A Look Under the Hood: Unexpected Factors that Increase Retail Electricity Prices in Ohio[†]

Authors: Noah Dormady, Ph.D.; Alfredo Roa-Henriquez, Ph.D.; Matthew Hoyt, M.P.A.; Matthew Pesavento, Ph.D.; Grace Koenig, B.S.; William Welch, M.P.A.; Zejun Li, M.A.

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Scope of the Problem:

With the passage of SB 3 in 1999, the Ohio General Assembly began the process of restructuring (or 'deregulating') the State's electricity markets. As a result of this process, most consumers can now 'shop' for the generation portion of their electricity bill, through what is now called 'retail choice.' The other portions of a consumer's bill (transmission and distribution) remain set by regulators rather than through the workings of markets. How generation pricing markets work plays an exceedingly important role in shaping consumer outcomes, including energy prices for Ohio's households and businesses.

Although restructuring provides customers with an opportunity to shop, some do not. Thus, two generation pricing markets exist. Customers who shop (or take service through a municipal aggregation) purchase their generation from a Competitive Retail Electric Service (CRES) supplier (called a 'marketer') in an open market. The rates in this open market are intended to be competitively set based on the cost of procuring electricity from regional wholesale markets. In other words, policymakers originally expected that there would be competition among the marketers, and consumers would get a fair rate because the marketers would compete with one another to earn consumers' business. Customers who do not, or cannot, shop stay on the Standard Service Offer (SSO), otherwise known as 'default' service.

RETAIL CHOICE:

Retail deregulated markets like Ohio's are commonly referred to as "retail choice" markets.

Retail choice means that residential customers can either "shop" from among competing marketers to supply their electricity on a contractual basis, or remain with the regional distribution utility on the Standard Service Offer (SSO).

STANDARD SERVICE OFFER (SSO):

The SSO is the default price for generation (excluding the price of transmission or distribution) provided by an electric distribution utility for customers who do not, or cannot, obtain service from a CRES supplier. SSO service is sometimes referred to as Provider of Last Resort (POLR) service.

⁺ The findings, conclusions, and recommendations expressed in this report are the product of research conducted by the authors and do not necessarily represent the views of either the John Glenn College of Public Affairs or The Ohio State University.



A key challenge in the design of retail choice markets is determining how retail generation prices should be set for the 40-60% of customers who do not shop.¹ In Ohio, the default generation price for non-shopping customers is set by a complex series of procurement auctions, called competitive bidding process (CBP) auctions. These auctions are held by each local distribution utility (e.g., FirstEnergy, AEP) to procure energy, capacity (i.e., reliability), and ancillary services (i.e., services that stabilize the grid) for SSO customers. These auctions take place in advance of a delivery period, meaning the period during which electricity is served to customers. Multiple auction results are blended, or averaged over time, to determine the SSO retail price for customers who do not shop.

Herein lies the problem. CRES suppliers are not entirely in competition with one another as originally expected. Instead, many of them have

COMPETITIVE BIDDING PROCESS (CBP) AUCTION:

Each regional distribution utility conducts regular auctions through which third-party suppliers bid for the right to supply full requirements generation services to the distribution utility on behalf of default customers for a future time period.

been setting their rates based on the prices of the CBP procurement auctions, as indicated in a recent peer-reviewed study published by researchers at The Ohio State University.² That research also found that the majority of CRES offers have been more costly than the SSO. Further, during times when the CRES marketplace has offered consumers savings, the savings have been relatively small.

Why is this important? If default service auctions are not operating efficiently or competitively, retail energy prices may be higher *not only* for default customers who do not shop, but for <u>all customers</u> in the State. Put simply, the CBP procurement auctions are the lynchpin of consumer electricity prices in Ohio.

The Ohio State University Study:

A new peer-reviewed study from the Energy Markets and Policy Group at The Ohio State University (OSU Study), in collaboration with external partners and funded by the Alfred P. Sloan Foundation, assessed the CBP auctions that set the default service price and that drive CRES market and municipal aggregation prices across Ohio.³

¹ For specific customer and consumption switching statistics over time and by region, see Public Utilities Commission of Ohio, Customer Choice Activity dashboard. Available at: <u>https://puco.ohio.gov/utilities/electricity/resources/ohio-customer-choice-activity</u>. Over the last decade (the period of study reported in the peer-reviewed study described herein), the statewide average ranged between approximately 40 and 60%.

² See Dormady, Noah, William Welch, Yufan Ji, Stephanie Pedron, Abdollah Shafieezadeh, Alberto Lamadrid, Matthew Hoyt, and Samantha Fox. "Efficiency and consumer welfare under retail electricity deregulation: Analysis of Ohio's retail choice markets." *Journal of Critical Infrastructure Policy* 6, no. 1 (2025): e12031. Available at: <u>https://doi.org/10.1002/jci3.12031</u>. See also, Dormady, Noah, William Welch, Yufan Ji, Stephanie Pedron, Abdollah Shafieezadeh, Alberto Lamadrid, Matthew Hoyt, and Samantha Fox. "Finding a black cat in a coal cellar: Ohio State University study of Ohio's retail electricity markets finds majority of retail electric supply offers have not been cost saving, cost saving offers difficult to find." *John Glenn College of Public Affairs*. Policy Brief, December 17, 2024. Available at: <u>https://glenn.osu.edu/sites/default/files/2024-12/JGC_Policy-Brief-Electricity-Markets_2024-12.pdf</u>

³ See Dormady, Noah, Alfredo Roa-Henriquez, Matthew Hoyt, Matthew Pesavento, Grace Koenig, William Welch, and Zejun Li. "How are retail prices formed in restructured electricity markets?" *Energy Economics* (2025): 108243. Available at: <u>https://doi.org/10.1016/j.eneco.2025.108243</u>

The team built and analyzed a comprehensive dataset relating to each of the 120 auctions held for each of the four major electric distribution service territories in Ohio: AEP Ohio, FirstEnergy, AES/Dayton Power and Light or DPL, and Duke Energy. The analysis was performed over 14 years, with data between 2010 and 2023. The dataset accounts for many factors that explain changes in auction outcomes and consumer retail prices. These include historic wholesale energy market conditions (e.g., wholesale electricity and natural gas prices), historic options market data, historic consumer load data, and historic auction performance data.

Study Findings:

Figure 1 visualizes the major relevant cost categories that, together, contribute to the default generation price as indicated in the OSU study. The suppliers' price for procuring wholesale electricity (supply cost) was an average of \$59/MWh (or 5.9 cents/kWh). The price for reliability (from capacity markets) was an average of \$10/MWh (or 1 cent/kWh). Conducting fewer auctions that procured a higher share of electricity ('tranches'), as opposed to more frequent auctions procuring smaller increments of electricity, produced slightly more favorable retail prices, equal to a savings of about \$6/MWh (or 0.6 cents/kWh). These values incorporate suppliers' profit and overhead.



Figure 1. Waterfall Chart of Factors Contributing to Default Retail Electricity Generation Price

Note: The chart provides the categories—some of which aggregate multiple factors—that contribute positively or negatively to the CBP auction prices used to set the default SSO generation price in Ohio. Values are averages based upon the statistical analysis published by Dormady et al. (2025) *Energy Economics*, incorporating 14 years of historical auction and market data for each electric distribution service territory in Ohio.

Importantly, the OSU study has two key takeaways that inform today's pressing energy debates. Two additional, unanticipated factors were found to significantly impact consumer prices:

1. Competition in the CBP procurement auctions is critical to retail consumer price relief.

After evaluating numerous market factors and conditions over a 14-year period of study, one key variable stood out to researchers: *competition*. When fewer bidders showed up to compete with one another, and when the auctions were less competitive, retail prices considerably increased. During the research period, the number of participating bidders ranged widely, from as few as five to as many as 15 different suppliers. Through the use of statistical techniques, the researchers found that each additional bidder provided between about \$3-\$4/MWh (or 0.3-0.4cents/kWh) in price relief (i.e., reduced cost) to retail consumers.

Put another way, just three additional competing bidders could reduce retail prices for consumers by about \$10-\$12/MWh (or 1 to 1.2 cents/kWh), an 18-23% savings.

Further, the researchers noticed a key pattern in the relationship between the count of competing bidders and the count of bidders who *did not* win procurement contracts in the auctions (i.e., the count of losing bidders). When more bidders try to win supply contracts but are edged out by other less costly suppliers (i.e., when there are more losing bidders), this indicates a higher order of competition. That is, a higher number of losing bidders suggests that bidders are competing more aggressively with one another. This process results in lower prices for consumers.

The practical significance of this competition finding is considerable. When as few as only three bidders do not show up to compete in these auctions (or withhold their supply), the retail price markup (including suppliers' profit margin) increases between 27 and 36 percent. That is more than a full \$10/MWh (or 1 cent/kWh) of additional costs to consumers. When those bidders opt out of participating in the auctions, the suppliers that do show up have the ability to charge consumers a much higher premium because a seller's market has been created by their absence. That means less money in consumers' pockets.

This finding can be put in perspective relative to the overall size of the U.S. Shale Boom.⁴ From 2008 to 2016, the net annualized price of natural gas declined from \$8.86 to \$2.52/MMBtu.⁵ This decrease led to a \$34/MWh (or 3.4 cent/kWh) decrease in the retail generation price in Ohio, according to the researchers. The OSU study results, meanwhile, indicate that this same effect could be achieved with an average increase of nine additional competing bidders in the SSO auctions. In other words, if policymakers could induce or incentivize nine additional suppliers—approximately the same number of bidders as the difference between the highest (15) and lowest (5) bidder count during the study period—to show up and meaningfully compete in the SSO auctions, Ohio's businesses and households

⁴ In the early 2010s, large deposits of natural gas in Ohio and surrounding Appalachian states were tapped resulting in substantially lower energy costs.

⁵ Based on the NYMEX Henry Hub, the most liquid (i.e., widely traded and cash convertible) market.

could see the same degree of price relief as the entirety of the US Shale Boom. The importance of competition should not be understated.

2. Future price uncertainty drives higher retail energy prices.

In addition to competition, the researchers also found that implied volatility is a key cause of higher retail generation prices. Implied volatility, which is a complex economic and finance-related concept, is an indicator of the expected future price uncertainty in a market. It is calculated based upon realized trades by commodities brokers in energy markets. This is important because, when suppliers bid in the SSO auctions, they use options markets to 'hedge' uncertainty.⁶ This helps them manage the risk of market changes, including future price changes.

The researchers studied historic options data using trading data from the day of each historic SSO auction. Over the full study period, the researchers found that increased implied volatility added about \$12/MWh (or 1.2 cents/kWh) to retail costs. This is important because it demonstrates that the auction-based market is effectively pricing market uncertainties. However, that uncertainty is passed along to consumers in the form of significantly higher retail prices.

Policy Recommendations:

Presently, Ohio's policymakers are debating numerous energy policy reforms. These include changes to how consumers are billed, certain relationships between marketers and distribution utilities, and the process through which certain costs are incorporated into rates. However, the current debate and recently introduced reform measures do not address the most fundamental element of consumer price relief—the CBP auctions that set the default retail generation price, upon which all other generation prices in the State are set or influenced. In other words, the current debate is overlooking the most fundamental market element.

There are some direct actions that policymakers can take to address this core issue:

1) Commission a thorough independent study of CBP auction format.

The rules and format of auctions can vary widely. When the CBP auctions were originally introduced in Ohio and codified in State law, external consultants recommended the format that is currently being used. Various consultants provided recommendations for the auction format but a thorough study comparing various auction formats and designs was not conducted or released to the public. This is unusual because it is commonplace for public entities to commission these sorts of studies for auction-based markets that allocate important public goods.⁷

⁶ An option contract is a financial agreement that gives the buyer the right to buy or sell a market product at a predetermined price.

⁷ This includes the U.S. Federal Communications Commission's (FCC) spectrum auctions that allocate cellular telephone frequencies to different cellular service providers, and the U.S. Environmental Protection Agency's (EPA) auctions that were administered by the Chicago Board of Trade (CBOT), among several other prominent examples.

These studies can help to ensure that consumers and suppliers are served by the most appropriate auction format and auction rules before they are rolled out. Through these studies, external independent experts can perform sophisticated analysis and modeling, and various outcomes can be compared, including fairness of prices, risks to consumers and suppliers, environmental considerations, investment incentives, and other strategic priorities. This may also help to assure Ohioans that the format used today is the most appropriate.

2) Incorporate novel alternative policy designs into the study.

Policymakers should keep an open mind to alternative formats and market rules that may help to improve consumer and supplier outcomes. Some possible market rules that may be worthwhile candidates for evaluation include, but are not limited to:

- Alternative auction formats: The current descending clock auction format can be compared against alternative combinatorial formats, Vickrey, uniform-price and sealed-bid auction formats.
- **Supplier diversity rules**: Alternative evaluations can be conducted with varying rules for supplier diversity (e.g., requiring at least 3 to 4 different winners) that may help to attract increased participation. For example, in Maine, default service auctions require at least 3 providers across the three separate service procurement products there.
- **Separate default service products for different customer classes**: Ohio is the only retail choice jurisdiction to combine the load for all customer types (e.g., residential, small businesses, large industrial consumers) into one default service product. Dividing default service load into different products for different classes is worthy of study as it could enable better tailoring of procurement requirements for the types of customers being served. This, in turn, could help bidders better manage their risk.
- Alternative forward delivery periods: Ohio's CBP auctions include longer-term procurements of 36 months (3 years into the future) alongside shorter procurements of 1 year. Other states do not have such long-range procurements. Longer-term procurements may add risk premia that harm consumer price relief. A thorough study of the merits of longer versus shorter timing and its implications under various market scenarios and conditions can be of great help in ensuring that consumers are not unnecessarily paying to protect suppliers against market uncertainty.
- **Minimum bidder requirements:** Economists have long understood that when there are not enough suppliers in a market, the few suppliers that do exist can call the shots and dictate prices. Alternative auction formats should be studied that include different requirements for minimum counts of suppliers before the auction can proceed.
- **Reducing barriers to entry:** Market rules and regulations such as credit requirements can play an important role in influencing whether a supplier enters a market. The study should also consider the market rules and regulations that may be unnecessarily restrictive, and the degree to which they disincentivize auction participation.

More broadly, the commissioned Ohio study should also consider evaluating the potential of procurement products that address supplier risk. This can include "block and spot" or "swing" products as used in some other states with retail choice markets.⁸

3) Conduct auction competitiveness evaluations.

The Ohio State University Energy Markets and Policy Group has previously recommended the establishment of an Office of the Independent Market Monitor (IMM) to independently evaluate the efficiency and competitiveness of Ohio's restructured retail electricity markets. It is recommended that this office be tasked with a routine evaluation of the competitiveness of the CBP procurement auctions. This is common practice in other auction-based markets, including auction-based markets for tradeable emissions permits, but it does not happen comprehensively in Ohio by a central independent entity. There is no independent market evaluation conducted for these important auctions.

An IMM evaluation of an auction's competitiveness would include key economic indicators and tests for competitiveness, including tests for the presence of one or more pivotal suppliers.⁹ These formal evaluations can quantify the degree to which any supplier or group of suppliers are able to control or influence prices in the auctions, engaging in possible market manipulations of the auctions, or are incentivized to collude with one another to inflate profits. An IMM would have confidential access to each bidder's bidding data that are generally not publicly disclosed, and would use that data to evaluate conduct and performance in these important procurement auctions.

⁸ Suppliers in Ohio SSO auctions bid on full requirements, load following contracts, meaning suppliers assume all risk associated with meeting their service obligations. A "block and spot" contract, by comparison, involves procuring fixed quantities of energy at set prices ("block" purchases) and then using variable, short-term transactions ("spot" purchases or sales) to balance block quantities with actual service obligations. This approach, which is used for default service in Illinois and New York, transfers more risk to consumers. "Swing" arrangements, a variant of which is used for default service in Delaware, put bounds on bidder risk that are tied to an established range of acceptable load or price variation.

⁹ These important tests would include public release of each auction's Herfindahl-Hirschman Index (HHI) and/or Lerner Index, alongside pivotal supplier tests.