



Kentucky’s Low Electricity Prices September 23, 2024

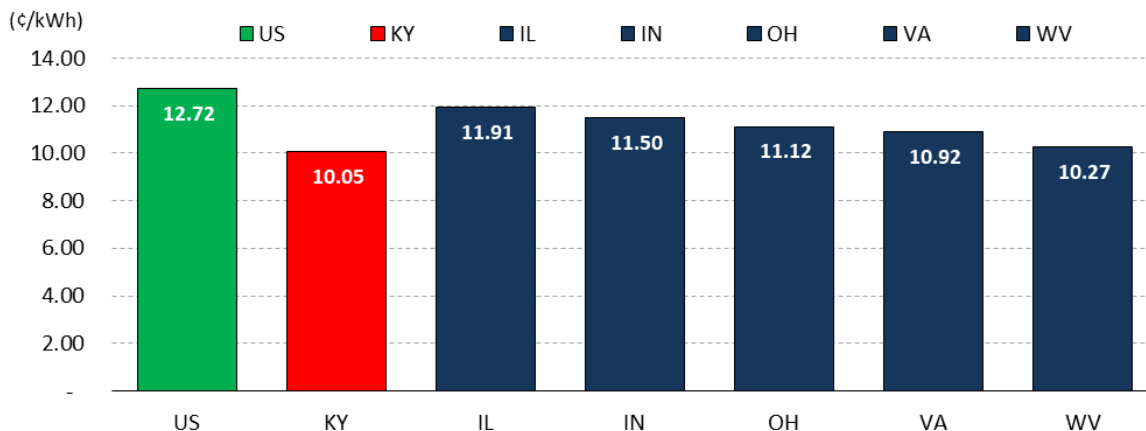
Overview

Kentucky has maintained some of the lowest electricity rates in the nation, primarily due to its abundant coal resources and regulated market structure. This has insulated the state from the price volatility that has affected deregulated markets, which are more exposed to natural gas price fluctuations. However, Kentucky is currently witnessing a significant shift, with a growing reliance on natural gas and a corresponding decline in coal generation, signaling a potential increase in future electricity price volatility and regulatory challenges.

Introduction

In 2023, coal-fired power plants generated 69% of Kentucky's electricity, making it the state with the third-largest share of coal-fired generation, following West Virginia and Wyoming. Historically, over 90% of Kentucky's net generation came from coal-fired plants. At 10.05 cents per kWh, Kentucky boasts the lowest electricity rates among states east of the Mississippi River and the 12th lowest in the nation. While some attribute the state’s rising electricity rates to a reluctance to adopt renewable energy and its continued reliance on coal, this analysis demonstrates that fluctuations in retail rates are primarily driven by nationwide variations in natural gas prices and the structural differences between regulated and deregulated electricity markets. In fact, Kentucky's reliance on coal has helped maintain comparatively low electricity prices over the past two decades when compared to other states in the region.

2023 KENTUCKY RETAIL ELECTRICITY PRICE COMPARISON-ALL SECTORS

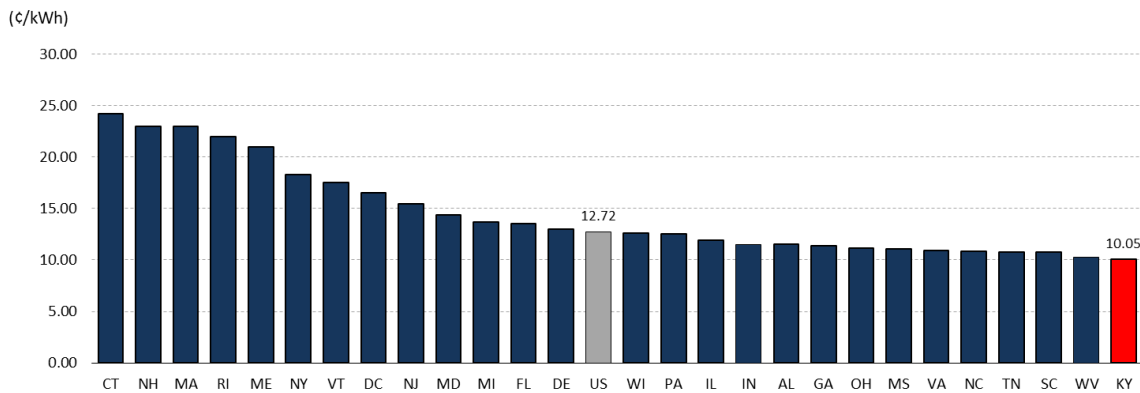


Source: U.S. Department of Energy, Energy Information Administration

Historically, the state’s electricity rates have consistently ranked among the most affordable, often placing as the first, second, or third lowest among the 26 states east of the Mississippi River. While coal and natural gas remain the predominant resources for power generation—being cheaper due to supply proximity—the policies and ownership profile

of generation assets also play an essential role in determining the stability and characteristics of electricity retail pricing in the state.

2023 AVERAGE ELECTRICITY RETAIL RATES FOR STATES EAST OF THE MISSISSIPPI



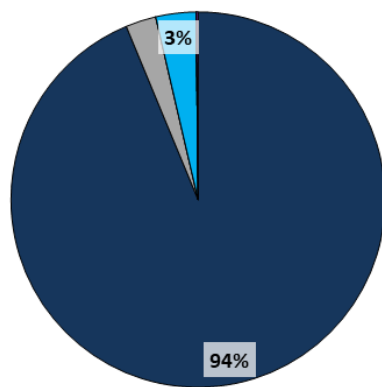
Source: Energy Information Administration

Kentucky’s Generation and Retail Electricity Rates

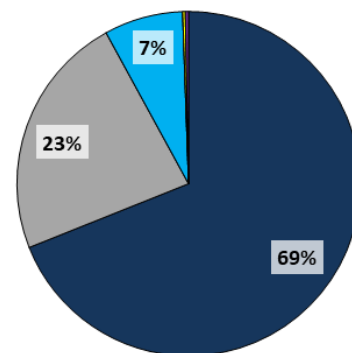
Kentucky ranks as the sixth largest coal-producing state in the U.S., providing a robust fuel supply for coal-fired power generation. While the state's natural gas reserves are more limited, the extensive network of natural gas pipelines crossing through Western Kentucky ensures a steady supply for new gas power plants. Although natural gas has gained a significant foothold in the state's energy mix—growing from 3% in 2014 to 23% by 2023—coal continues to dominate electricity generation. Over the past decade, coal’s share has dropped from 94% to 69%, yet it remains the primary energy source. Meanwhile, renewable energy development has been minimal, with hydroelectric power as the only significant contributor, accounting for 7% of electricity generation.

COMPARING KENTUCKY’S GENERATION MIX IN 2023 AND 2014

Kentucky 2014 Generation Mix



Kentucky 2023 Generation Mix



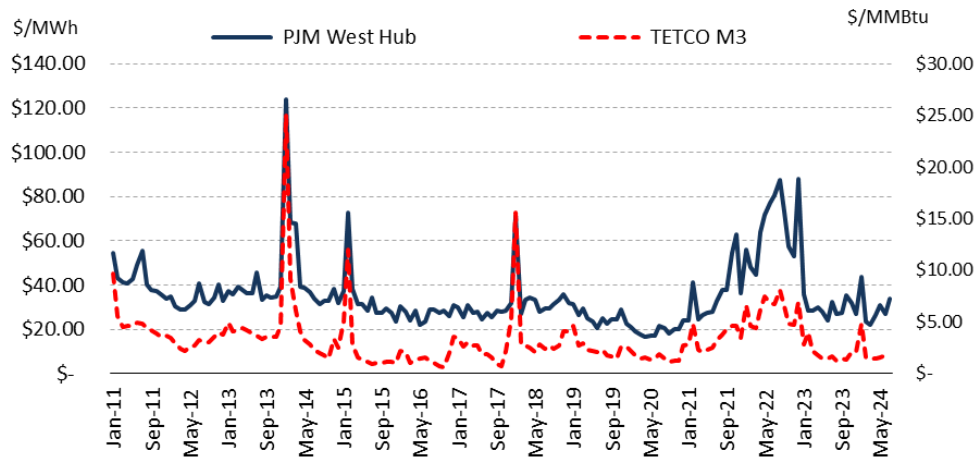
Source: U.S. Department of Energy, Energy Information Administration

Historically, Kentucky has enjoyed some of the lowest retail electricity rates in the nation. This has been primarily due to its proximity to coal reserves and the state's heavy reliance on coal production and coal-fired generation. Similar trends are observed in neighboring states (e.g., West Virginia) with significant coal production, where electricity retail rates also tend to be lower than the national average.

Price stability varies significantly between these energy sources. Natural gas prices have exhibited historical volatility, often influenced by market dynamics and geopolitical events. In contrast, coal prices have remained relatively stable over the last few decades, with recent fluctuations primarily attributed to external factors such as severe winter weather conditions and the broader impacts of the global energy crisis.

Although Kentucky electric retail rates have remained low over the past few decades, PJM wholesale electricity prices have shown tremendous volatility and high correlation with regional and national natural gas prices. This volatility is closely linked to natural gas prices, with electricity prices following similar upward and downward trends in response to changes in natural gas prices.

PJM WHOLESALE ELECTRICITY PRICE VS. NATURAL GAS HUB (TETCO M3) PRICING



As depicted above, natural gas prices and wholesale power prices within the PJM power market, which includes parts of Kentucky, exhibit a strong correlation, mainly due to the substantial proportion of natural gas resources utilized within the PJM market. Furthermore, PJM natural gas prices demonstrate a significant correlation with prices at other major natural gas hubs, such as Henry Hub in Southwestern Louisiana. This is primarily because natural gas is a widely traded homogeneous commodity throughout the United States. Consequently, any fluctuations in natural gas prices—and, by extension, wholesale power prices within PJM—are influenced mainly by events impacting natural gas supply or demand beyond the confines of the regional market.

Conversely, the price of coal delivered in Kentucky is less susceptible to external disturbances, owing to the relatively limited trade volume and the region’s proximity to Appalachian coal sources. This localized pricing dynamic shields Eastern Kentucky from broader market fluctuations, thus stabilizing electricity costs derived from coal.

Major natural gas pipelines, such as the Columbia Gas Transmission pipeline and Tennessee Gas Pipeline, which traverse Kentucky, ensure a reliable and well-integrated supply of natural gas. Although 90% of this transmission is directed to other states, it still supports a consistent supply to Kentucky, thereby facilitating the growing capacity and utilization of natural gas-fired plants. The increased dependence on natural gas, along with this engagement, has heightened their exposure to the inherent price volatility driven by the fluctuations in natural gas prices, which significantly affect the power market’s electricity cost structure. In contrast, Kentucky’s coal-fired power plants rely predominantly on coal mines within the region, thus insulating them from external price influences that affect other energy sources.

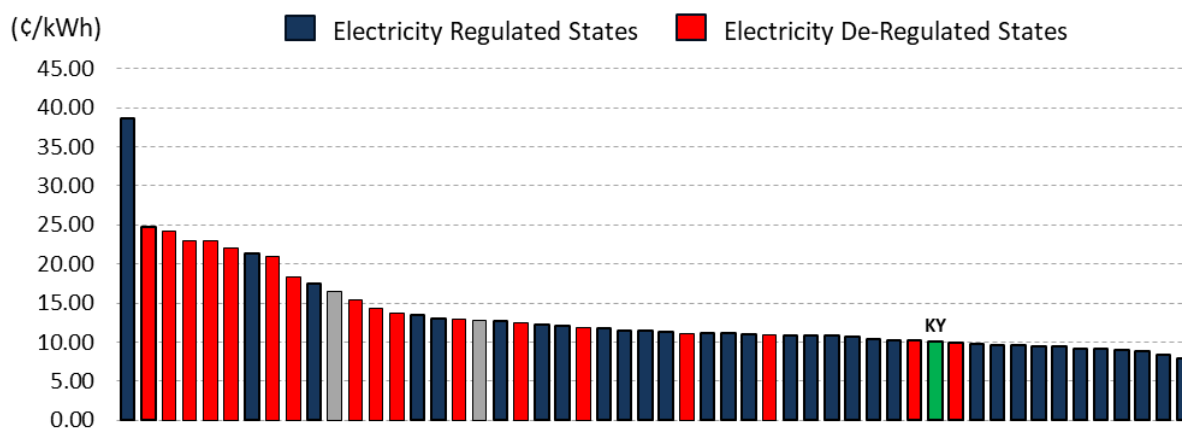
Deregulation and Impact on Retail Rates

Policy decisions play a crucial role in shaping retail electricity prices, influencing everything from the structure of the energy market to the cost of generation and distribution. Regulations at both federal and state levels determine how utilities can recover costs, the types of energy resources that are prioritized, and the incentives available for different forms of energy production. Policies that promote renewable energy or mandate emissions reductions lead to increased

capital or operating costs for utilities, which are passed on to consumers in the form of higher electricity rates. Conversely, policies that support fossil fuels or limit regulatory burdens help keep prices lower, particularly in regions with abundant coal resources like Kentucky.

One of the most significant policy decisions in the U.S. electricity industry was allowing for the deregulation of electricity generation. Traditionally, the entire electricity supply chain (generation, transmission, and distribution) was regulated by state or federal agencies. However, starting in 1996, states started to exclude electric generation from regulation, hoping that increased competition between independent power producers and regulated utilities would reduce the overall cost of electricity. Today, about 20 states have some form of deregulated or restructured system, while the majority of states still use regulated monopolies. The exhibit below shows the 2023 average retail rate ranking of regulated vs. deregulated states. Kentucky, highlighted in green, continues to regulate electric generation within the state.

2023 RETAIL PRICES OF ELECTRICITY REGULATED AND DE-REGULATED STATES



Source: Energy Information Administration

In Eastern Kentucky, electricity is predominantly supplied by regulated utilities operating under state oversight, which effectively insulates consumers from market volatility. The pricing structure here is determined by the state utility commission, leading to more stability over time, aided by the region’s substantial reliance on coal. Meanwhile, Western Kentucky, though more exposed to competitive electricity markets, still sees all in-state electric retail sales conducted through regulated utilities that own and operate their own power plants within the state.

Conclusion

Kentucky is experiencing a notable shift in its energy mix, moving away from coal and increasing its reliance on natural gas. This transition, while consistent with national trends of replacing coal with natural gas-fired power plants, introduces new challenges. The volatility of natural gas prices, influenced by both national and international market dynamics, could lead to future instabilities in electricity pricing as Kentucky utilities either increase the usage of natural gas in their own generating fleet or their reliance on market purchases, which are increasingly influenced by fluctuations in natural gas pricing.

Lastly, PJM’s latest capacity auction results highlight the value of in-state regulated utility-owned generating resources. While other states will likely see double-digit rate increases due to the record-high capacity prices of the 2025/26 PJM capacity auction, customers of Kentucky utilities participating in the PJM market will see no or a minimal rate increase as most of the state’s utilities did not participate in the auction because they own and operate sufficient power plants to meet their demand. Maintaining Kentucky’s power plant fleet will be paramount to ensuring Kentucky ratepayers continue to enjoy one of the country's lowest electricity rates.