial up: 1.3 ¢/kWh – 19%
- Continued longer-term trend of increasing gap between residential and C&I prices
- Divergence could be due to:
  - Cost to serve smaller customers is higher than larger customers
  - Desire to support econ. development that comes from C&I demand…
  - …which is related to strength of advocacy from large C&I customers

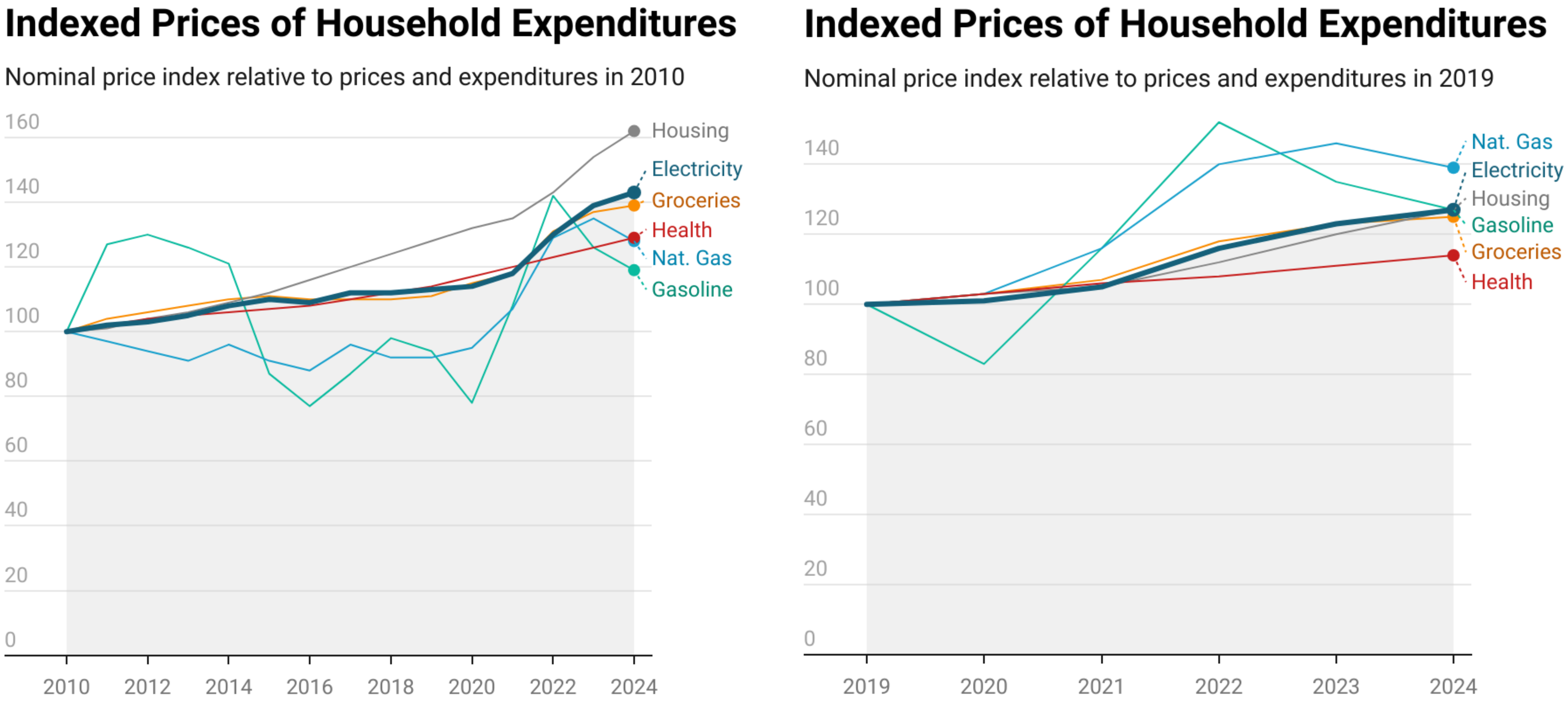
Average Nationwide Retail Price by Sector: 2019 and 2024

Nominal cents/kWh (not inflation adjusted)



Source: EIA • Created with Datawrapper

Residential price increases have been significant, but inline with many other household expenditures

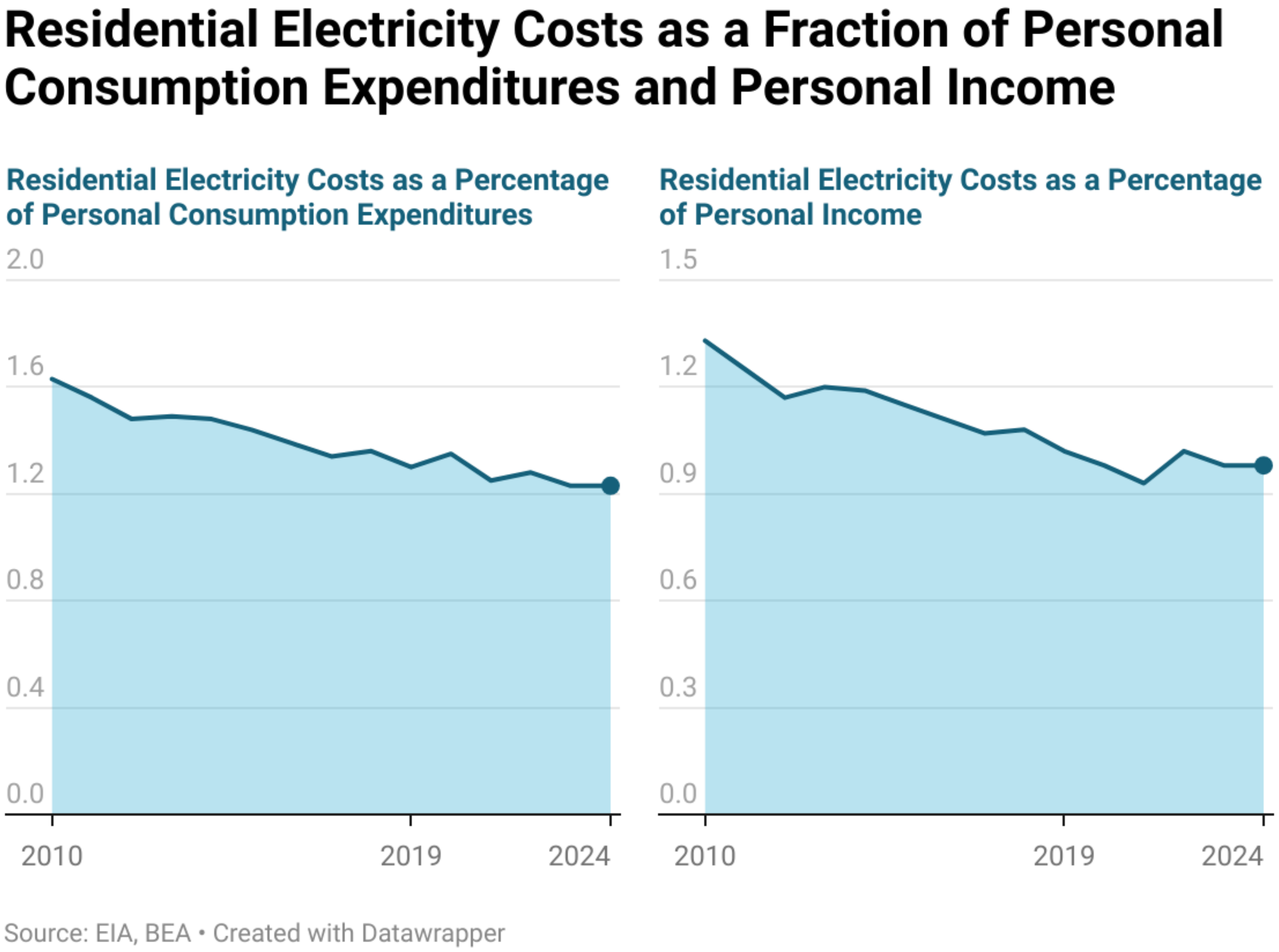


Figures show indexed residential electric prices vs. other household expenditures [not inflation adjusted]: since 2010 (*left, longer term*) and 2019 (*right, shorter term*)

National residential electricity costs as a fraction of personal expenditure *(left)* and income *(right)* have been trending down

- Residential electricity costs as a fraction of personal expenditure has generally declined, to 1.23% in 2024

- Residential electricity costs as a fraction of income (0.98% in 2024) was also at or near all-time lows since data became available in 1970



Regardless of overall trends at the national level, energy expenditures are a major hardship for some households

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: U.S. Census Bureau: Household Pulse Survey (2024); NEADA (2024); Powerlines (2025).

Some metrics have improved over time; others have gotten worse

(though it depends on the timeframe selected)

Improved since 2019[1]

- 17.4 M households were behind on their energy bills in 2024, down from 20 million in 2019

Worse since 2021[2]

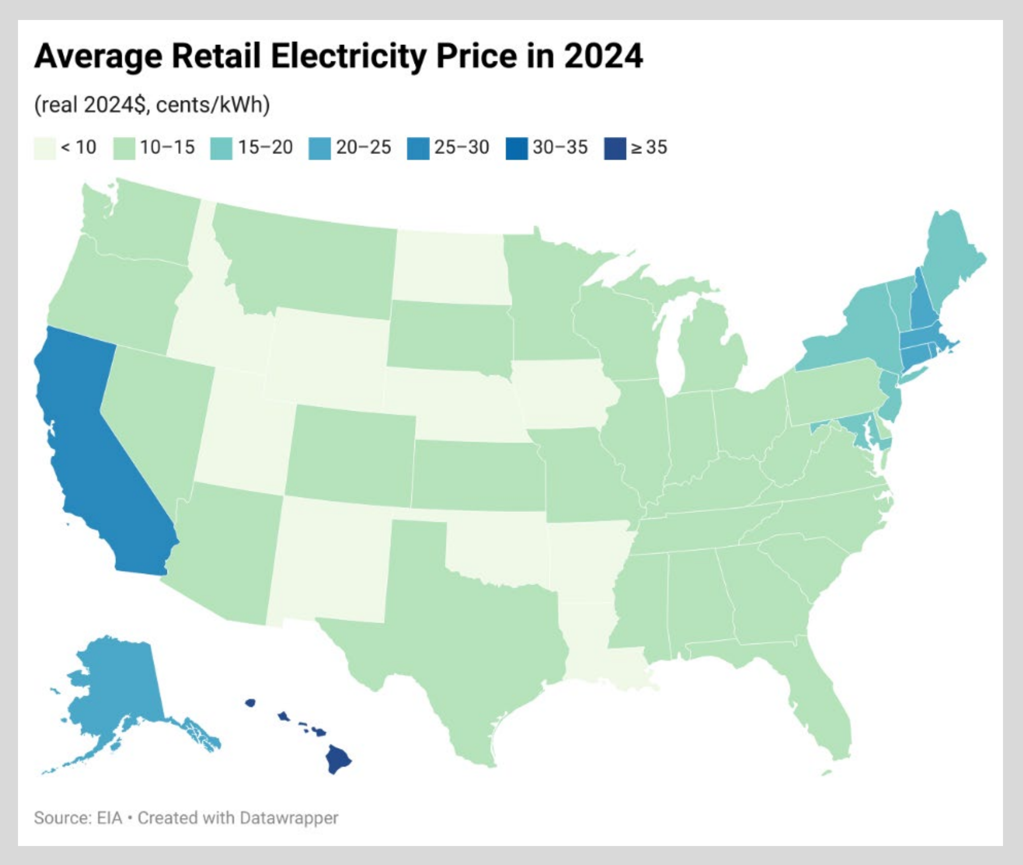
- 34% of households reduced or forwent necessities to pay an energy bill in 2024, up from 29% in 2021
- 22% of households kept their home at an unsafe or unhealthy temperature in 2024, up from 20% in 2021
- 24% of householder were unable to pay their energy bill in full in 2024, up from 20% in 2021

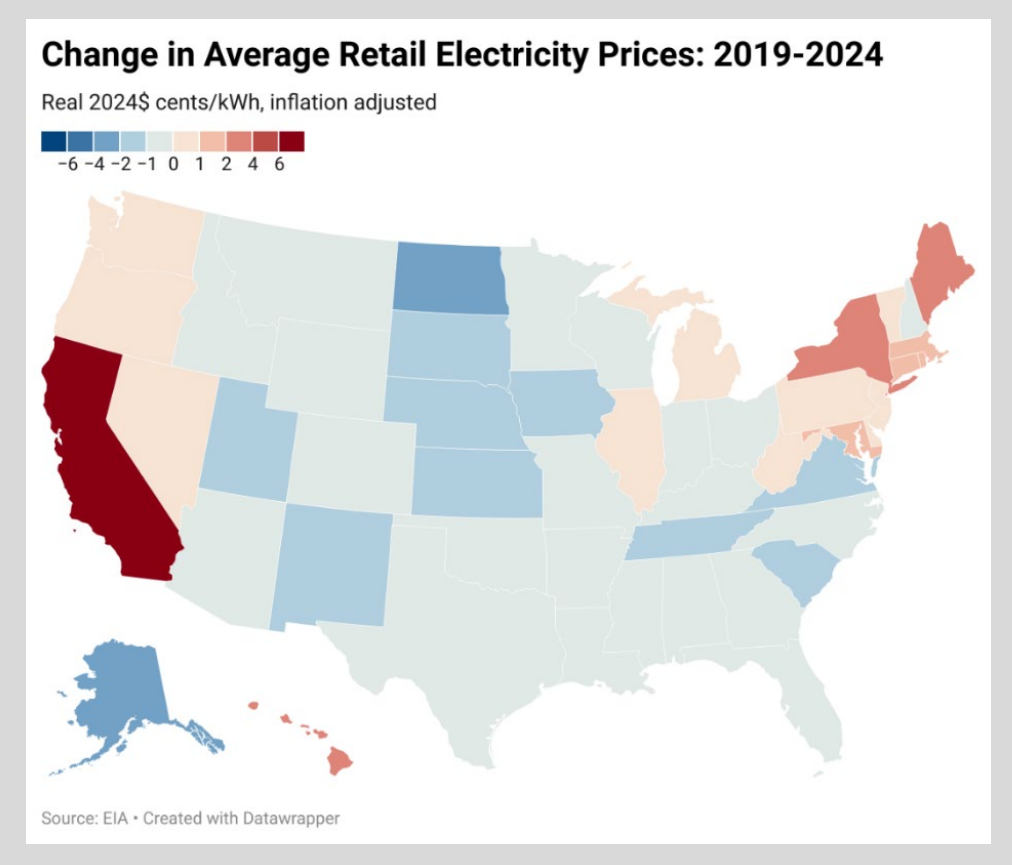
[1] NEADA Energy Hardship Reports (2022 & 2024)

[2] US Census Bureau: Household Pulse Survey (2021 & 2024)

Recent national trends in retail electricity prices mask vastly divergent trends in state-level average electricity prices

- Retail prices in 2024 varied widely: 90% of lower-48 landmass and 75% of population had average prices <15 ¢/kWh, but prices were much higher in California and the Northeast, and in HI & AK
- In nominal terms, almost all states experienced price increases from 2019-2024, but in real terms most experienced price decreases; largest increases in CA, HI, states in the NE, West, Great Lakes





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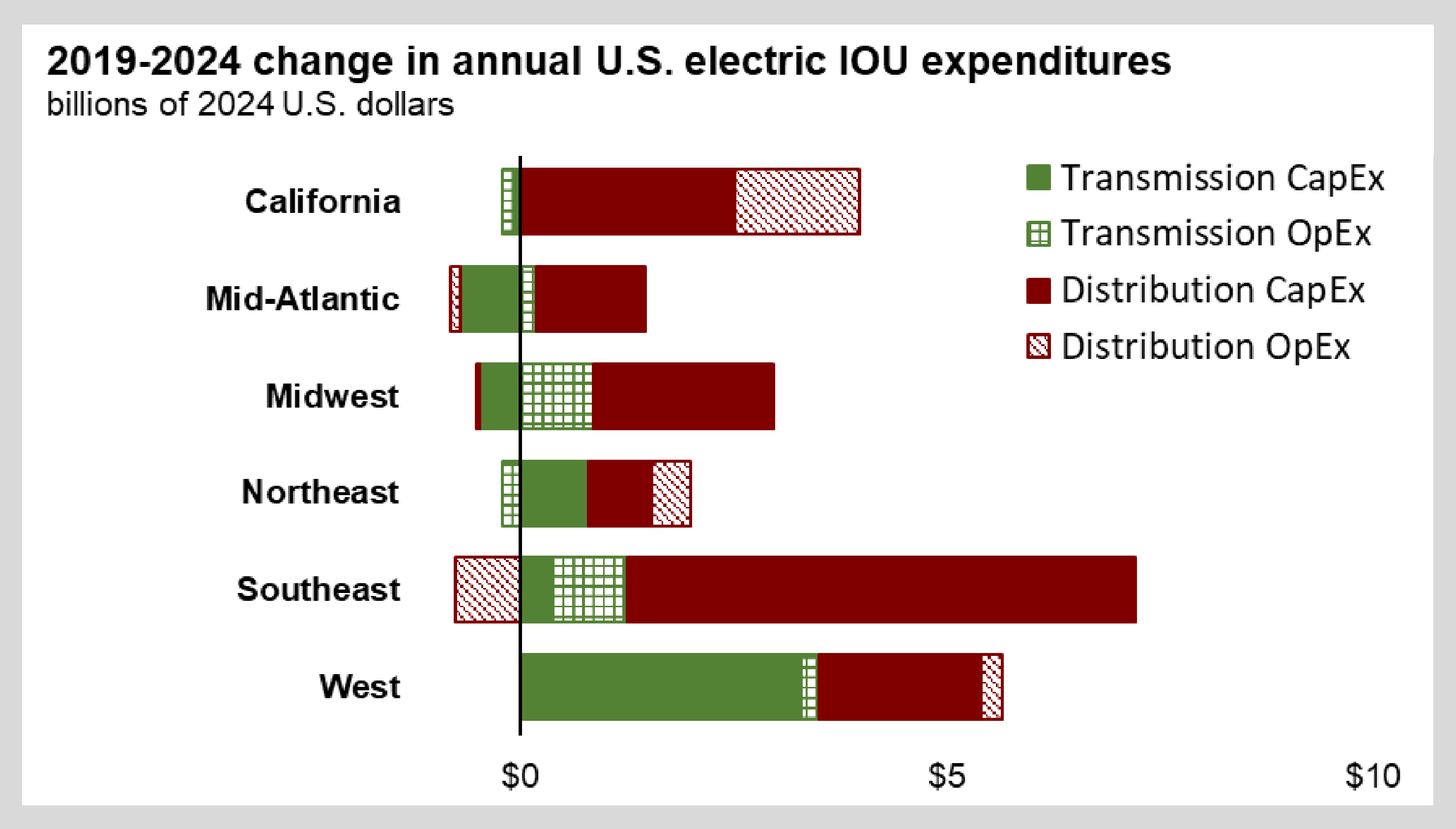
Drivers – *Understanding state variation, 2019-2024*

Distribution (& transmission) expenditures have contributed to retail price increases, whereas direct generation costs have declined nationally

- For IOUs, inflation-adjusted distribution and transmission expenditures increased, while generation costs declined; distribution increase was widespread geographically[1]
- Several factors drove distribution (and transmission) spending:
  - **Aging infrastructure:** Assets >50 years need to be replaced, costing over $10 B/yr just for transmission[2]
  - **Equipment hardening:** Spending on adaptation and resilience, hardening T&D systems[3]
  - **Supply-chain constraints:** Pandemic-era shortages persist; T&D costs have risen far above inflation[4]



Source: [1] Updated analysis of FERC Form 1 data, based on similar methods as in EIA (2024) and Forrester et al. (2024)

Sources: [2] Brattle (2025), [3] EEI (2024), [4] Lubershane (2025)

Storm recovery and wildfire mitigation costs have significantly increased prices in some states—can be among the largest drivers of price changes

- **Storms** result in **reactive** investments:
  - Repairs needed immediately following storm damage, incurring costs
  - Influence on electricity prices depends on frequency and extremity of storms, cost recovery period, type of costs, and previous hardening
  - **Greatest impacts on East & Gulf coast:** >1 ¢/kWh in some cases
- **Proactive** investments: storms and **wildfires**
  - Investments & insurance to reduce impacts
  - Wildfires are largest driver in CA: ~4 ¢/kWh
  - **Growing price impact in western states**

Recent Estimates of Utility Storm Recovery Price Impacts

Price estimate represents actual or likely impact on (mostly) residential retail prices in year shown, but some cost recovery mechanisms are short duration (i.e., the reported impact is temporary) whereas in other cases costs are securitized and the reported price impacts will persist for as many as 20+ years. Normalized 1-year cost estimates represent the total costs recovered over the recovery period divided by one year's of retail sales, and reflect the retail price impact that could occur if costs were recovered in a single year. Data are imperfect and should only be used to illustrate the wide range of and significant impacts. Includes recent estimates for only a subset of utilities.

Utility	State	Year	Duration	Price impact (cents/kWh)	Normalized 1-year cost (cents/kWh)
Duke Energy Florida	FL	2025	1-year	3.2	3.2
Central Maine Power	ME	2025	2-years	2.4	3.1
Tampa Electric Company	FL	2025	1.5-years	2.0	3.0
Entergy Louisiana	LA	2025	15-years	1.4	20.0
Florida Power & Light	FL	2025	1-year	1.2	1.2
Eversource	CT	proposed	6-years	1.1	6.4
NYSEG	NY	2025	6-11 years	1.1	9.6
Central Florida Electric Coop.	FL	2025	temporary	0.9	1.4
SWEPCO	LA	2025	14-years	0.6	9.0
Duke Energy Progress	SC	2025	20-years	0.5	10.0
Oncor	TX	proposed	long-term	0.5	0.6
Duke Energy Carolinas	LA	2022	9-20 years	0.5	7.6
Centerpoint	TX	2025/proposed	15-years	0.3	3.8
Duke Energy Progress	NC	2022	20-years	0.2	4.9
Entergy Texas	TX	2022	15-years	0.2	3.4
PSE&G	NJ	2025	long-term	0.2	0.4
Portland General Electric	OR	2023	7-years	0.1	0.8
Duke Energy Carolinas	NC	2022	20-years	0.1	1.0

Source: LBNL • Created with Datawrapper

Recent Estimates of Utility Wildfire Mitigation Costs

Includes estimates for a subset of electric utilities. As per note below, data shown are not always equivalent to retail price impact, and are not fully comparable with one another.

Utility	State	Equivalent cost impact (cents/kWh)
PG&E	CA	7.0
SDG&E	CA	3.0
SCE	CA	2.6
KIUC	HI	1.7
Hawaii Electric	HI	1.5
PSCo	CO	1.4
Rocky Mountain Power	UT	0.8
Pacific Power	OR	0.7
Rocky Mountain Power	WY	0.6
PGE	OR	0.6
AEP Texas	TX	0.5
Northwestern	MT	0.5
APS	AZ	0.4
Idaho Power	ID	0.3
Avista	WA	0.2
Nevada Power-North	NV	0.2
Oncor	TX	0.2
Nevada Power-South	NV	0.2
PNM	NM	0.1
PSE	WA	0.1
SPS	TX	0.1

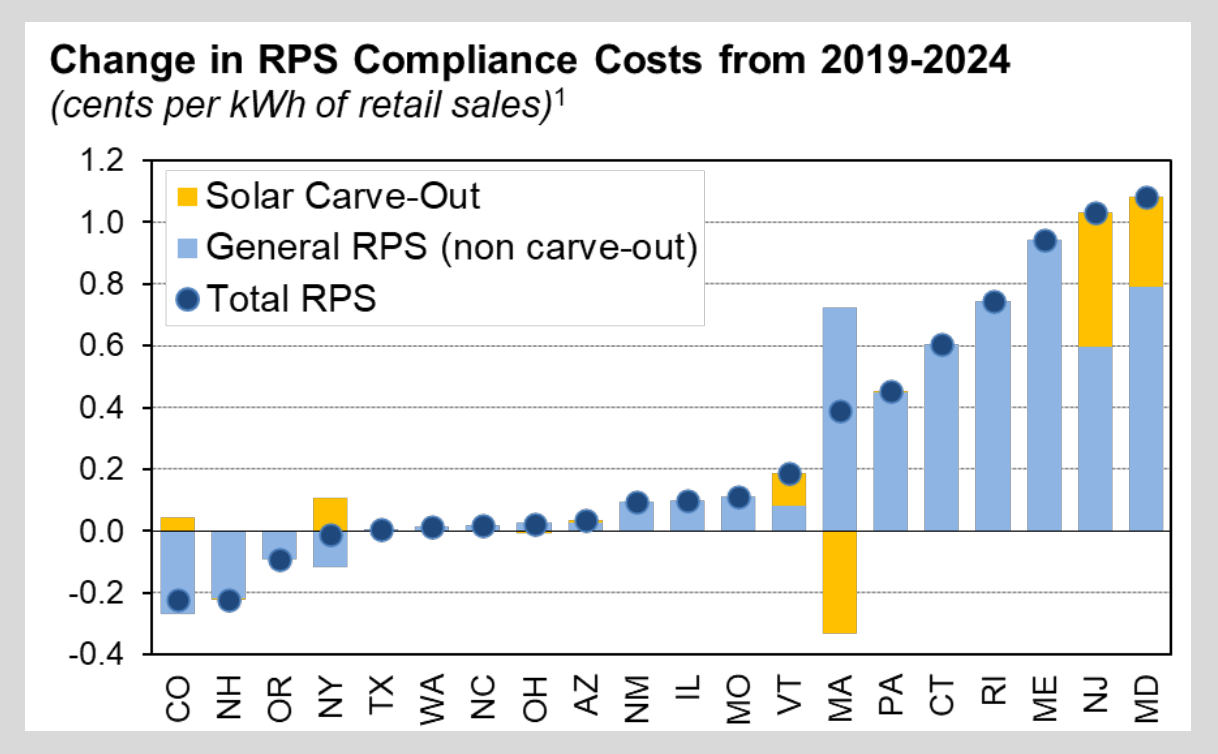
Cost estimates are recent (e.g., 2024-2025) or projected (2026-2028), and normalized by retail sales. Data do not always equate to retail prices, and are not fully comparable given different scopes (e.g., liability insurance is only included in a subset), tariff surcharges vs. balancing accounts, vs. revenue requirements, different mixes of CapEx and OpEx, etc. Data should therefore only be used to illustrate wide range of and significant impacts.

Source: LBNL • Created with Datawrapper

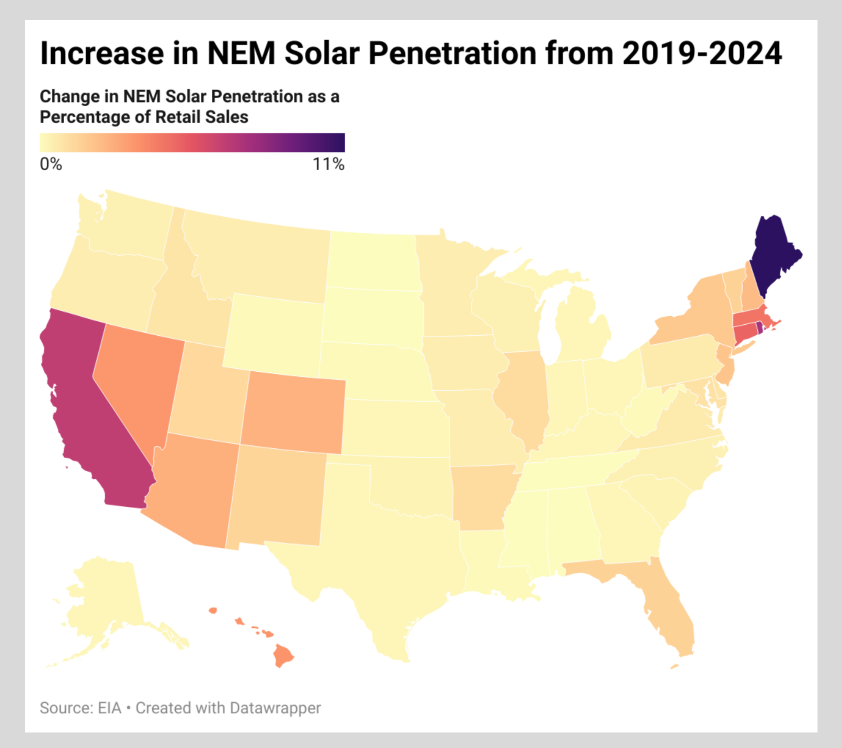
Source: Review of available data from regulatory filings and tariffs, for subset of utilities

State policies to require or encourage wind and solar deployment above what the competitive market would deliver have often increased prices

- **RPS:** Recent wind and solar growth that contributed to incremental state RPS demand often increased prices
- RPS compliance costs from 2019-2024 equate to an average price increase of ~0.25 ¢/kWh; in some mid-Atlantic and New England states >1 ¢/kWh[1]; statistical analysis supports impacts of this same magnitude



- **Net metering:** Benefits adopters, but often results in a utility's fixed costs being spread over lower sales, leading to higher prices[2]
- 2019-2024 effects variable; statistical analysis and other studies suggest impacts <0.5 ¢/kWh in 40 states, but as high as ~2 ¢/kWh in CA



Sources: [1] Barbose (2024)

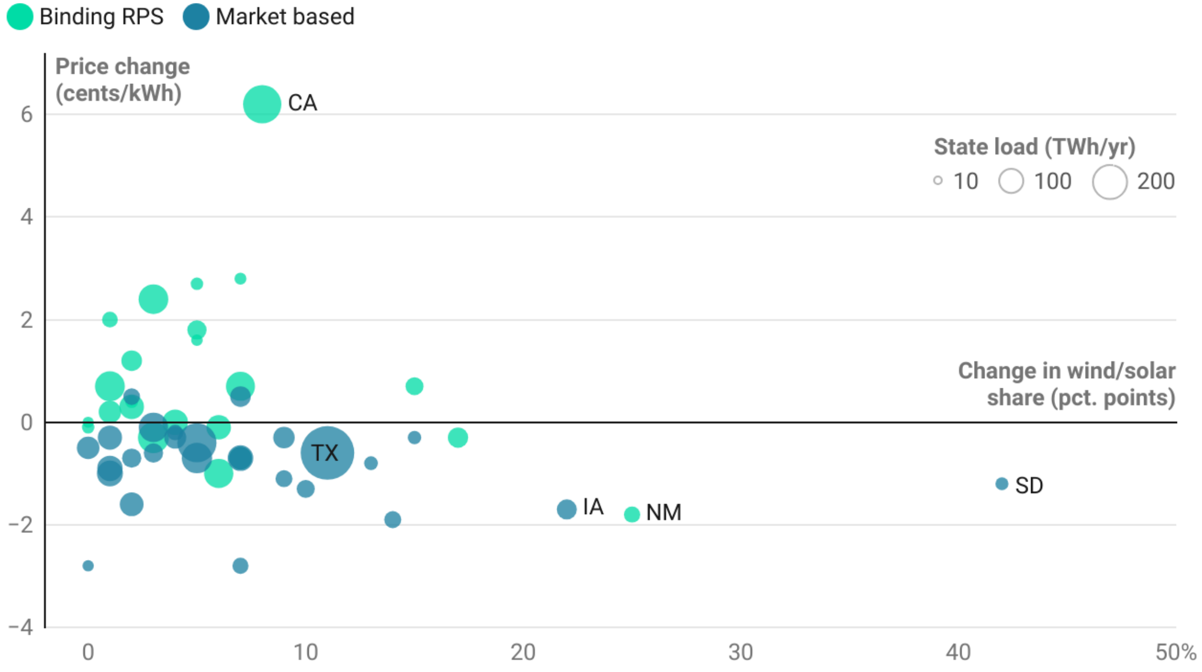
Sources: [2] National Academies (2023), Sieren-Smith et al. (2024), O'Shaughnessy et al. (2025)

State RPS policies often increased prices but “market based” wind & solar, supported by tax incentives, do not appear to drive retail price increases

- States with binding RPS’s generally saw increased prices, as shown on previous slide and as illustrated in figure to right
- 75% of the growth in utility-scale wind and solar occurred outside of RPS, supported by tax incentives <u>but not</u> compelled by RPS programs (termed “market based” here)
- There is no obvious correlation between higher price increases and “market based” deployment of wind and solar over this period (as shown in blue circles in figures)
- Statistical analysis supports these graphical relationships: RPS generally increased prices, especially in many New England and Mid-Atlantic states; “market based” wind and solar do not appear to have increased prices and may have reduced them

Growth in Utility-Scale Wind and Solar vs. Retail Price Changes from 2019 to 2024

Price change in cents/kWh, inflation adjusted to 2024$. Utility-scale wind+solar in-state market share is presented as a percentage point change in share from 2019 to 2024.

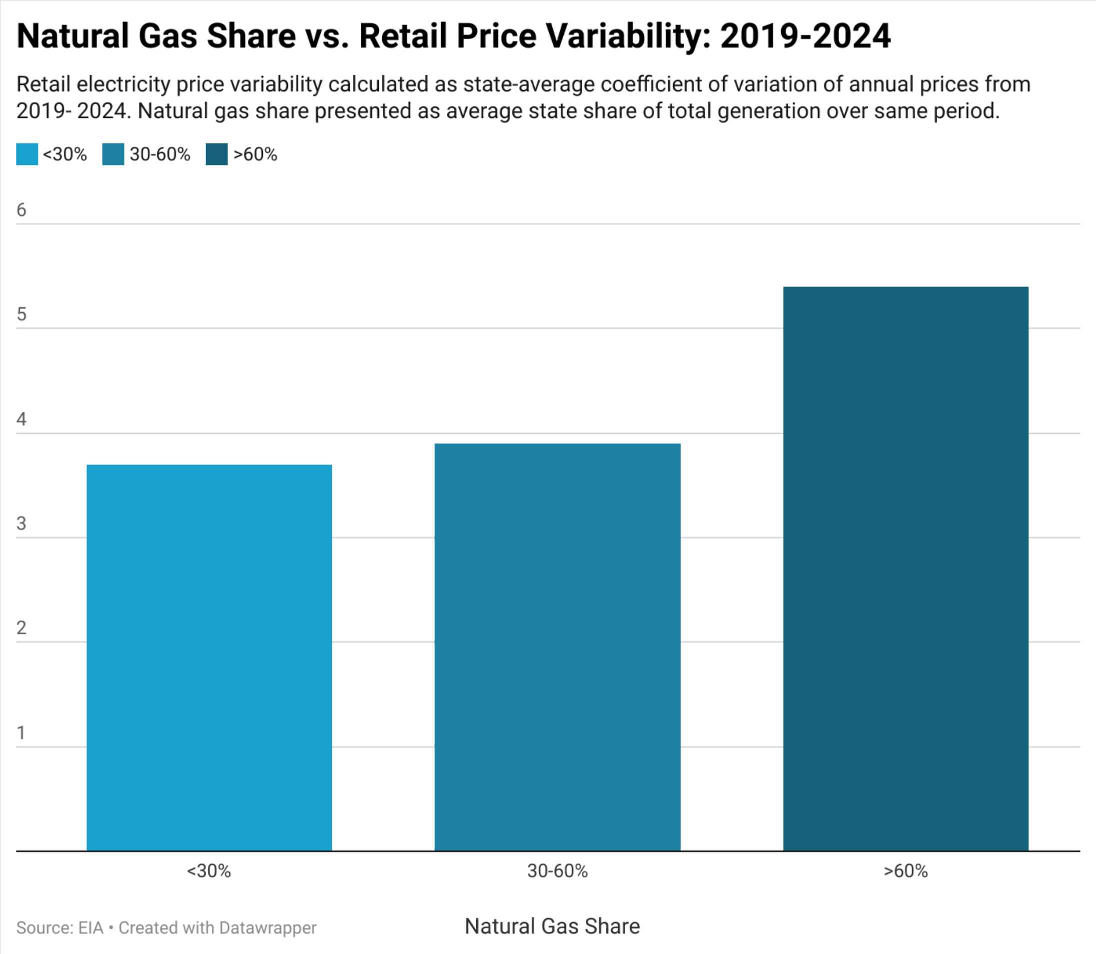


Source: EIA, LBNL • Created with Datawrapper

Simple bubble graphic should be interpreted with care (here and on next slides) because price changes were driven by multiple factors and due to correlated effects; statistical analysis was used to isolate drivers, and produced results consistent with general observed trends

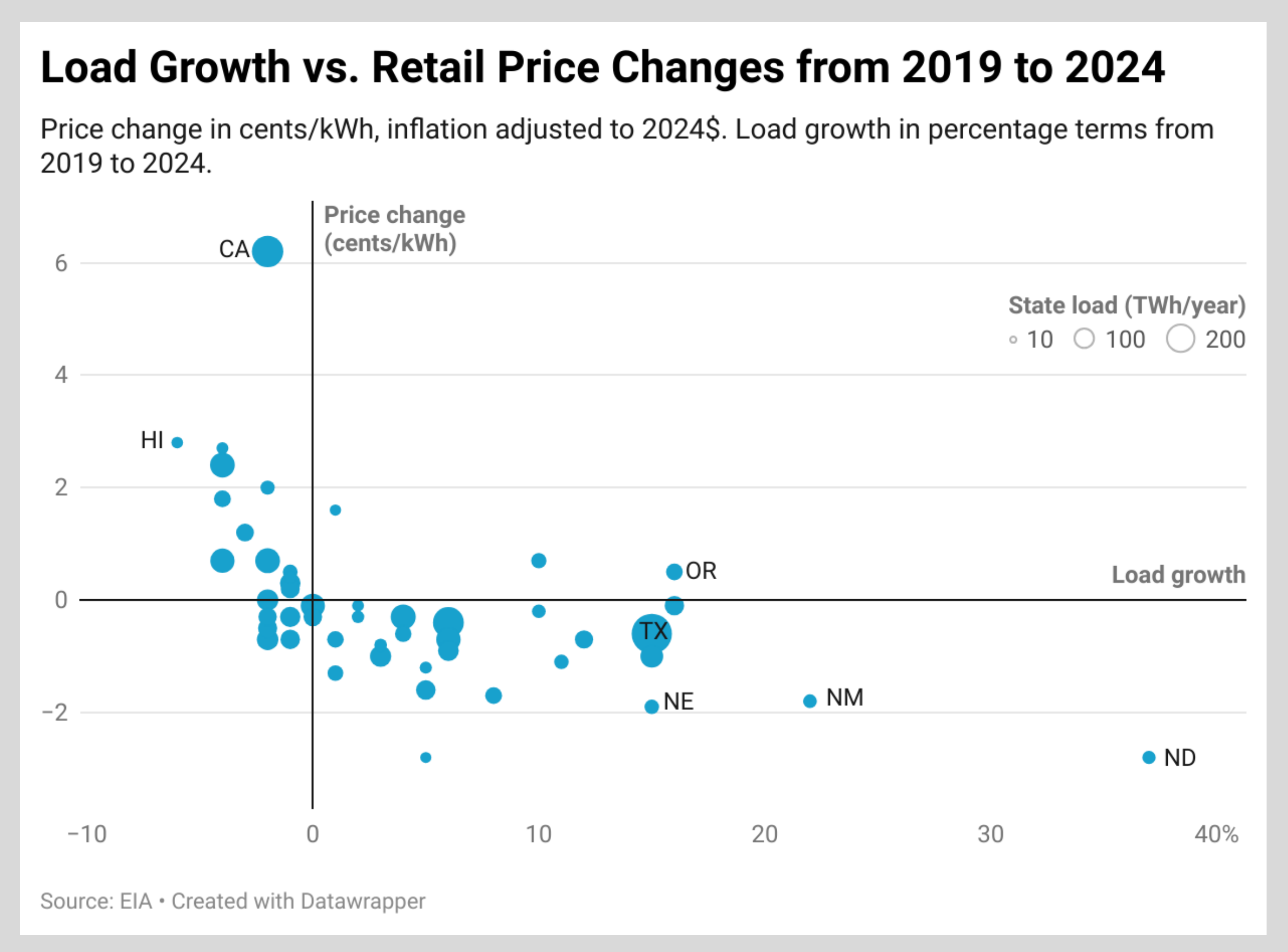
Low-cost natural gas has reduced retail electricity prices over the long term; gas price fluctuations impact year-to-year variation in electric prices

- **Declining inflation-adjusted natural gas prices contributed to reductions in generation costs over the long term**
- Natural gas accounts for a large share of generation (43% in 2025, growing for decades), reflecting its competitiveness
- However, natural gas prices are variable, and fluctuations have long been known to pass through to retail electricity prices
  - Notable example: onset of Ukraine/Russia war **increased electricity prices by 2 ¢/kWh or more** in some states through 2022-23, with subsequent decline after that shock passed
- Impact of gas on electricity price variability depends on: degree of reliance, pipeline constraints, fuel hedging, participation in wholesale markets, utility ownership, any lag in pass-through of costs to consumers



Load growth at the state level has tended to depress retail electricity prices in recent years…*unclear to what degree this will hold in the future*

- Over the past 5 years, states with the highest load growth generally saw retail prices decline in real terms
  - **Over 1 ¢/kWh price reduction in highest-growth states**, based on statistical analysis
  - Those states where load declined often experienced price increases
- *Reason:* cost growth was mostly for maintenance and—with prevailing rate structures—greater load leads to fixed costs being spread over more demand, reducing per unit costs[1]
- Commercial sector led load growth, was largest beneficiaries of reductions
- **Past relationships may not persist:** past growth was modest outside ~10 states and supply was adequate; growth can increase prices in presence of supply/delivery constraints



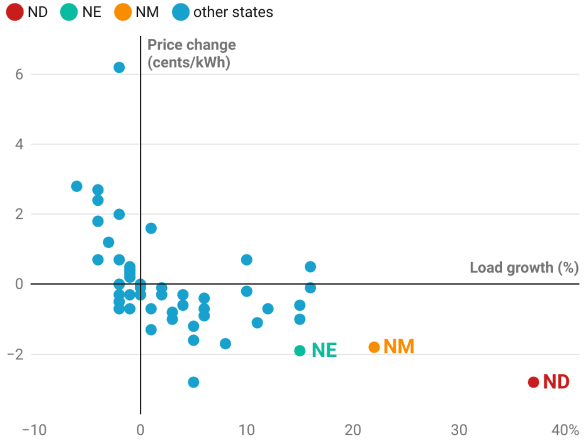
Sources: [1] Fares and King (2017)

Case Study: North Dakota, New Mexico, Nebraska

Managing load growth while reducing inflation-adjusted retail prices

1 Three states have significantly increased load while reducing inflation-adjusted retail prices

Load Growth vs. Price Change: 2019-2024

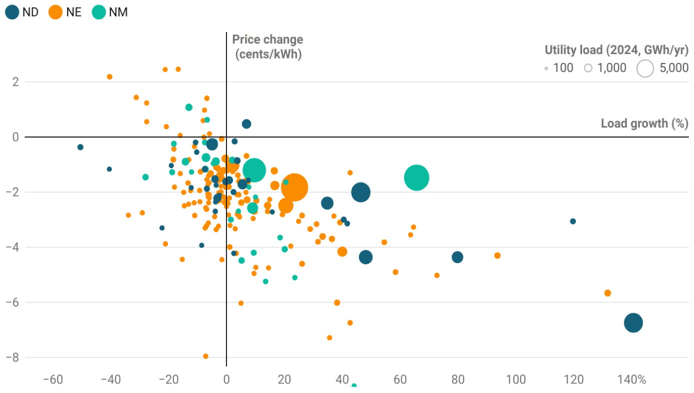


Source: EIA • Created with Datawrapper

2 Utilities with the greatest load growth generally experienced the largest reduction in prices

Impact of Load Growth on Utility-Level Average Retail Price Changes from 2019-2024: North Dakota, Nebraska, New Mexico

Price change in cents/kWh, inflation adjusted to 2024$. Load growth in percentage terms from 2019 to 2024. A few small-utility outliers are excluded due to the y-axis scale.



Source: EIA • Created with Datawrapper

3 Utilities with sizable C&I growth lowered C&I prices; residential customers were not harmed

ND, NE, NM: Impact of Utility- and Sector- Specific Load Growth on Retail Price Change from 2019-2024

Price change in cents/kWh, inflation adjusted to 2024$.

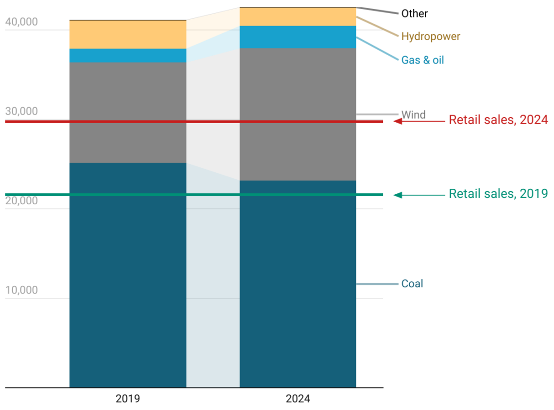
Utility Grouping	Residential Load Growth	Residential Price Change	C&I Load Growth	▲ C&I Price Change
High Load Growth: >20%	−1%	-1.3	64%	-2.7
Low Load Growth: 0-20%	4%	-1.3	10%	-1.4
Load Contraction: shrinking	−2%	-0.9	−10%	-0.9

Created with Datawrapper

4 Load growth matched with abundant, low-cost energy enabled positive outcomes

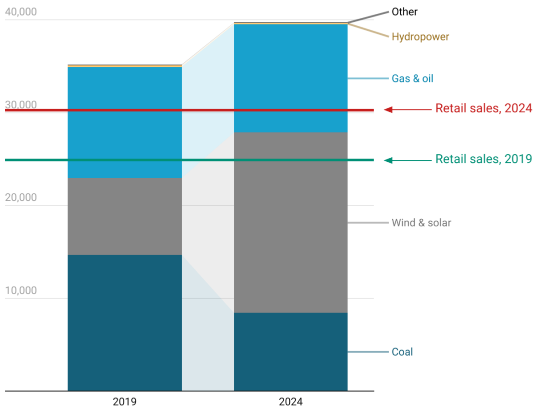
- Substantial C&I growth enabled fixed costs to be spread over more load
- Abundant, low-cost energy enabled load to be served at low incremental cost

North Dakota Generation and Retail Sales (GWh)



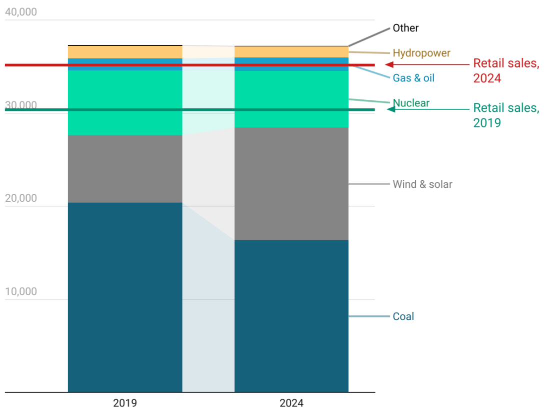
Source: EIA • Created with Datawrapper

New Mexico Generation and Retail Sales (GWh)



Source: EIA • Created with Datawrapper

Nebraska Generation and Retail Sales (GWh)



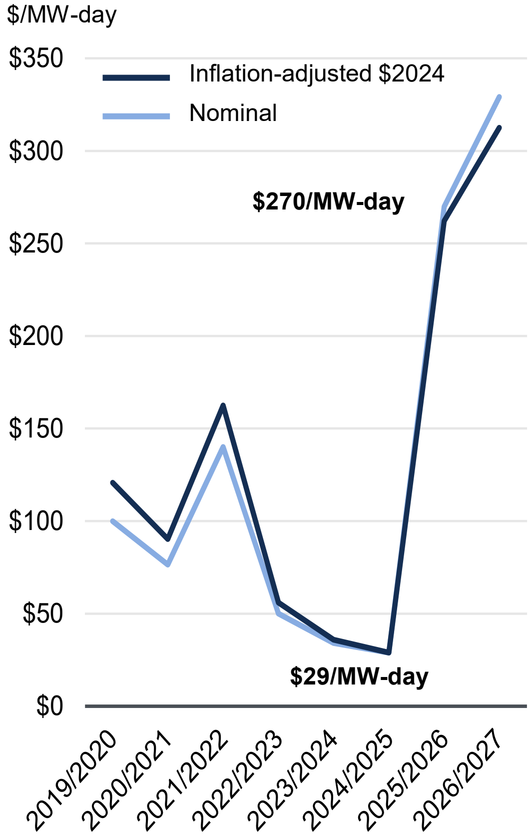
Source: EIA • Created with Datawrapper

Case Study: PJM Capacity Auction

Accelerated load growth combined with supply and delivery constraints leads to significant price increases

1 Significant increase in PJM capacity prices

PJM: Capacity Auction Clearing Price History



Data from PJM compiled by NRG with inflation data from the Bureau of Labor Statistics (BLS)

2 PJM's capacity prices increased due to multiple factors, including load growth

Data Center Load Growth

174% increase in auction revenues

Summer Capacity Ratings for CC/CTs

23 - 118% increase in auction revenues

Demand Curve Price Cap

68% increase in auction revenues

Adoption of ELCC Method

49% increase in auction revenues

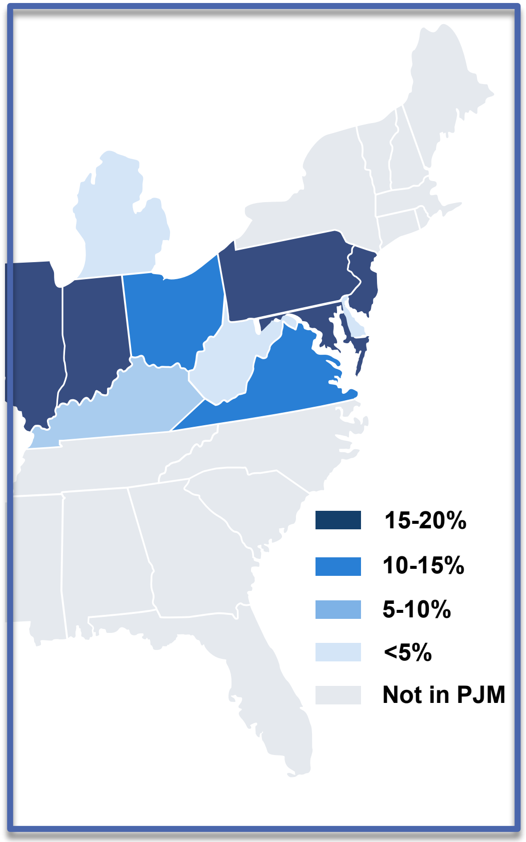
Capacity prices are one but not the only contributor to price increases

Other major drivers included the exclusion of Reliability Must Run units from the auction supply curve and the withholding of exempt capacity. The resulting auction outcomes signal a need for new resources to meet the growing demand of the region. One can therefore also interpret the rapid increase in clearing prices as indicative of prices that were too low in previous auctions.

Source: Data from Monitoring Analytics' IMM Analysis of the 2025/2026 RPM Base Residual Auction Parts A through G

3 Significant increase in state-level retail prices

Average Increase in Retail Prices Between Sept 2024 & Sept 2025



Notes and source: States with vertically integrated utilities are shielded to some extent from capacity auction price spikes because utilities can self-supply instead of purchasing capacity from PJM: from EIA Electricity Monthly Update Sept. 2025

Three steps to minimizing the risk of data-center buildout for other electricity customers

1

Reduce system-level supply and delivery constraints

2

Reduce system-level needs from new data center buildout

3

Large load tariffs (+ other tools) to ringfence impacts from data centers

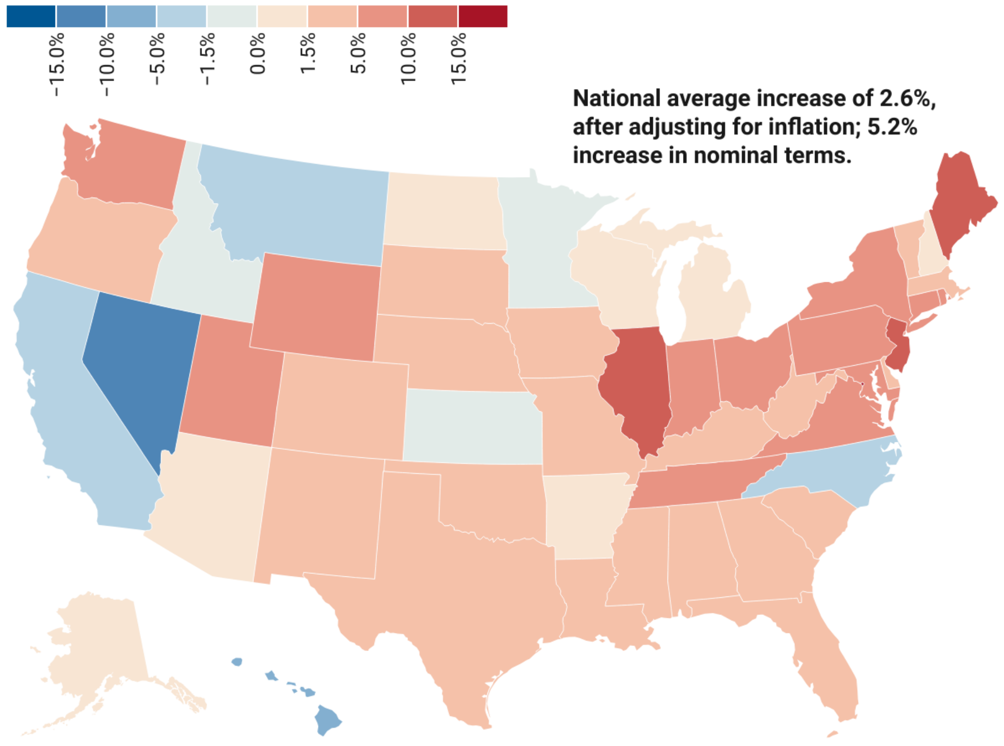
2025 & beyond

Retail price increases <u>over the last year</u> have outpaced inflation nationally and in a growing number of states

Prominent drivers for YoY price increases: fuel and wholesale power prices; inflation & hardening of distribution assets; capacity prices; transmission costs; storm recovery costs

Percentage Change in State Retail Electricity Prices: Average Jan-Sept 2025 vs. Jan-Sept 2024

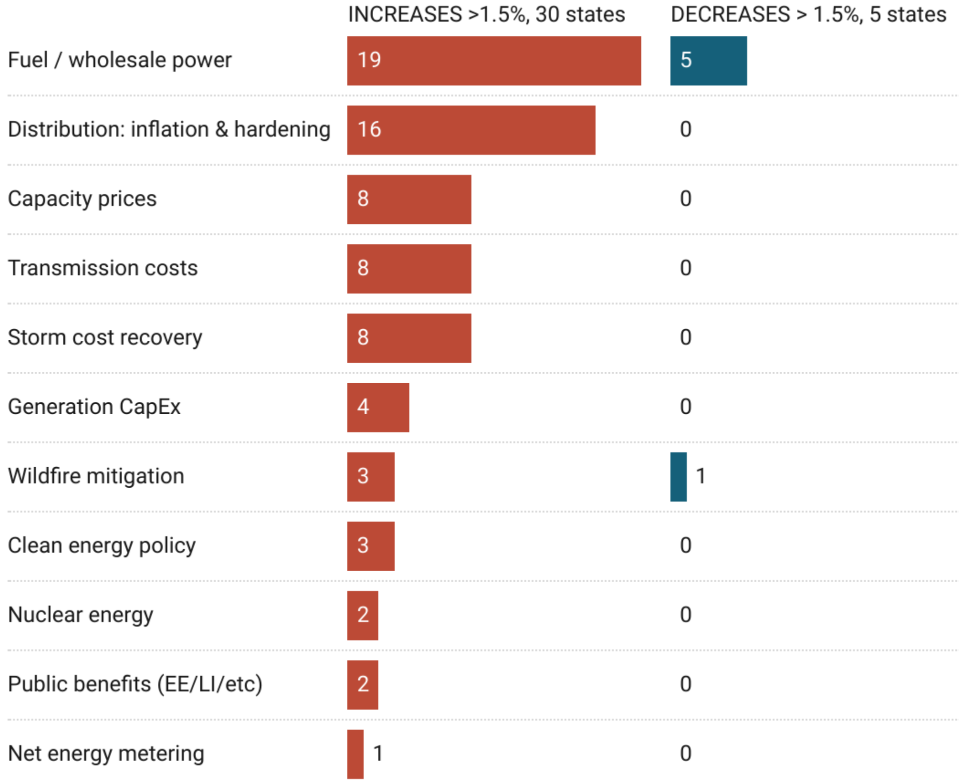
Percentage change, adjusted for inflation in 2024$



Source: EIA • Created with Datawrapper

Primary Drivers of Price Changes from 2024 to 2025

Stated reasons for price changes from July 2024 YTD to July 2025 YTD, for those states with average increases or decreases of >1.5%, after adjusting for inflation.



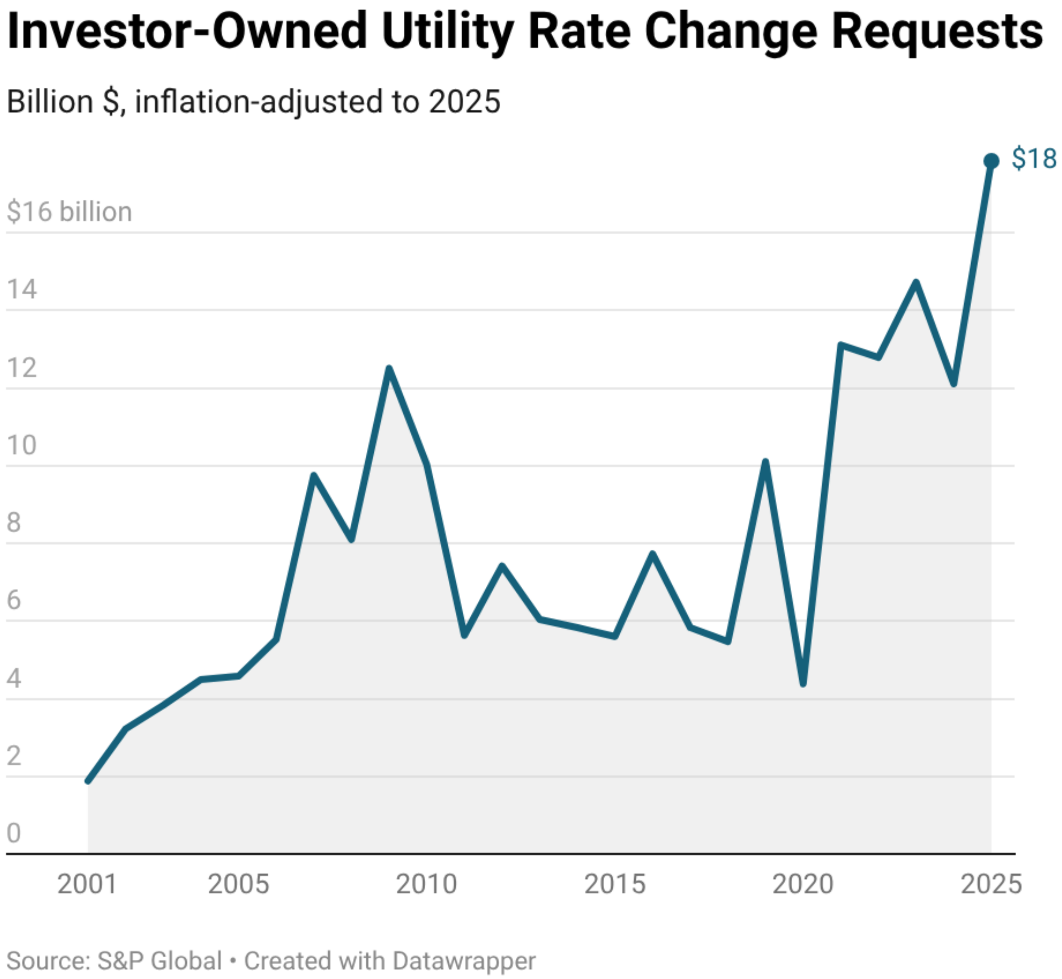
Source: LBNL • Created with Datawrapper

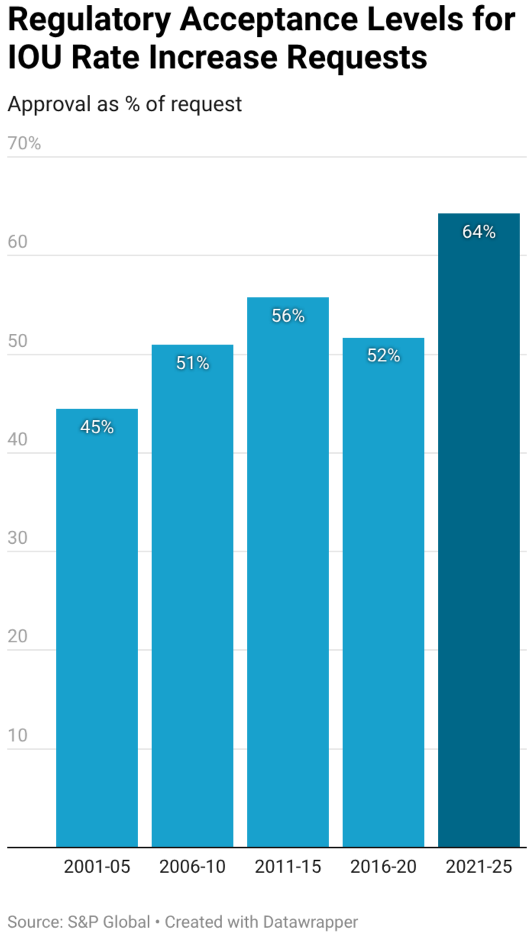
The few states that experienced larger reductions in inflation-adjusted prices did so via lower fuel prices (sometimes from delayed reductions after increase from Ukraine-Russia war).

Note: year-over-year trends are subject to various state ratemaking idiosyncrasies; trends and drivers reported here are therefore, to a degree, unstable.

IOU rate increase requests in 2025 were higher than experienced in decades, suggesting continued price increases; acceptance levels have been high

- IOU requests in 2025 were higher than in previous decades
- Data show relatively high levels of PUC acceptance of rate increase requests in recent years
- Data collected from S&P; limitations:
  - Rate cases involve IOUs; other utility types do not file with PUCs
  - Requests include base revenue requirements, include some but not all fuel costs or rate riders
  - Difficult to translate changes in rate requests to a cents/kWh impact
- Nevertheless, data represent a key signal for changes in underlying costs and therefore near-term prices





Notes: (1) Source: S&P Global, LBNL Analysis; (2) Rate case sample includes all "major" rate cases that impact base rates and would result in a rate change of at least $5 million, inclusive of limited issue rider cases. Fuel cost changes and rate riders are partially but not fully captured.

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For more information

This Overall Project Currently Includes Multiple Products

For more information, contact: Ryan Wiser (rhwiser@lbl.gov)

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Peer-reviewed journal article

Highlights a subset of the trends, with a focus on statistical analysis of broad drivers

Data visualization tool

Allows users to explore some of the data that underpins the journal article

Detailed presentations

Summarizes the article and provides additional material beyond that included here

These products can all be found at: https://eta-publications.lbl.gov/publications/factors-influencing-recent-trends

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