ESCA Back Pocket Insights

KEY INSIGHTS

- **Causal evidence suggests that data centers modestly lowered U.S. retail electricity rates from 2015 to 2024.**

- **A doubling of data center capacity caused residential retail prices to fall by roughly 4%:** the average effect of growth between 2019 and 2024 was to decrease average rates by 6%.

- **Economies of scale offer an explanation:** durable new demand can spread fixed costs across more kilowatt-hours and pulls in cheaper new capacity.

- **Similar dynamics can apply to electrification**, where adoption of electric vehicles and heat pumps need not drive bills up while also lowering emissions and providing consumer benefits.

This brief is based on the white paper "Have Data Centers Raised Your Electric Bill? Causal Evidence from the United States"

Have Data Centers Raised Your Electric Bill?

by Asa Watten, John Bistline, and Geoff Blanford

New EPRI study provides causal evidence from the United States that data centers caused average retail electricity rates to fall modestly rather than rise.

Data centers have become a highly visible flashpoint in the American energy landscape. They are projected to account for 9-17% of U.S. electricity by 2030 (up from 5% in 2024), driven by a rapid acceleration of artificial intelligence (AI) and other data-intensive services. This growth has provoked backlash: public concerns have increased local resistance to data center siting, including air pollution, noise, water consumption, and higher utility bills. Roughly 70% of Americans say they oppose data centers being sited near them.

Despite the popular narrative that data center growth is the driver of recent price increases, evidence points in the opposite direction. Wiser, et al. (2025) show negative correlations between average prices and changes in electricity sales. However, this observation does not indicate causality. It is possible that data centers and other new loads have chosen to locate in areas with low prices. This selection bias could mask a price-increasing effect.

This paper empirically tests this intuition, using an econometric approach to control for location selection and to show that in fact load growth is the driver of lower prices. We find that **data centers caused average retail electricity rates to fall modestly rather than rise between 2015 and 2024**.

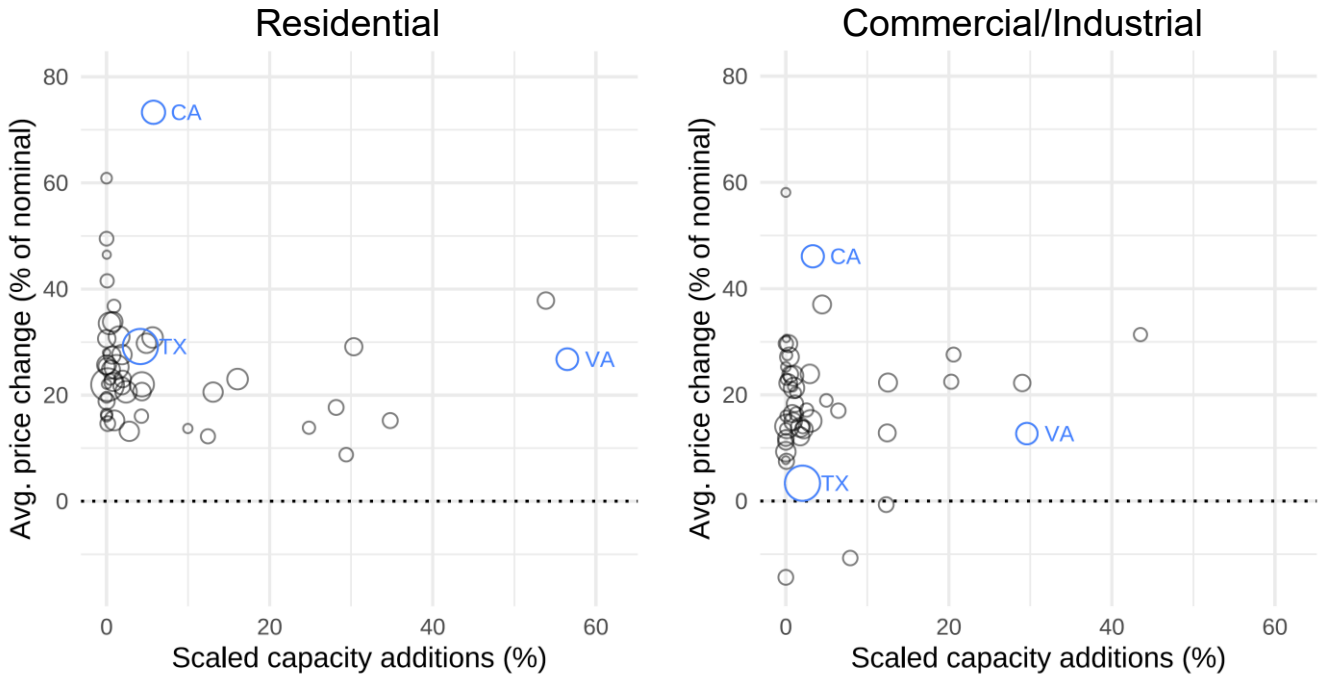

Figure 1. Average prices versus data center capacity change by state. *The vertical axis shows the percent change in sectoral average retail prices in 2024 relative to 2015; the horizontal axis shows estimated data center load in 2024 relative to sectoral demand. Circle size is scaled by state sectoral demand. Data center capacity additions compiled by S&P Global.*

How can higher demand lead to lower prices? Simple supply and demand dynamics are incomplete in the context of electricity markets, which have two features that differ from many other commodities:

- **Retail prices reflect average costs, not just the cost of the next unit:** When demand rises in the short run, grid operators dispatch increasingly costly generators, which pushes wholesale prices up. But retail tariffs also have to recover the large fixed costs of building and maintaining generation, transmission, and distribution. Those fixed costs are spread across every kilowatt-hour sold. With new demand, the existing system gets used more intensively, and fixed costs are spread across more demand, pushing average costs down.
- **New, long-lived demand triggers new, cheaper investment:** Durable shifts in demand from data centers, electric vehicles, and heat pumps can lead to new capacity. Because technology costs have fallen so far, newly built generation tends to be cheaper than the older assets it displaces. New capacity often comes in below the average cost of the existing system.

Empirically, the simple picture is inconsistent with the “data centers raise bills” story (Fig. 1). Without controlling for selection, **the correlation between data center growth and price changes is near zero**. Virgina, currently the U.S. leader in data centers, which consume over 20% of the state's electricity, saw lower than average rate increases in recent years. Meanwhile, in California average prices rose by 40% from 2019 to 2024, mainly from wildfire-related costs, despite modest data center growth.

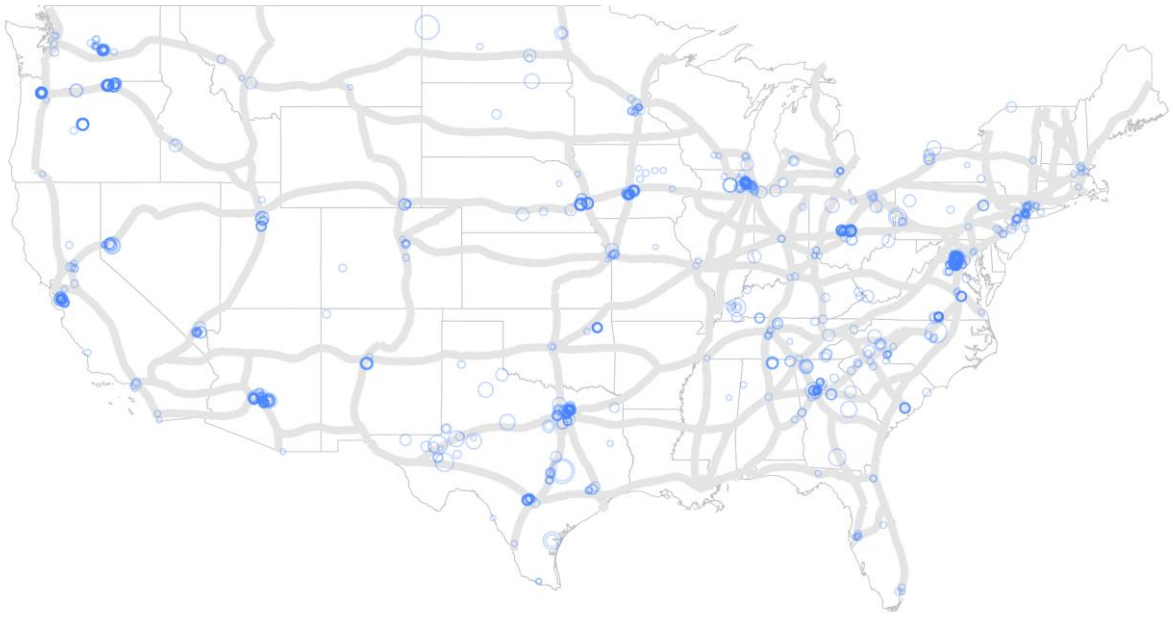

Figure 2. Data center additions and the 1947 Interstate Highway Plan. *Circles indicate data centers built from 2015 to 2024. The size of the circles is scaled to data center capacity. The gray lines show the original 1947 Eisenhower National System of Interstate and Defense Highways Plan.*

Drawing on utility cost data and state-level retail data, the study finds further empirical evidence for economies of scale:

Costs fall per unit as demand grows. The largest categories of power system costs (i.e., capital and operating expenses for generation, transmission, and distribution) fall per unit of delivered electricity as demand rises, which reflects economies of scale.

There is no evidence of cost-shifting onto households. One concern is that data centers, billed as commercial or industrial customers, could lower system costs while shifting the burden on residential ratepayers. The data show that, when other customer classes grow, prices tend to fall with no sign of systematic cost-shifting between sectors.

To isolate the causal effect, we need a source of variation in where data centers are built that is not tied to expectations about future electricity prices. In econometrics, this is called an instrumental variable.

For the instrument variable, we use the total **length of the 1947 Eisenhower Interstate Highway Plan within each state** (Fig. 2).

The intuition is that terrestrial fiber-optic cable was largely laid along interstate highway corridors, and data centers need fast fiber connectivity, which means states with more of the original highway plan attracted more data centers. At the same time, this 80-year-old plan has limited plausible effect on today's electricity prices, except through population and economy activity, which the analysis controls for separately. This approach allows the analysis to attribute price changes to data centers rather than the other way around.

The study's key result is that **data centers caused residential prices to fall.** Using the instrumental variable strategy, we find that a doubling of data center capacity caused residential electricity prices to fall by 3.5% for a fixed level of demand.

The average customer lived in a state where data center capacity increased by around 160% from 2019 to 2024. Our results imply that **data center load growth over this period caused average residential prices to fall by roughly 6%**.

Testing for spillovers between neighboring states, we find no evidence that data centers have cross-border impacts. The results are also notably consistent across customer classes and survive a range of robustness check, including dropping California, dropping 2020, and controlling for new generation built by technology type.

Similar intuition about economies of scale can apply to electrification of transportation and heating, switching from gasoline cars to electric vehicles and from gas furnaces to heat pumps. Electrification is expected to be a major driver of economy-wide decarbonization and has consumer affordability benefits. This study's implication is that **electrification need not raise electricity prices and may help to lower them**.

There are several caveats about the scope of these findings:

- Supply constraints: These findings depend on the grid adding capacity affordably, which could be strained by turbine backlogs, transformer shortages, solar tariffs, and permitting delays. New capacity can cost more than the supply it replaces if these constraints bind.
- Durability of demand: The benefit holds if projected load shows up and stays, since demand that fails to materialize leaves utilities recovering fixed costs across fewer kilowatt-hours, reversing the mechanism.
- Fuel price and load shapes: The analysis does not capture national effects like data centers' pull on natural gas prices (likely small) or differences in load shape, the daily and seasonal pattern of demand that may differ across data centers, EV charging, and electric heating.
- Historical scale: The findings describe a period of relatively modest data center buildout, so they may not extrapolate to larger hyperscale and AI-driven facilities, whose size and pace could push the system into the supply-constrained regime where the price-lowering effect weakens.

Overall, this research finds that the headline fear – that data centers are driving up household electricity bills – is not supported by the evidence. From 2015 to 2024, data centers modestly lowered average retail rates in the United States.

The mechanism is well understood and well grounded in economic theory: durable new demand can spread fixed costs across more usage and pulls in cheaper new capacity. These dynamics offer a hopeful signal for electrification more broadly, provided that the system can keep building.

FOR MORE INFORMATION

Read the full white paper: Watten, et al. (2026), "Have Data Centers Raised Your Electric Bill? Causal Evidence from the United States."

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