UPDATE ON ELECTRICITY CUSTOMER CHOICE IN OHIO:

Competition Continues to Outperform Traditional Monopoly Regulation

NOPEC℠

No one does more to lower your utility bills.℠

UPDATE ON ELECTRICITY CUSTOMER CHOICE IN OHIO:

Competition Continues to Outperform Traditional Monopoly Regulation

Prepared by:

Cleveland State University
Maxine Goodman Levin College of Urban Affairs

THE OHIO STATE UNIVERSITY
JOHN GLENN COLLEGE OF PUBLIC AFFAIRS
OHIO MANUFACTURING INSTITUTE

Cleveland State University:

Andrew Thomas
Mark Henning
William Bowen

The Ohio State University:

Edward (Ned) Hill
Adam Kanter

Prepared for: Northeast Ohio Public Energy Council

NOPEC℠
No one does more to lower your utility bills.℠

The findings, conclusions, and recommendations expressed are those of the authors. They do not necessarily represent the views of Cleveland State University, The Ohio State University, or of the Northeast Ohio Public Energy Council.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The purpose of this study is to provide an update to the research team's 2016 report *"Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation"* using data for 2016 through 2018.

KEY FINDINGS:

1. **Since 2011, Ohio consumers have saved $23.9 billion because of deregulation.** Of this total savings, $19.5 billion resulted from competitive auctions driving down the price of the utilities' Price to Compare (PTC). These savings are realized by Ohio electric consumers who obtain their power from the default generation service that sets the price for this utility service. An additional $4.4 billion has been saved by consumers who contracted with Competitive Retail Electric Service (CRES) providers or governmental aggregators and were able to negotiate electricity prices below the PTC.

   The 2016 report analyzed data through 2015 and estimated that Ohio consumers had saved about $3 billion per year, $15 billion in total, through deregulation between 2011 and 2015. That report set forth two types of savings:

   - "Shopping" are those costs avoided through purchasing electricity from a CRES provider, rather than defaulting into the Standard Service Offer (SSO) (used to create the PTC).
   - "SSO Auction" are the savings resulting from utilities setting their SSOs through a competitive auction process, rather than the traditional cost-based accounting method that was used in Ohio before deregulation.

Total Savings Due to Deregulation in Ohio 2011-2015 (millions of dollars)

Year	Shopping	SSO Auction	Total
2011	$496.70	$2,395.00	$2,891.70
2012	$443.29	$2,366.00	$2,809.29
2013	$744.11	$2,342.00	$3,086.11
2014	$824.21	$2,380.00	$3,204.21
2015	$645.19	$2,339.00	$2,984.19
Total	**$3,153.30**	**$11,822.00**	**$14,975.30**

Below is the update analyzed pricing data from 2016-2018. Total savings over the three years was around $9 billion.

Total Savings Due to Deregulation in Ohio 2016-2018 (millions of dollars)

Year	Shopping	SSO Auction	Total
2016	$540.77	$2,553.90	$3,094.67
2017	$403.59	$2,502.10	$2,905.69
2018	$353.45	$2,612.60	$2,966.05
Total	**$1,297.81**	**$7,668.60**	**$8,966.41**

Total Savings from Deregulation in Ohio 2011-2018 (millions of dollars)

Shopping	SSO	Total
$4,451.11	$19,490.60	$23,941.71

* Energy Information Agency (EIA) data, together with brokerage data from aggregated private contracts, and aggregator pricing discounts from the Price to Compare, were used to estimate the total savings realized from competitive generation markets.

2. **Competition has driven down average electricity prices in deregulated Midwestern states (Ohio, Pennsylvania, Illinois), while their regulated peers (Indiana, Michigan, Wisconsin) have seen a steady increase in price of generated electricity.** Ratepayers in these regulated states are saddled with the cost of aging, uneconomic power plants, while competitive markets in the deregulated states have incentivized investment into new efficient and cost-effective generation and have accessed wider multi-state markets for generated electricity. Deregulation has also led to the adoption of dynamic pricing programs and more renewable energy resource offerings.

   Competitive markets have proven to be a powerful tool to deliver value to Ohio's ratepayers. Competitive rates are attractive to businesses looking to locate in Ohio. Any attempt to derail competitive generation markets would cause significant harm to all of Ohio's electric consumers and to Ohio's economy.

3. **The Study Team anticipates that savings will continue for the near term to be around $3 billion per year. However, these savings may be lost, in whole or in part, if deregulated energy markets continue to be undermined by cross subsidies of uncompetitive Investor Owned Utility (IOU) generation through Electric Distribution Utility (EDU) riders and surcharges, or through legislatively-mandated, above-market Power Purchase Agreements (PPAs) and subsidies.**

   Despite the many benefits of competition, there have been continuing threats to deregulated electricity markets in Ohio. Investor Owned Utilities have used Ohio's regulatory system to obtain cross-subsidies to support their unprofitable generating facilities through riders and surcharges collected by their regulated Electric Distribution Companies on consumers' bills.

   The costs charged to Ohio consumers through these riders and surcharges are not directly related to the purchase of electric power itself. These efforts have served to undermine the billions of dollars of benefits consumers have realized from competitive markets and have prevented consumers from realizing the full benefits from deregulation.

I. INTRODUCTION

In November 2016, Cleveland State University's Energy Policy Center, in partnership with The Ohio State University's John Glenn College of Public Affairs and the Northeast Ohio Public Energy Council, released the report "*Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation*." At that time, some investor-owned utilities were advocating reregulation of electric generation in Ohio, reverting to the traditional vertically integrated monopoly model that defined the electricity industry for most of the 20th century. The report found that such a reversion would likely cost Ohio consumers around $15 billion dollars over the ensuing five years. Indeed, the report demonstrated that deregulation had saved Ohio electricity consumers over $14 billion between 2011-2015 as a result of competitive generation markets.[1]

This updated study was undertaken to determine if the projected savings from 2016 to present had in fact materialized, and if not, what changes have occurred since 2015 that may be affecting competitive retail electricity markets. This new study has been conducted by the same team that researched and produced the 2016 report.

As of the spring of 2019, Ohio's electricity markets remain competitive. However, there continues to be regulatory and legislative activity that threatens the health, if not the existence, of competitive retail electricity markets in Ohio. These threats include, among other activities, the cross subsidization of generation through surcharges and riders applied to Ohio ratepayers by reregulating at least a portion of Ohio's electricity generating capacity. Shifting a portion, if not all, of generation costs to regulated rate-making undermines the efficient operation of Ohio's electricity generation market and will cost consumers money. Moreover, subsidized generation bid into the utility Standard Service Offer (SSO) auctions depress Ohio's "Price to Compare (PTC)," the rate which competitive retailers must beat to sell electricity. An artificially suppressed PTC reduces the available "headroom" for CRES providers to show value to customers while delivering acceptable margins. This may in turn cause aggregators, brokers and commercial retail electric service (CRES) providers to leave Ohio's market, easing competitive pressure on the IOUs. This will result in price increases that will be unchecked by competition. Ohio would return to its old system of regulated rate making where the cost of purchased electricity is augmented by a guaranteed rate of return that is approved by the Public Utility Commission of Ohio (PUCO) – a system that our 2016 Report showed would have cost ratepayers billions of dollars had it been continued.

[1] Thomas, et al. (2016). "*Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation*." Retrieved from *https://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=2420&context=urban_facpub*

What is currently an unregulated multi-state market for electricity generation will devolve into a partially regulated generation market. Think of electricity that is being consumed at any point in time as a large pool of electrons. Currently the pool is filled by competitive purchases of electricity on an open market with the first electrons that enter the pool coming from the cheapest source of supply. If demand is greater than supply after the lowest cost electrons spill into the pool, then the next cheapest source will continue to fill the pool. This goes on until supply meets demand and the cost of the last electrons to enter the pool can be thought of as determining the cost of power. In reality it is the average cost of all of these tranches of power that determines the price. Electricity generating capacity that is above the market determined price does not enter the pool.

There are five reasons why the cost of electricity generation will increase in a reregulated market:

- If the state legislature mandates that power that is purchased with above-market rate PPAs be the first electrons to spill into the pool, then the most expensive power enters first and displaces cheaper power. It makes no difference if this power comes from subsidized nuclear plants or new utility scale solar farms. The trouble stems from the mandated above-market PPAs, coupled with subsidy. The power that will be rationed out of the pool is likely to be the next most expensive power source. Arithmetic and the calculation of average and marginal costs ensures a higher price of purchased power under the reregulated regime than under the existing competitive system.
- The second reason why we expect the cost of electricity generation to increase if the market is either partially or fully reregulated is that protected sources of generation will have reentered the world of cost-plus pricing and will lose their incentive to hold down costs.
- A third wave of cost increases will come from the capacity markets. PJM Interconnection, the regional transmission organization that covers Ohio, runs auctions for power generation and from reserve generation capacity (termed capacity markets), in addition to auctioning off room in its transmission lines. To protect the capacity markets from being undermined by state-subsidized power and predatory pricing, PJM offsets the cost of the subsidy by assessing fees on power users in the subsidizing states. Runnerstone, an independent energy analytical consulting firm, puts this cost at $80 million a year.[2]
- The supply-side domino effect will also contribute to the long-term increase on the cost of power. If the newly protected sources of electrons push Ohio-located production out of the market, those producers, their employees, and their elected officials will call a foul and insist on equal protection. If they have either enough political power or political sympathy as victims of legislatively-enabled market rigging, they too may earn above-market PPAs and shove the next highest producer out of the pool.

[2] Nader, Jordan and Seryak, "FirstEnergy Solutions Corp. Recommended Changes to Wholesale Electricity Markets to Address Power Plant Subsidies." Runnerstone, May 16, 2019. *https://ohiomfg.informz.net/ohiomfg/data/images/PJM%20memo-may2019.pdf*

- The fifth reason to expect prices to increase is the deterrence of new, low cost, sources of power from entering the generating market as the market is draped in legislatively mandated protection. Natural gas generation that is not owned by IOUs is, for instance, price competitive. This has unleashed consumer savings throughout the PJM territory, including Ohio. In a flat, or slowly growing power market, the return on investment for new generation depends on higher cost, inefficient, sources of power leaving the market. If higher cost power does not leave due to legislative action, then there is no room for competitive supply, investment will not take place, and prices will rise once again.[3] The cumulative effect is higher profits for the legacy power producers, increased costs for consumers, and diminished economic prospects for Ohioans. Protected power generation is an anti-economic development policy.

We estimate that deregulation of retail electricity markets has delivered $8.7 billion in savings to Ohio customers from 2016-2018. In total, since 2011, Ohio's consumers have saved $23.9 billion as a result of electricity deregulation. This updated study confirms the continued savings to Ohio consumers of about $3 billion per year from Ohio electric generation deregulation. These projected savings assume that Ohio's General Assembly does not enact legislation that subsidizes uncompetitive power generators and does not re-regulate utility scale green generating sources owned by IOUs.

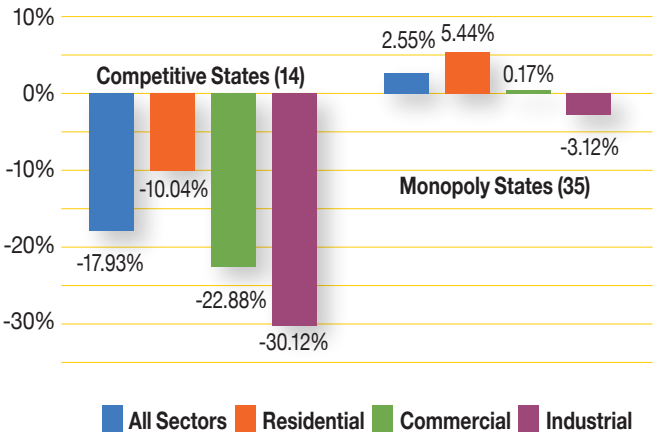
[3] Siderewicz, William. H.B. 6 Testimony to the Energy Generation Subcommittee of the Energy and Natural Resource Committee of the Ohio House of Representatives, April 24, 2019.

II. LITERATURE REVIEW

The Study Team's 2016 report contained a literature review highlighting a wide range of studies focused on measuring the impact of deregulation on electricity prices. These studies concluded that deregulation generally led to a decrease in electricity prices. The degree and timing of this impact were dependent upon the regulatory structure in which each competitive electricity market operates.[4] Some regulatory environments more readily promote the transfer of competitive benefits to ratepayers, while others limit the opportunities for consumers to realize these benefits.

Since 2016, several important new reports have emerged that shed additional light on the value of deregulation. The first, written by Philip O'Conner in 2017, was an update of a 2015 study, and directly compares the rate of change in weighted average price between regulated and competitive markets.[5] The 2017 report extends the analysis beyond the five Midwestern states originally examined, comparing the prices of 35 monopoly states to 14 competitive states. Figure 1 shows O'Connor's 2017 findings. The study demonstrates that while "all sector" prices in competitive states have dropped nearly 18% since 2011, they have simultaneously gone up nearly 3% in monopoly states, for a 21% difference in growth rates.

FIGURE 1: Inflation-Adjusted Weighted Average Percentage Price Change by Rate Class, Choice vs. Monopoly States, 2008-2016



Source: O'Connor[6]

[4] Thomas, et al., *supra*.

[5] O'Connor, P. & O'Connell-Diaz, E. (2015). "Evolution of the Revolution: The sustained success of retail electricity competition." COMPETE. Retrieved from: *http://www.competecoalition.com/files/COMPETE%20White%20Paper_Evolution%20of%20Revolution_Final.pdf*

[6] O'Connor, O. (2017). "Restructuring Recharged: The Superior Performance of Competitive Electricity Markets 2008-2018." Retrieved from *https://www.resausa.org/sites/default/files/RESA_Restructuring_Recharged_White%20Paper_0.pdf*

The second study, by Noah Dormady, et al, (2019) considers, among other issues, the impact of Ohio's incomplete deregulation on the ability of ratepayers to realize the full value of competition.[7] Dormady utilized complete electricity bill data from the Public Utilities Commission of Ohio (PUCO) to examine "all-in" prices. They found that due to rate-setting practices in Ohio, IOUs have been able to recover losses incurred from non-competitive power generating plants through non-bypassable charges placed onto regulated, distribution bills.[8] While generation prices have significantly decreased in Ohio since deregulation, these savings have not always lead to a corresponding reduction in total electricity bills of consumers. The expansion of non-bypassable charges that the PUCO allowed the IOUs to recover has masked, in part or in whole, the $3 billion annual savings derived from deregulation in Ohio. The lesson learned from Dormady et al. applies equally as well to electricity regulation and magicians: to understand what is happening always watch the other hand. In the case of regulation, it is the mandatory costs not associated with power generation that takes the place of the magician's hand not holding the scarf.

A third important recent study found that competitive markets have additional benefits for all consumers beyond better prices. According to Morey, Matthew and Kirsch (2016), deregulation has expanded the adoption of dynamic pricing programs, such as time-of-use rates and real-time pricing. These pricing options work to improve the allocation of power system resources (efficiency), to lower the costs of power production, and to improve resource adequacy (system reliability).[9] Additionally, states with retail choice better promote renewable resources both through greater investment into renewable generation and by providing more options for consumers to purchase green energy exclusively.[10]

[7] Dormady, et al. (2019). "Who Pays for Retail Electric Deregulation?: Evidence of Cross Subsidization from Complete Bill Data." *The Energy Journal*, 40(2): 161-194.

[8] *Id*.

[9] Morey, Matthew and Laurence Kirsch (2016). "Retail Choice in Electricity: What Have We Learned in 20 Years?" Electric Markets Research Foundation.

[10] *Id*.

III. CHALLENGES IN ANALYZING ELECTRICITY PRICES

The complex nature of electricity prices creates challenges to isolating the effect of competitive electric markets on the consumer's cost of power. Due to the way data are collected and reported, it can be difficult to separate the regulated and deregulated portions of the price. Also confused is the reported price of purchasing power (the purchased price of electricity without transmission, distribution, and other charges), and the "all-in" price of power (including generating, transmission, distribution, and other mandated charges). In Ohio, the mandated charges are referred to as "riders." Regulated utilities generally do not break down these costs and report them publicly in a fashion that enables easy comparison across service territories or states.

This lack of transparency limits the ability to study the effects of deregulation. Most studies, as a result of this practice, use reported "all-in" prices which encompass both regulated and deregulated components (further discussed in Section V). Such "bundled" price data are readily available from the Energy Information Agency (EIA). However, private retail contracts that beat the standard service offers are not included in EIA data. As a result, any study that relies solely on EIA data will likely overstate the generating cost of electricity by relying on the standard service offer (SSO) and not on the competitive price of power that is reflected in bill data. This overstatement increases with the amount of power used by a customer. It is smallest with residential customers and largest with industrial customers and energy-intensive users such as data centers. EIA data do not fully measure savings from deregulation.

This study assesses the savings realized both from competitive auctions setting the Price to Compare, as reflected in the EIA data, as well as from retail shopping. Statistical techniques were deployed to estimate the impact of deregulation on the Price to Compare. These techniques are explained in more detail in Section VII. In addition, private retail contracts were aggregated and examined to estimate the savings from shopping. In Ohio, 57% of consumers, accounting for 79% of the total consumption, shop for their power,[11] and in so doing, over time generally beat the PTC.

[11] PUCO. (2019). Retail Market Activity: Switching Rate Percentage (Customer Count). *https://app.powerbigov.us/view?r=eyJrIjoiMjU1ZWRkNGUtYmJmZS00YTEyLTk5NWYtMGE1NmJmZjYxMzVjIiwidCI6IjUwZjhmY2M0LTk0ZDgtNGYwNy04NGViLTM2ZWQ1N2M3YzhhMiJ9*

To capture this additional value to consumers from shopping, the Study Team aggregated data from private sources for larger "mercantile" users of electricity (customers that use more than 700,000 kilowatt hours (kWh) a year). The effects of deregulation on smaller "non-mercantile" consumers (residential and some commercial users) in Ohio were estimated by applying the discount rates negotiated by a municipal government aggregator, Northeast Ohio Public Energy Council (NOPEC) through 2017. These rates were assumed to be representative of savings offered to non-mercantile electricity shoppers across the state.

For mercantile customers, the Study Team used broker data aggregated from Competitive Retail Electric Service (CRES) retail energy supply contracts. Data were gathered from over 1,000 accounts and aggregated to maintain confidentiality. Contracts were gathered from all four territories served by Ohio's investor-owned utilities: FirstEnergy, AEP Ohio, Duke Energy, and Dayton Power & Light.

Average load factors and average electricity consumption for each of the rate classes were used to model electricity prices. This method helps create "apples to apples" comparisons between each rate class's PTC and the privately contracted cost of generated electricity. This method is also consistent with the practices used by the professional staff of the Public Utilities Commission of Ohio.[12] The average load factor assumed for the mercantile primary rate class was 67 percent, with an average annual consumption, or usage, of 3 million kWhs. The average load factor assumed for the mercantile secondary rate class was 47 percent, with annual usage of 1 million kWhs.

[12] Public Utilities Commission of Ohio. (2013). "In The Matter of the Commission's Review of Customer Rate Impacts from Ohio Power Company's Transition to Market Based Rates." PUCO Case Number 13-1530-EL-UNC, Attachment 1A. Retrieved from: *https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=13-1530*.

IV. OHIO'S COMPETITIVE MARKET

A. OVERVIEW OF DEREGULATION IN OHIO

A comprehensive history of Ohio's path to deregulation can be found in the Study Team's initial report posted in 2016. This overview highlights the key aspects of Ohio's restructuring and provides context for the ensuing analysis of the state's electricity market.

Ohio's journey to deregulation began in the 1990s in response to increased pressure from commercial and industrial users. These users sought greater direct access to wholesale markets to decrease costs of production and other utility-related expenses. Increasing electricity prices during this time period threatened Ohio's manufacturing base, as many industrial users began to move out of the state.[13]

In 1999, Ohio's General Assembly passed Senate Bill 3, which initiated restructuring of the electricity generation in the state. The Bill required electric utilities to allow consumers to choose their electric retail suppliers, beginning in 2001. However, the bill mandated a five-year "market development" period, which provided utilities time to transition to a competitive generation market. During this time, retail rates were frozen. After "market development" ended, the PUCO extended retail rate freezes through a "rate stabilization period," further delaying the development of a competitive retail energy market.[14]

In 2007, Ohio's then-Governor sought to fix the regulatory structure in Ohio after determining that deregulation was "not working."[15] This was proposed under an "Energy, Jobs, and Progress Plan," with the goal of remaking the regulatory structure under which utilities operate, and advancing the development of renewable energy in Ohio.[16] The plan was introduced as Senate Bill 221.

Senate Bill 221 introduced market-based ratemaking into Ohio's retail market. The Bill required utilities to remain the "provider of last resort," or the supplier that provides default service if a consumer fails to choose an alternative provider. The rate paid by non-shoppers who retain the default service is called the - the "Price to Compare" which is the sum of the "Standard Service Offer" and all other by-passable riders as approved by the PUCO under Senate Bill 221. The SSOs are set through a competitive

[13] Thomas, et al. (2016). "*Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation*." Retrieved from *https://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=2420&context=urban_facpub*

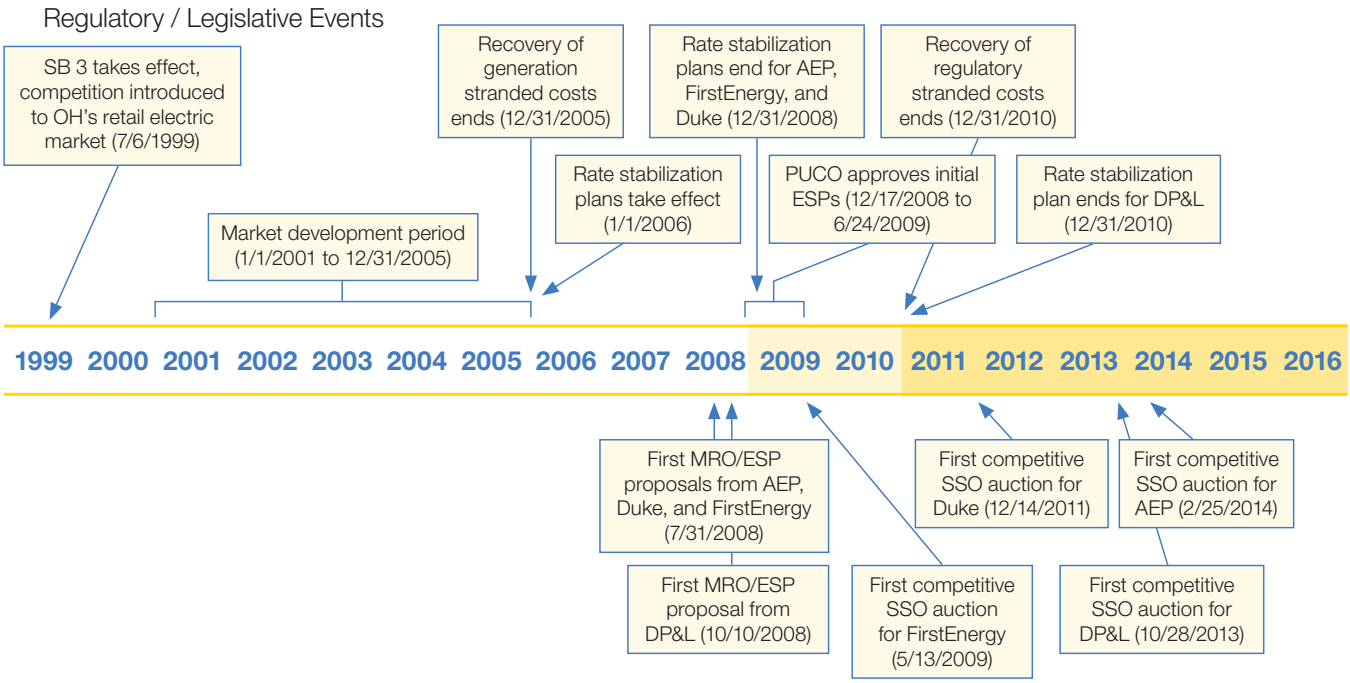
[14] Public Utilities Commission of Ohio. (2007), "Electric Rate Stabilization Plans: Ensuring Rate Certainty in Ohio." Retrieved from: *http://www.getpurenergy.com/states/forms/Electric%20Rate%20Stabilization.pdf*.

[15] Littlechild, S. (2007), "Municipal Aggregation and Retail Aggregation in the Ohio Sector." Retrieved from: *http://www.eprg.group.cam.ac.uk/wp-content/uploads/2008/11/eprg0715.pdf*.

[16] Bricker & Eckler. (2008). "Ohio Senate Bill 221: A Summary of Its Advanced Energy and Energy Efficiency Provisions." Retrieved from: *http://www.bricker.com/documents/Publications/1533.pdf*

wholesale energy power market intended to align price-to-compare (PTC) rates with wholesale prices and allow customers to realize the benefits of competition, whether or not they actively shop for electricity.[17] Since 2011, retail electricity markets have grown rapidly in Ohio, as has shopping. Likewise, since 2011, the SSO generation auctions have attracted considerable competition.

FIGURE 2: Ohio Electricity Market Restructuring Timeline



Source: Noah Dormady, et al, Ohio State University (2016)

[17] Dormady, et al. (2019). "Who Pays for Retail Electric Deregulation?: Evidence of Cross Subsidization from Complete Bill Data." *The Energy Journal*, 40(2): 161-194.

B. PROBLEMS WITH CURRENT REGULATORY STRUCTURE

While Senate Bill 221 fixed some of the problems with Ohio's first restructuring effort, the regulatory structure remained imperfect. The problems manifest in two principal ways. First, the legislation failed to mandate the complete divestiture of generation facilities from Electric Distribution Utilities, the latter of which remain fully regulated. Rather, SB 221 continued to allow for "corporate" separation of regulated and unregulated assets, allowing utilities to maintain ownership and control over their generation fleet as subsidiary corporations.[18] With the regulated side of their businesses enjoying a guaranteed rate of return of as much as 11%, the utilities were incentivized to find ways to transfer generation costs to their Electric Distribution Utilities, especially as their aging generation fleets and their sources of generating fuel became increasingly uncompetitive. The IOUs were able to use their regulated operations to financially support, or cross-subsidize, their generation business because of the incomplete separation of assets. They also failed to aggressively write-down the value of their generating assets with the "stranded asset" payments awarded to the PUCO. This cross-subsidization diminished the benefits that consumers should have realized from deregulation. Failing to spin off their uncompetitive generating fleets and not tying their values to market was a business or financial bet that went wrong for AEP, Dayton Power and Light, and most disastrously for FirstEnergy. Incomplete separation threatens to undermine competitive electricity markets in Ohio, including the Standard Service Offer auction.

Second, Senate Bill 221 allowed utilities to continue to set rates through cost-of-service proposals (Electric Security Plans, or ESPs), rather than a competitive bidding process (Market Rate Offers, or MROs). The Bill provided these two avenues for rate-making, but to date, only ESPs have been filed with the PUCO. Through ESPs, utilities can assess "riders" in the non-bypassable portion of customers' electricity bills, so the charges are unable to be avoided through shopping. The PUCO's hearing process for ESPs has resulted in the investor-owned utilities getting approval for cost recovery measures and cross-subsidization without much difficulty.[19] Additionally, oversight over how the money recovered from these "riders" is ultimately spent has been startlingly limited. In 2017, for instance, the PUCO approved a "distribution modernization rider" for FirstEnergy customers, through which the utility collected $168 million that year. The PUCO did not require any specific projects related to grid modernization in relation to the collected funds and FirstEnergy had not, as of the date this report was finalized, reported on how it has used the funds.[20]

[18] Dormady, et al. (2018). "Do markets make good commissioners? A quasi-experimental analysis of retail electric restructuring in Ohio." *Journal of Public Policy*, 1-33. Retrieved from: *https://doi-org.proxy.lib.ohio-state.edu/10.1017/S0143814X18000168*

[19] *Id.*

[20] Kowalski, K. (2018). "FirstEnergy won't say what it's doing with Ohio grid modernization money." Midwest Energy News. Retrieved from: *https://energynews.us/2018/07/30/midwest/firstenergy-wont-say-what-its-done-with-ohio-grid-modernization-money/*

Indeed, FirstEnergy has made no secret about what the distribution modernization rider (DMR) money is for: according to testimony FirstEnergy provided to the PUCO, the purpose of Rider DMR is to provide "credit support" to enable the company to be able to, at some future date, acquire capital for future distribution upgrades.[21] In short, the funds from the DMR had been expressly earmarked to shore up FirstEnergy's failed finances stemming from its uncompetitive generation fleet. The PUCO approved this charge, awarding FirstEnergy over $600 million in subsidies through 2019. FirstEnergy applied with the PUCO for a two year extension of this DMR rider.[22]

As background to the DMR rider, FirstEnergy had previously sought nearly $8 billion in Power Purchase Agreements tied to its nuclear and coal plants. This was approved by the PUCO, but later disallowed by Federal Energy Regulatory Commission because it put regional electricity retail markets at risk. Having failed to get relief with above market PPAs, FirstEnergy sought another end run on deregulation by asking the PUCO to approve a "retail rate stability" rider, totaling $4.46 billion to support the company's coal and nuclear plants. The PUCO did not grant this, but instead gave FirstEnergy the aforementioned $600 million DMR.[23] In short, FirstEnergy was able to obtain subsidies for its upside down generation fleet by simply re-characterizing the generation subsidy as "distribution modernization." What they lost in a competitive marketplace they clawed back through the regulatory process.

The Northeast Ohio Public Energy Council (NOPEC), the Ohio Manufacturers' Association (OMA), and others challenged the legality of FirstEnergy's DMR rider, arguing that it was an illegal cross subsidy of FirstEnergy's unregulated generation fleet through non-bypassable charges collected by its regulated distribution companies. In June of 2019, the Ohio Supreme Court agreed with NOPEC and OMA, determining that the DMR rider was an impermissible charge, because, among other reasons, FirstEnergy was not required to invest the money into modernizing the grid.[24]

[21] PUCO, Rehearing Rebuttal and Surrebuttal Testimony of Eileen M. Mikkelson on Behalf of Ohio Edison Company, The Cleveland Electric Illuminating Company, the Toledo Edison Company, Case No. 14-1297-EL-SSO, July 25, 2016, at p. 5.

[22] R. Heidorn, Jr., RTO Insider, August 16, 2017, *https://www.rtoinsider.com/ohio-puco-firstenergy-47841/*

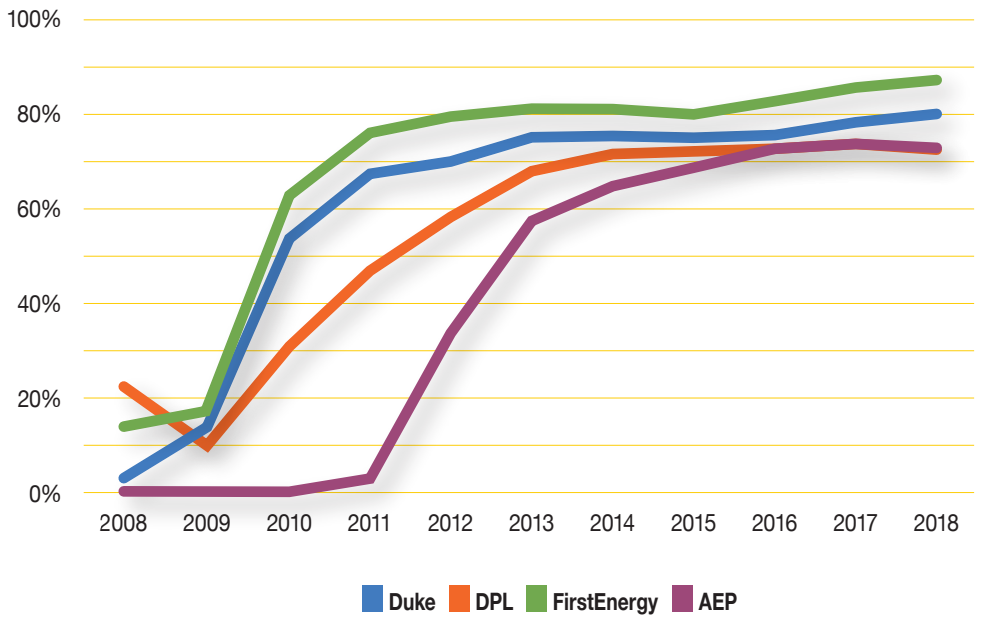
[23] *Id.*

[24] *See* D. Trevas, "FirstEnergy Grid Modernization Charge Improperly Imposed," *Court News Ohio*, June 19, 2019, found at: *http://www.courtnewsohio.gov/cases/2019/SCO/0619/171444_171664.asp#.XSaXpnt7naY*. FirstEnergy filed a motion to reconsider the ruling, which motion was pending as of the date of this report.

C. CURRENT STATE OF SHOPPING

The competitive electricity supply industry evolved slowly in Ohio, as the state's initial regulatory structure did not provide an attractive market place for competitors. In 2008, 90% of the megawatt hour (MWh) sales in Ohio were purchased by defaulting to the SSOs.[25] However, since 2008, Ohio has attracted dozens of CRES providers, who have made significant market gains in the past 10 years. In 2018, 79.4% of all MWh sold in Ohio were sold through CRES providers, accounting for 57% of all electric power customers.[26] Figure 3 below shows the growth of shopping in Ohio. In 2018, commercial retail electric service providers sold more than 70% of all MWh in each utility territory.[27]

FIGURE 3: Percentage of Ohio Energy Sold to Shoppers in Each Utility Territory, 2008-2018



Source: PUCO[28]

[25] PUCO. (2019). Retail Market Activity: Switching Rate Percentage (MWh Sales). *https://app.powerbigov.us/view?r=eyJrIjoiMjU1ZWRkNGUtYmJmZS00YTEyLTk5NWYtMGE1NmJmZjYxMzVjIiwidCI6IjUwZjhmY2M0LTk0ZDgtNGYwNy04NGViLTM2ZWQ1N2M3YzhhMiJ9*

[26] *Id.*

[27] *Id.*

[28] *Id.*

V. RECENT TRENDS IN ELECTRICITY MARKETS

Since our 2016 report, there have been two significant trends affecting regional competitive electricity markets: 1) the closing of some uneconomic power plants and a subsequent introduction of subsidies to support a few of the remaining plants; and 2) a push towards increased choice and new efforts for restructuring.

A. PLANT CLOSURES AND SUBSIDIES

As independent power producers invest into efficient, cost-effective generation facilities, natural gas prices remain low, load remains flat, and society's demand for renewable energy increases, utilities are facing difficulty profiting from older, coal-fired and nuclear power plants. The electricity generated from these plants struggles to compete on the wholesale market.

The unhealthy economic status of older generation facilities has forced many utilities to shutter plants ahead of schedule. Most recently, the Tennessee Valley Authority (TVA) chose to retire its Paradise and Bull Run coal plants in Kentucky and Tennessee respectively. TVA's board faced great political pressure to keep them open, as the country's mix of fuel used to generate power has become an increasingly politicized topic. However, TVA's president made clear that the decision was, "not about coal. Rather, this decision is about economics."[29] TVA serves southern Kentucky and a connecting piece of southwestern Virginia; residents of most of Tennessee, as well as those who live in adjoining western North Carolina, are TVA's customers; sophisticated manufacturing employers in northern Mississippi benefit from TVA's rates, as do those in northern Alabama's Muscle Shoals and Huntsville regions. Chattanooga and Atlanta's northern suburbs are also customers of TVA. In other words, a good portion of Ohio's day-to-day economic competition purchases power from TVA.

Free market reality has driven utilities to demand subsidies to support their uneconomic generation facilities. Such subsidies have been the source of much debate on both the federal and state level, with stakeholders battling over the validity of utility arguments around the value of the uneconomic plants. Utilities contend that both coal and nuclear fueled power generation are key to system reliability and resiliency as they provide baseline generation and create fuel diversity.[30] Supporters of nuclear subsidies also argue for the fuel source's importance to meet low emission goals.

[29] Bruggers, James. (2019). "TVA Votes to Close 2 Coal Plants Despite Political Pressure from Trump and Kentucky GOP. *Inside Climate News*." Retrieved from *https://insideclimatenews.org/news/14022019/tva-coal-power-plants-shut-down-vote-trump-mcconnell-pressure-paradise-kentucky-bull-run-tennessee*

[30] Plumer, Brad. (2018). "Trump Orders a Lifeline for Struggling Coal and Nuclear Plants." *The New York Times*. Retrieved from: *https://www.nytimes.com/2018/06/01/climate/trump-coal-nuclear-power.html*

Numerous states have introduced legislation to support coal and nuclear plants, including Connecticut, Illinois, Indiana, Montana, New Mexico, New Jersey, New York, Ohio, Pennsylvania, and Wyoming. The Department of Energy is also looking into methods of federal financial support for the at-risk power plants.[31]

In Ohio, IOUs have been repeatedly asking for generation subsidies for uneconomic power plants through both the PUCO and the state legislation. For example in 2016, AEP was able to get the PUCO to subsidize aging coal plants in Ohio and Indiana.[32] These plants, originally built in the 1950s, are owned by a collective of IOUs, including FirstEnergy, Duke, AEP, and Dayton Power & Light.[33] After Ohio introduced electric competition, the utilities *voluntarily* extended their contract with these coal plants through June 2040. The PUCO ratemaking ensured that AEP received guaranteed income from the plants by shifting the risk of the utilities' decision making in a competitive market to Ohio's consumers, through their distribution bills.[34] In other words, AEP was granted an above-market-rate PPA to shelter AEP's asset value and shareholders from a business decision that went bad, even though over half of the power produced comes from power boilers located in Indiana and even though the decision was made after the Ohio legislature encouraged the utility to separate its generating fleet from the rest of the company.

FirstEnergy has championed many of these attempts to support aging coal and nuclear facilities. The Northeast Ohio investor-owned utility has been hit particularly hard changes in the relative cost of fuels used to produce electric power. The utility's unregulated generation subsidiary, FirstEnergy Solutions, filed for bankruptcy in March of 2018 as a result of its dependence on uncompetitive coal and nuclear plants. The bankruptcy occurred after a failed appeal to the Department of Energy to issue an emergency order for cost recovery.[35]

---

[31] Bade, Gavin. (2019). "Perry says federal coal and nuke bailout not dead, but encourages states to act." *UtilityDive*. Retrieved from: *https://www.utilitydive.com/news/perry-says-federal-coal-nuke-bailout-not-dead-but-encourages-states-to-a/550461/*

[32] The Investor Owned Utilities were also successful in getting the Ohio General Assembly to propose bailouts through HB 239 and SB 155, which were never passed.

[33] Kowalski, Kathiann. (2017). "As Ohio legislature regroups, power plant subsidy debate to continue." *Energy News*. Retrieved from: *https://energynews.us/2017/08/16/midwest/as-ohio-legislature-regroups-power-plant-subsidy-debate-continues/*. In 2018 FirstEnergy was released from its obligations under these plants by federal bankruptcy court. *See: https://www.cleveland.com/business/2018/05/firstenergy_solutions_wins_cou.html*

[34] Lawson, Greg. (2017). "Utility Subsidies Hurt Competition and Hurt Ohio." *The Buckeye Institute*. Retrieved from: *https://www.buckeyeinstitute.org/research/detail/the-buckeye-institute-utility-subsidies-hurt-competition-and-hurt-ohio#_ftn1*. The Ohio Supreme Court upheld the PUCO's right to cross subsidize the OVEC charges to distribution bills. *See:* D. Trevas, "Court Approves Ohio Power Company Rate Plan," *Ohio Court News*, November 27, 2018, found at: *http://www.courtnewsohio.gov/cases/2018/SCO/1127/aep.asp#.XMpQdqZ7mYU*

[35] Walton, Robert. (2018). "FirstEnergy Solutions files for bankruptcy after pushing for DOE emergency order." *UtilityDive*. Retrieved from: *https://www.utilitydive.com/news/firstenergy-solutions-files-for-bankruptcy-after-pushing-for-doe-emergency/520371/*

B. INCREASED CONSUMER CHOICE

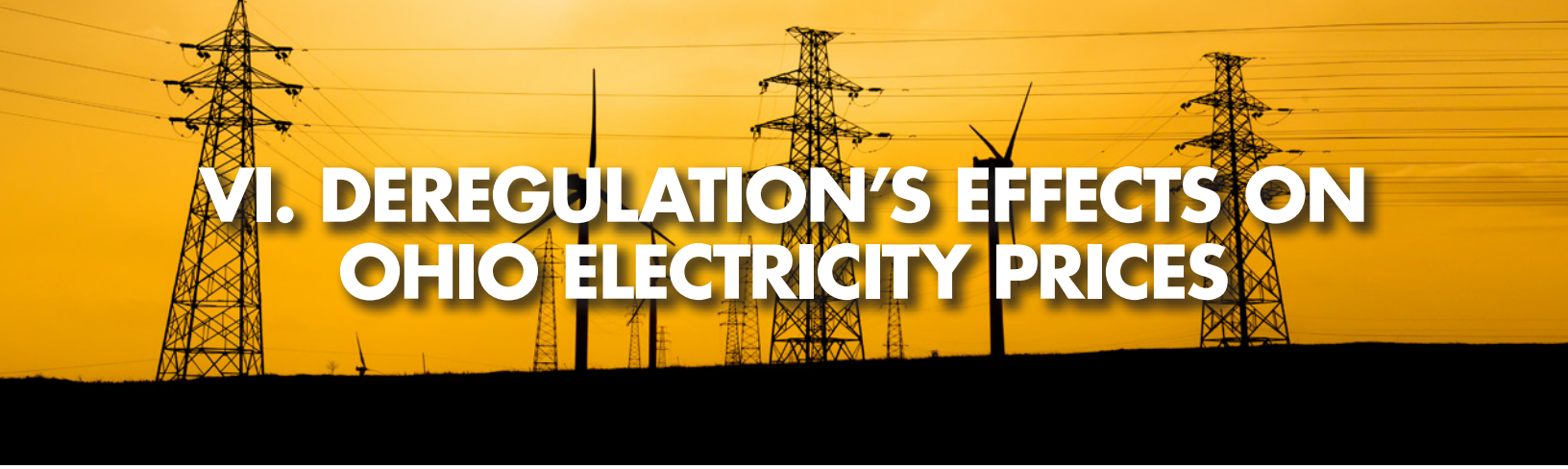
Recent years have seen a significant increase in states taking measures to transition from the traditional vertical monopoly structure towards a market with greater choice for consumers. Table 1 outlines the various efforts across the country to both introduce and further support competition and choice rather than monopolized electricity markets. While some initiatives are top-down, many are being driven by citizens and industry demanding greater economic freedom and ability to choose electric service providers. Not every effort will result in deregulation, but the trend towards choice suggest that consumers prefer competitive markets over utility monopolies.

TABLE 1: Highlights of Consumer Choice Across the Country[36]

State(s)	Effort
California	Community Choice Aggregators have experienced a rapid expansion and are projected to serve more than 50% of California's load by 2020.[37] The California Public Utilities Commission is researching an expansion of direct access customer choice.
Minnesota	New legislation was introduced to provide large industrial consumers the opportunity to purchase electricity from market-priced independent power producers.
Missouri	Legislation has been introduced to allow Commercial and Industrial consumers over a certain load threshold to purchase renewable power.
Washington	The state's Utilities Commission allowed Microsoft to produce energy from independent power producers in the wholesale market. Additional efforts are underway to provide similar choice to other large industrial consumers.
Florida	There is a push to amend Florida's state constitution to declare that it is the state's policy to establish a competitive market for electricity and provide ratepayers the right to choose their electricity provider threshold to purchase renewable power.
Michigan	In 2016, Michigan protected its limited choice program against an existential legislative threat. Residents as well as commercial and industrial users have shown support for the expansion of the current 10% limit on electricity choice.
Arizona, Oregon, and Virginia	Large commercial and industrial users in each state are increasingly pressuring regulators to initiate or expand choice programs.
Nebraska and Kansas	Proposed bills in 2017 would unbundle rates and start a movement towards increased retail choice.

[36] O'Connor, O. (2017). "Restructuring Recharged: The Superior Performance of Competitive Electricity Markets 2008-2018." Retrieved from *https://www.nytimes.com/2018/06/01/climate/trump-coal-nuclear-power.html* and *https://www.resausa.org/sites/default/files/RESA_Restructuring_Recharged_White%20Paper_0.pdf*

[37] Bonson, Tyler and Brashares. (2017). "Community Choice Aggregation Expansion in California and its Relation to Investor-Owned Utility Procurement." Center for Climate Protection. Retrieved from: *https://cleanpowerexchange.org/wp-content/uploads/2017/06/Procurement-Report-May-30-2017.pdf*



VI. DEREGULATION'S EFFECTS ON OHIO ELECTRICITY PRICES

A. COMPONENTS OF ELECTRICITY PRICE

The "all-in" price of electricity is comprised of a variety of components: the purchase price of generated electricity, capacity or generation reserves, the regulated costs of transmission and distribution, and a series of regulatory approved add-on charges called "riders". In a deregulated electricity market, only the generating price of power and capacity charges are directly affected by competition, and they are but a portion of the final bill, while other elements remain regulated. The table below provides a high-level overview of the major components of electricity price for a commercial customer in Ohio.

TABLE 2: Components of Electricity Price

Price Component	Regulated or Deregulated	Description
Energy	Deregulated, not part of Electric Distribution Utility cost	The cost of generating electricity.
Capacity	Auction managed by PJM, not part of Electric Distribution Utility cost	Capacity consists of dedicated generation reserves, designed to "meet the demand for the future" and ensure long-term grid reliability. Capacity costs are determined in a three-year-ahead annual auction.
Ancillary Charges	Managed by PJM, not part of Electric Distribution Utility cost	Ancillary services result from a range of costs incurred by PJM through managing the grid. These charges generally fall into two categories: regulation services, which maintain system frequency, and operating reserves, which provide back-up power in emergency situations.
Line Losses	Not part of Electric Distribution Utility costs	Line losses account for energy that is lost while transmitting electricity along transmission and distribution lines.
Transmission	Regulated, part of Electric Distribution Utility cost	Transmission charges allow utilities to recover the costs of transporting electricity from generating plants to distribution systems as well as the costs of maintaining the grid. All transmission costs are non-bypassable (cannot be avoided through shopping).
Distribution	Regulated, part of Electric Distribution Utility cost	Distribution accounts for the costs of delivery of low-voltage electricity to end-users. These costs are set by state regulators through tariffs. These costs include both distribution and demand charges, and cannot be bypassed.
Non-Bypassable Riders	Regulated, part of Electric Distribution Utility cost	Riders are costs that are assessed with the approval of the PUCO. These charges are numerous, vary in purpose, and traditionally small. However, they have been growing rapidly in recent years. Non-bypassable riders cannot be avoided by shopping.
Bypassable Riders	Regulated, part of Electric Distribution Utility cost	Bypassable riders are costs generally associated with generation service. Shopping customers can avoid these charges if they shop with a CRES.

Each component accounts for a distinct portion of an end-user's retail electricity price. The relative weight of each element has changed since the emergence of competitive markets in Ohio. The cost structure has shifted significantly since the Study Team's previous report. Figures 4 and 5, below show the changing nature of total electricity price for shopping mercantile customers in Ohio. Mercantile customers are industrial and commercial users that consume greater than 700,000 kWh/year.

FIGURE 4: Approximate Structure of Electricity Price for Mercantile Users in Ohio, 2016

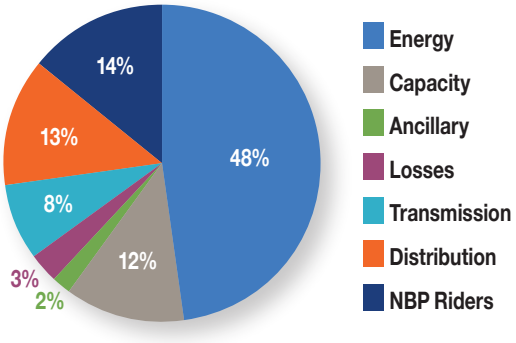
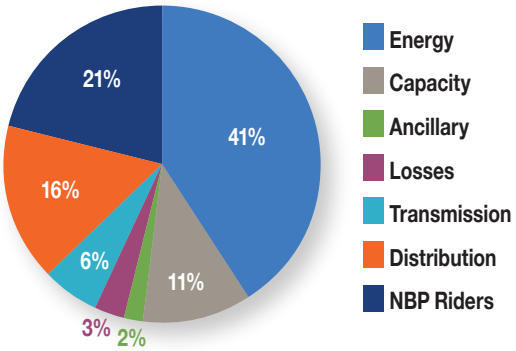


FIGURE 5: Approximate Structure of Electricity Price for Mercantile Users in Ohio, 2018



Between 2016 and 2018 the energy portion of the total bill decreased by 7%, while non-bypassable riders portion of the bill increased 7%. This continued a trend in the makeup of electricity costs for Ohio consumers: as the energy (generation) component of the bill decreased in response to the pressures of a competitive markets, distribution charges and non-bypassable riders have increased in response to pressure from IOUs on the PUCO to increase the regulated costs, and, of course, the noncompetitive profit that comes with regulation. Overall, the regulated portion of retail electricity prices in Ohio (transmission, distribution, and non-bypassable riders) has increased from 35% of the total bill to 43%. On the other hand, the deregulated components have decreased from 65% to 57% of the all-in price. This trend is discussed further in the below section.

B. ELECTRICITY PRICE TRENDS IN OHIO

1. Trends in Non-Bypassable Charges

As described above, the regulated portion of Ohio consumers' electric bills has been steadily increasing since the development of a competitive retail energy markets. This trend is even more pronounced when specific the rate classes from specific Electric Distribution Utilities (the local distribution subsidiaries of the IOUs) are examined. Table 3, below, breaks down percentages of the regulated and deregulated portions of the bill for AEP, FirstEnergy, and Duke's Secondary rate classes. Rate classes are determined by voltage level and the Secondary rate class contains a majority of commercial and small industrial customers.[38] The table compares these percentages in 2011 and 2019 to exhibit the market trend.

[38] "Secondary" is a designation by the utility to describe the voltage level delivered to the customer. Secondary is on the "low" side of the transformer after it has been stepped down. In AEP territory, the Secondary Rate Class includes nominal regulated voltages of 120, 120/208, 120/240 or 240/480 volts, single phase and 120/208, 120/240, 240, 240/280, 277/280 and 480 volts, 3 phase.

TABLE 3: Regulated vs. Deregulated Portions of Total Price for Commercial and Small Industrial Customers in 2011 and 2019[39]

	AEP CS GS3S		FirstEnergy OE Secondary		Duke Secondary	
	2011	2019	2011	2019	2011	2019
Regulated	32%	49%	31%	47%	29%	35%
Deregulated	68%	51%	69%	53%	71%	65%
Total Price/kWh	$0.089	$.099	$0.101	$0.102	$0.123	$.081

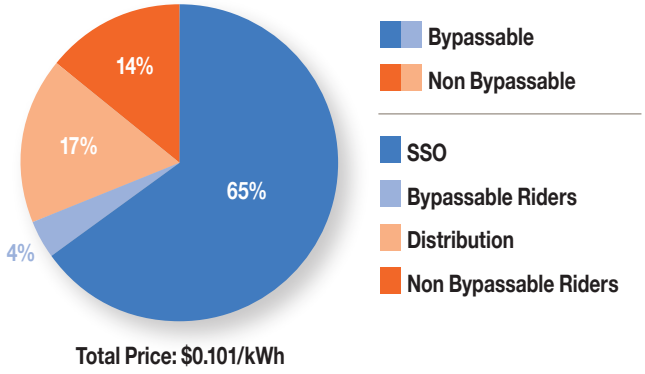
For ratepayers in AEP and FirstEnergy territories, the regulated portion of the all-in electricity price jumped 17 and 16 percentage points respectively from 2011 to 2019. Increases in the regulated price components for commercial customers in AEP and FirstEnergy's territory wholly offset the savings realized from the competitive generation market.

On the other hand, Duke only experienced a 6% increase in the regulated portion of its bill during this same time period. This increase, however, coincided with a $0.042 drop in total price per kWh. In the Duke territory, unlike AEP and FirstEnergy, the deregulated savings were not overwhelmed by rising costs on the regulated side.

2. Comparison of Price Components in Duke and FirstEnergy Territories

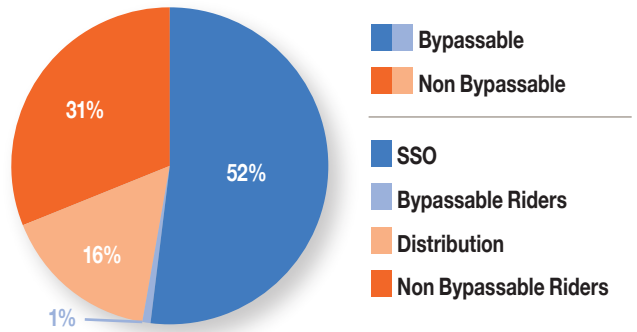
A comparison of FirstEnergy's and Duke's price components makes clear the different experiences of secondary rate class customers in the two territories. Figures 6 and 7 show the breakdown of electricity price for FirstEnergy's Secondary rate class in the utility's Ohio Edison territory for January 2011 and January 2019.

FIGURE 6: FirstEnergy Ohio Edison Secondary (Commercial and Small Industrial) Cost Breakdown, January 2011



Total Price: $0.101/kWh

FIGURE 7: FirstEnergy Ohio Edison Secondary (Commercial and Small Industrial) Cost Breakdown, January 2019



Total Price: $0.102/kWh

[39] The defining characteristics of a "secondary" rate class varies by utility. Generally, this rate class includes primarily large commercial users.

This comparison between FirstEnergy's price components in 2011 and 2019 describes the nature of the dramatic changes in the composition of electric bills set forth in Table 3 above. While the SSO in FirstEnergy dropped by 13 percentage points as a portion of the total cost (a 20% decrease), the non-bypassable Riders more than doubled over the same time period, from 14% to 31% of the overall price (increasing by 121%). The increase in non-bypassable riders accounts for the entirety of the increase in the regulated portion of the total price. These riders offset the drop in the SSO and prevented ratepayers from realizing an overall price decrease.

For comparison, Figures 8 and 9 breakdown the total price for Duke's Secondary rate class.

FIGURE 8: Duke Secondary (Commercial and Small Industrial) Cost Breakdown, January 2011

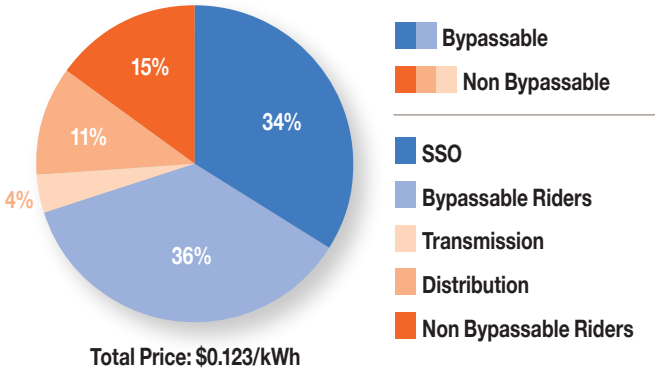
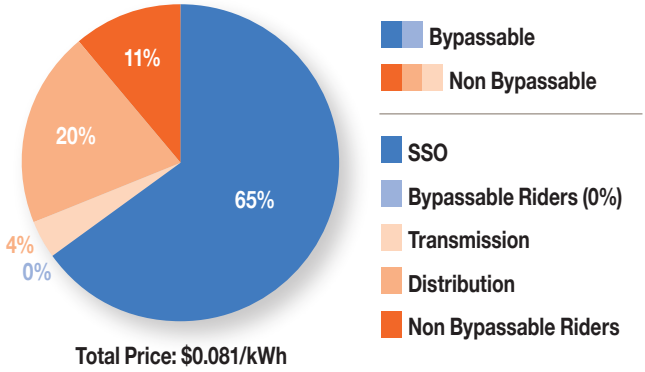


FIGURE 9: Duke Secondary (Commercial and Small Industrial) Cost Breakdown, January 2019



Although Duke's distribution costs increased by 9 percentage points, its non-bypassable rider percentage fell by 4%, and its overall price fell by $0.042/kWh. Duke's Secondary rate class saw a 34% decrease in the percentage of its all-in costs once a competitive market was established. This is a startling contrast to the experience of commercial customers in FirstEnergy's territory.

3. Cross-Subsidization

So why did Duke's ratepayers realize greater actual savings benefits from deregulation than their counterparts in FirstEnergy territories? A key difference between Duke and FirstEnergy is that Duke sold off its generation assets to a third party, while FirstEnergy (as well as AEP) retained its fleet in a wholly owned unregulated subsidiary.[40] In short, Duke functionally separated its Ohio regulated business from its deregulated business, while FirstEnergy placed its fleet in a wholly owned subsidiary company. In other words, Duke sold off its fleet while FirstEnergy still owned its generating plants. FirstEnergy's operational structure creates incentives for the company to delay marking down

[40] PR Newswire (2015). "Duke Energy completes sale of its non-regulated Midwest generation business to Dynegy." Retrieved from: *http://www.prnewswire.com/news-releases/duke-energy-completes-sale-of-its-non-regulated-midwest-generation-business-to-dynegy-300060392.html*

the asset value of its loss-making generating plants and to try to recoup losses from its generating subsidiary by using its political power to influence the regulatory process. Dormady explains that, "Ohio failed to remove generation from the balance sheets of utilities yet retained a regulatory rate-setting mechanism for utilities to obtain additional cost recovery that was entirely shielded from competitive pressures of retail choice."[41]

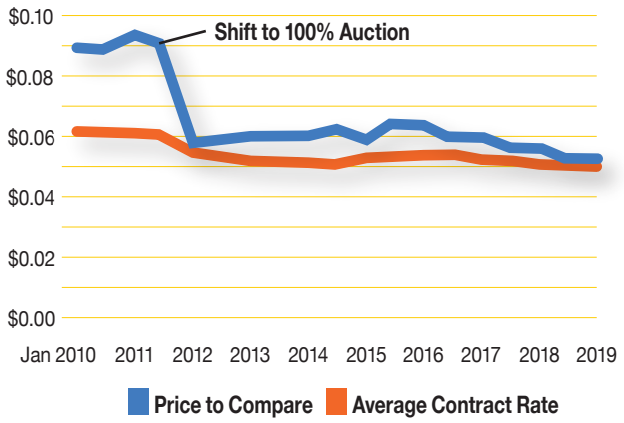
Dormady found that overall prices increased in every Electric Distribution Utility territory except for Duke, which is the only Ohio utility that completely divested its generation fleet.[42] Dormady points out that the decision made by Duke to sell off its fleet and the decisions made by FirstEnergy, AEP, and Dayton Power and Light to place their fleets in wholly-owned subsidiary corporations created a "unique natural experiment" in Ohio.[43]

Dormady argues that in a competitive market, decreases in the price of key generating fuel, like natural gas, should deliver savings to consumers. However, Ohio consumers outside of the Duke's territory have not realized such savings. Dormady postulates that this is because falling natural gas prices result in concurrent losses attributed to the operations of nuclear and coal generating plants, and for the IOUs that still own and operate nuclear and coal power plants, there were strong incentives to recoup these losses through the regulated side of their businesses.[44]

4. SSO Trends

Since deregulation, utilities have used a mixture of both auctions and cost-based generation (cost-of-service plus a guaranteed return on investment, sometimes referred to herein as the "cost-plus" method) approaches to determine the PTC. As utilities in Ohio phased in the use of auctions to determine their PTCs, the benefits of competition have driven down prices. Figure 10 shows how a competitive auction process impacted Duke's PTC. In 2011, when Duke transitioned to 100% auction pricing, its pricing for secondary mercantile customers dropped 37%, from 9 cents a kWh to 5.7 cents a kWh. Since 2011, Duke's PTC in this rate class decreased due to the effects of a competitive market. The savings totaled 5.2 cents/kWh in 2019.

FIGURE 10: Duke Secondary (Large Commercial) PTC and Average Contract Rate, 2010-2019



Similar trends can be seen in AEP's Columbus Southern territory as the utility begins to phase in auction-based pricing (seen in Figure 11). AEP phased in its auction pricing over a 12-month period. In 2014, still 90% of AEP's price to compare was determined by the cost-plus method. By January of 2015, AEP transitioned to 100% auction pricing, driving down the price 15%, from 10.16 cents per kWh to 8.65 cents per kWh. In June of 2015, AEP's auction process drove the PTC down an additional 32% to 5.88 cents/kWh. Between 2011 and 2015, auction pricing reduced the PTC in AEP's Columbus Southern secondary rate class by

[41] *Id.*

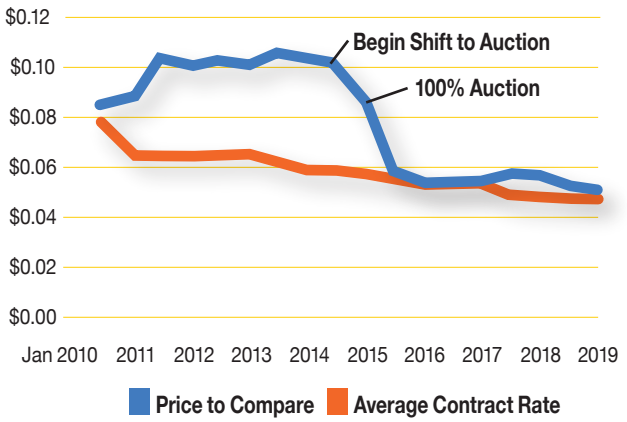
[42] *Id.*

[43] Dormady, et al. (2019). "Who Pays for Retail Electric Deregulation?: Evidence of Cross Subsidization from Complete Bill Data." *The Energy Journal*, 40(2): 161-194.

[44] *Id.*

42.13%. By 2019, AEP's PTC in this rate class was down to 5.05 cents per kWh, an additional 14% decrease from 2015.

FIGURE 11: AEP Columbus Southern Secondary (Large Commercial) PTC and Average Contract Rate, 2010 - 2019



While the introduction of competition is the key driver behind these falling prices, the decline in PTC within the AEP territory is not wholly attributable to competitive generation markets. Over the same time period, transmission costs shifted to the regulated portion of a customer's bill and dropped out of the PTC calculation. However, this contribution to the PTC reduction was only a fraction of the PTC savings. In 2015, for instance, AEP only charged 0.7 cents per kWh for its regulated transmission charge.[45] That year, AEP's Columbus Southern secondary rate class PTC dropped 2.77 cents, meaning that 97% of the drop in PTC could be attributed to the introduction of competition to the price-setting process.

5. Avoided Cost and Headroom

As auction prices and competition reduced the PTC, CRES providers are faced with an increasingly challenging environment in which to compete. As the PTC and contract rate converge, avoided costs through shopping shrink. In 2011, the early stage of competitive markets, avoided costs in all utility territories across Ohio averaged 22%.[46] As markets matured, avoided costs quickly dropped. Table 4 sets forth the avoided costs for the Secondary Mercantile market in each utility territory. In the last three years, avoided costs appear to have stabilized at around 8% in this rate class. Additional data on avoided costs from 2011-2018 can be found in Appendix 1.

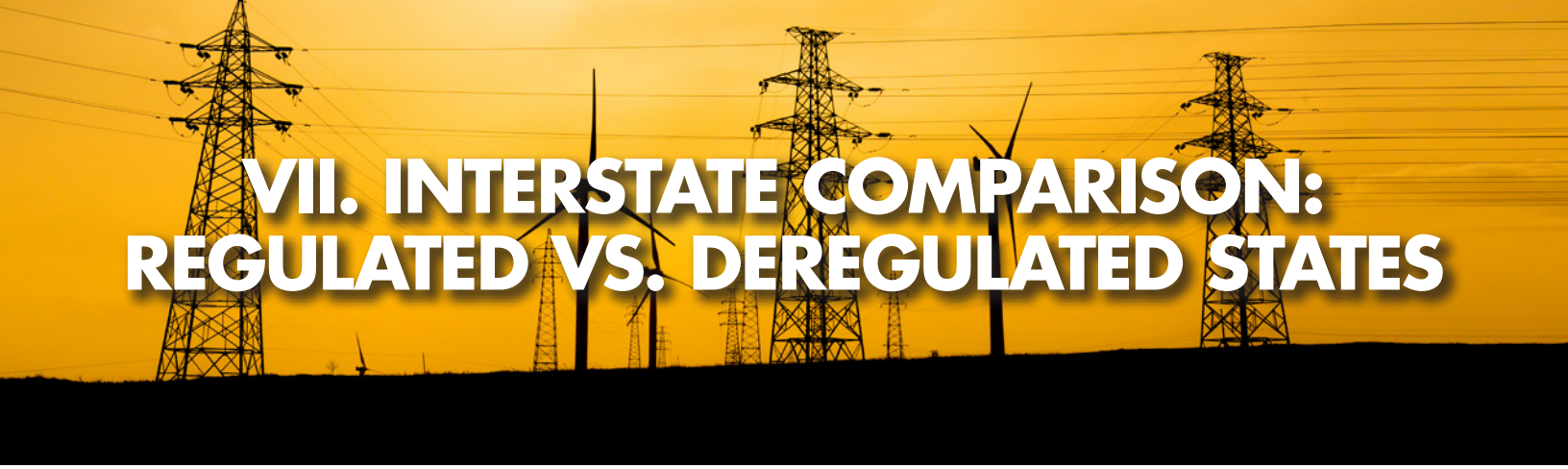
TABLE 4: Average Avoided Costs from Shopping in Secondary Mercantile Markets By Utility Territory 2016-2018

Utility	2016	2017	2018
AEP	6%	11%	11%
Duke	14%	10%	7%
DPL	3%	1%	-1%
FirstEnergy	13%	10%	16%
Average	**9%**	**8%**	**8%**

As competitive markets mature, we should expect that avoided costs will be reduced as an equilibrium price is reached. That is how competitive markets work. The broader goal of competition is to drive efficiency and put downward pressure on prices. Lower avoided costs are indicative of success in achieving this goal. However, the headroom between the PTC and contract prices must remain high enough to encourage aggregators, brokers, and CRES providers to compete and survive in the market. It is for this reason that subsidies for generation, especially that generation bid into the SSO auctions, pose a considerable threat to the electricity markets in Ohio. If the CRES providers, aggregators, and brokers leave the market, then competitive pressure will ease and prices will rise once again.

[45] Based on Broker calculations.

[46] Thomas, et al. (2016). "*Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation.*" Retrieved from *https://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=2420&context=urban_facpub*



VII. INTERSTATE COMPARISON: REGULATED VS. DEREGULATED STATES

EIA utility data are limited in their ability to account for the full effect of deregulation, insofar as the data fail to include savings from private contracts due to shopping. Even so, the EIA data provide relevant information for studying the savings from introducing competition into the SSO auctions. As shown in our 2016 study, savings from standard service auctions provide the biggest overall savings to ratepayers, including for those who do not shop.

In this updated report, the Study Team utilized two statistical tests to estimate the impact of deregulation on the PTC in Ohio. These analyses are similar to those conducted by the Study Team in 2016, updated with data through 2017 (the last year of available EIA data at the time of the tests were run).

Combating relatively high electricity prices has been the primary motivation behind state deregulation. It stands to reason that states with historically higher mean prices are more likely to be among the states that deregulated generating markets in an attempt to bring the relative cost of electricity down. We know that this was the motivation for deregulation in Ohio.

A. SIX MIDWESTERN STATES

By comparing states that are similar to each other, we can better distinguish the effect of deregulation on electricity price. Ohio is geographically surrounded by states with similar economies, energy systems, and varied regulatory statuses. Accordingly, we focused our analysis on Ohio's regulated and deregulated neighbors. We analyzed mean electricity prices in Indiana, Michigan, and Wisconsin (regulated states) and compared them to prices in Ohio, Illinois, and Pennsylvania (deregulated states).

We began our analysis of changes in the price of electricity among this set of Midwestern states in 2003. This is the year that O'Connor and O'Connell-Diaz (2015) demonstrated that true competitive markets began to develop in the Midwest.[47]

Table 5 shows the results of a two-way Analysis of Variance (ANOVA) test. This analysis provides two key conclusions. First, after deregulation began to take hold in 2003, the mean price of electricity in the deregulated states *decreased* from 11.9 cents/kWh to 10.2 cents/kWh. Second, during that same time period, the mean price of electricity in the regulated states *increased* from 9.9 cents/kWh to 10.1 cents/kWh. While the mean price in deregulated states remains slightly higher reflecting its higher starting point, the price trend is indicative of the downward pressure competition has put on electricity prices.

[47] O'Connor, P. & O'Connell-Diaz, E. (2015). Evolution of the Revolution: The sustained success of retail electricity competition. COMPETE. Retrieved from: *https://hepg.hks.harvard.edu/publications/evolution-revolution-sustained-success-retail-electricity-competition*. Note that Ohio, which deregulated in 2001, did not really see markets develop until after SB 221 was passed in 2008.

TABLE 5: Effects of Deregulation on Midwest Electricity Prices in All Sectors Combined Average Mean Cost of Electricity per Kilowatt Hour, 1990-2017

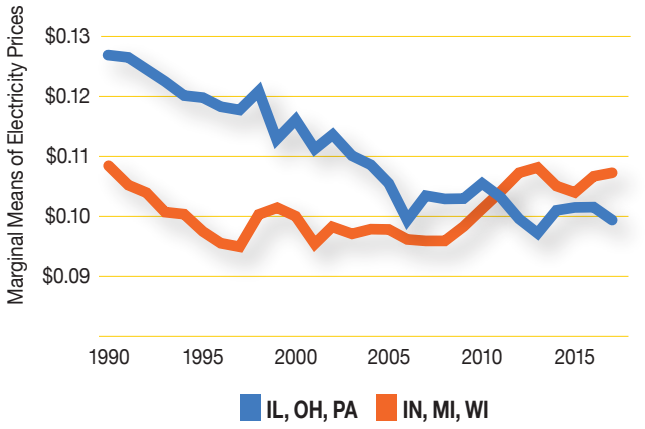
	Regulated States IN, MI, WI Mean (Standard Error)	Deregulated States OH, IL, PA Mean (Standard Error)
Before (1990-2002)	0.0994	0.1193
	(0.0023)	(0.0020)
After (2003-2017)	0.1008	0.1022
	(0.0017)	(0.0011)

***Statistically significant at the $p < 0.001$ level.

Real 2018 dollars

Figure 12 shows the mean electricity price of each of the two groups of Midwestern states in our analysis from 1990 to 2017. The price spread between the deregulated and regulated states was fairly consistent throughout the 1990s. However, once competition developed in the Midwest in 2003, the relationship between the two groups began to change. As the benefits of deregulation took effect, the prices begin to converge from 2002 to 2003. And, between 2010 and 2011 the average price in the deregulated states fell below the average price in the regulated group of states. The two distinct price trends provides insight how the power of deregulation and competition has performed compared to regulation in the Midwest.

FIGURE 12: Mean Electricity Prices in All Sectors in Six Midwestern States, 1990-2017



B. DIFFERENCE-IN-DIFFERENCE ANALYSIS

The difference-in-difference model statistically isolates the impact of deregulation between the two sets of Midwestern states by removing path dependencies. Historical cost structures and regulatory regimes tend to put future prices and operating costs on a pre-determined path relative to other states. Hence, the electricity price in any year is closely tied to the previous year's price. The difference-in-difference model estimates the effects of deregulation, isolating it from previous.

A key aspect of a difference-in-difference model is determining the inflection point, which is when the event that is hypothesized to have disrupted the previous path occurred. In our case, it is the year in which competition in electricity generating markets began in Ohio. While Senate Bill 3 restructured Ohio's generation markets in 1999, the bill failed to enable the development of true competition due to price freezes and a "market development" period.

Ohio's complicated and winding journey towards true competitive markets makes it difficult to pinpoint when the effects of competition finally took hold in the state. Accordingly, we conducted two analyses with distinctly different inflection points. In one test, we used 2003, the year O'Connor and O'Connell-Diaz stated that deregulation took hold generally in the Midwest.[48] In the other, we used 2009, the year after SB 221 restructuring was enacted, and the first year that Ohio's utilities began to conduct competitive SSO auctions.

This difference-in-difference statistical modeling approach is designed to capture the difference between electricity prices in both regulated and deregulated states (the first difference) before and after competition began (the second difference), and then compare these differences. Table 6 displays the results from the analysis.[49]

TABLE 6: Average Price per kWh under Two Assumptions about When Deregulation Began

	2003			2009		
	Prices before Deregulation	Prices after Deregulation	Difference	Prices before Deregulation	Prices after Deregulation	Difference
Deregulated States	0.1193	.1022	-0.0171	.1146	.1007	-0.0139
Regulated States	0.0994	0.1008	0.0014	.09830	.1040	0.0057
Difference in Differences			**-0.0185**			**-0.0196**

***The interaction term was significant at the $p < 0.001$ level in the case of either 2003 or 2009 being the year that deregulation took effect. All prices adjusted for inflation.

Using the 2003 inflection point, as proposed by O'Connor and O'Connell-Diaz, the independent effect of deregulation is determined to be a savings 1.85 cents per kWh, on average, across all rate classes in the three deregulated states. Using 2009 as the year competition began, the independent effect of deregulation saved 1.96 cents per kWh, on average, across all rate classes in the three deregulated states.

These results are similar to those found in our 2016 study, which looked at EIA data through 2015 and found that the difference after 2009 was around 1.76 cents/kWh between regulated and unregulated markets. The small increase since 2015 can be attributed to competition continuing to lower electricity prices.[50]

[48] *Id.*

[49] The more formal methods of propensity score matching and the Jenks natural breaks algorithm for dividing data into homogenous classes were also used to select groupings of regulated and deregulated states most like Ohio with regard to generation capacity per capita, mix of resources for electricity generation, and unit fuel costs. Accordingly, a difference-in-difference analysis performed on data for these states (MI, NV, VA, VT, WI, and NC on the regulated side and OH, IL, ME, and PA on the deregulated side) determined savings in the deregulated states due to competition of 1.33 cents/kWh, using 2003 as the inflection point, and 1.26 cents/kWh using 2009 as the year competition began. Thus, the savings identified in our difference-in-difference model of Ohio and its neighboring states is not an artifact of the selection of neighboring regulated and deregulated states.

[50] An additional small increase in the total difference comes from using a different measure of inflation in the latest study. The first study assumed a constant 2% rate of inflation, which is reasonable given that this is the rate targeted by the Federal Reserve. However, for the latest study we instead used the Bureau of Labor Statistics' CPI for Electricity for All Urban Consumers which better controls for the between-year variability in the price level for electricity. This measure of the change in the price level for electricity in particular from one year to the next averaged approximately 2.2% during the study period. See *https://www.stlouisfed.org/open-vault/2019/january/fed-inflation-target-2-percent.* See also *https://fred.stlouisfed.org/series/CUSR0000SEHF01*

VIII. ESTIMATED SAVINGS DRIVEN BY DEREGULATION

A. SAVINGS CREATED THROUGH DEREGULATION, FROM 2011 TO 2015

Our 2016 report analyzed savings from 2011 to 2015 by separately calculating (1) savings resulting from the competitive market's downward pressure on utilities' Standard Service Offers, and (2) shopper's avoided costs (i.e. savings below the Price to Compare or PTC). The latter is only realized by consumers that actively shop for electricity, while the former is realized by *all* customers of Ohio's IOUs, whether they shop or not. The following tables summarize the Team's findings from the initial report published in 2016. Table 7 describes savings from shopping for both mercantile consumers (using over 700,000 kWh/year – i.e. industrial and large commercial customers) and non-mercantile consumers (residential and small commercial customers using less than 700,000 kWh/year). Table 8 summarizes savings consumers realized due to falling SSO prices, and Table 9 outlines total savings from 2011 to 2015. The methodology used to calculate these savings are provided in Section VII of the initial report.[51] All industrial consumers, due to their high usage, are assumed to be mercantile, while all residential consumers are assumed to be non-mercantile.

TABLE 7: Total Shopping Savings from Mercantile and Non-Mercantile Markets from 2011 to 2015 (millions of dollars)

Year	Mercantile	Non-Mercantile	Total
2011	$391.60	$105.1	$496.70
2012	$324.69	$118.6	$443.29
2013	$600.81	$143.3	$744.11
2014	$664.21	$160.0	$824.21
2015	$487.19	$157.8	$645.19
Total	**$2,468.50**	**$684.80**	**$3,153.30**

TABLE 8: Savings from Competitive SSO, Not Including Shopping from 2011 to 2015 (millions of dollars)

Year	SSO
2011	$2,395.00
2012	$2,366.00
2013	$2,342.00
2014	$2,380.00
2015	$2,339.00
Total	**$11,822.00**

TABLE 9: Total Savings from Deregulation from 2011 to 2015 (millions of dollars)

Year	SSO
2011	$2,891.70
2012	$2,809.29
2013	$3,086.11
2014	$3,204.21
2015	$2,984.19
Total	**$14,975.30**

[51] Thomas, et al. (2016). "*Electricity Customer Choice in Ohio: How Competition Has Outperformed Traditional Monopoly Regulation.*" Retrieved from *https://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=2420&context=urban_facpub*

B. SAVINGS CREATED THROUGH DEREGULATION, 2016-2018

In our 2016 study, we projected likely consumer savings for the next five years based on our findings. The principal purpose of this study is to determine if, in fact, those projected savings were realized and to determine if market conditions have changed in ways that could change the future path of savings.

Accordingly, the Study Team updated the savings from deregulation for both shoppers and non-shoppers in Ohio to include the three years that passed since the 2016 study was completed. The savings realized from 2016 to 2018 are broken down into costs avoided by active shoppers and savings delivered to all consumers through decreasing SSOs. The Study team utilized updated data and methods to determine consumer savings from 2016 to 2018.

1. Avoided Costs from Shopping

The total cost Ohio consumers avoided through shopping was estimated by multiplying the average avoided cost in both mercantile and non-mercantile rate classes by the amount of electricity consumed by shoppers in each class. All industrial consumers, due to their high usage, are assumed to be mercantile customers, while all residential consumers are assumed to be non-mercantile. Commercial customers, due to their wide range of usage, can fall into either category. Using aggregated and anonymized broker data, the team approximated the percentage of commercial loads that fell into the mercantile category. Table 10 provides those percentages by utility service area.

TABLE 10: Percentage of Commercial Load That Was Mercantile from May 2015 to June 2016

Utility	% Mercantile
AEP Ohio Power	44%
AEP Columbus Southern	54%
Dayton Power & Light	41%
Duke Energy Ohio	61%
FirstEnergy Ohio Edison	32%
FirstEnergy Toledo Edison	33%
FirstEnergy Illuminating Co.	50%

To estimate the total avoided costs from shopping, the percentages in Table 10 were assumed to be the mercantile percentage of Ohio's commercial load from 2016 to 2018.

Average avoided cost data for industrial and large commercial mercantile customers was calculated using broker-derived data, based on actual aggregate contracts. The analysis of mercantile customers' savings through shopping from 2016 to 2018 is presented in Tables 11 and 12, both by utility and by year.

TABLE 11: Total Savings through Shopping, by Utility, for Mercantile Electricity Customers from 2016 to 2018 (millions of dollars)

Utility	Savings
AEP	$264.44
Duke Energy Ohio	$153.79
Dayton Power & Light	$45.21
FirstEnergy	$607.99
Total	**$1,071.44**

TABLE 12: Total Savings through Shopping, by Year, for Mercantile Electricity Customers from 2016 to 2018 (millions of dollars)

Year	Savings
2016	$408.30
2017	$309.69
2018	$353.45
Total	**$1,071.44**

In 2016, the Study Team calculated non-mercantile savings by applying the flat savings rate guaranteed by the Northeast Ohio Public Energy Council (NOPEC): 4% off the PTC for commercial users and 6% off the PTC for residential users. NOPEC continued to provide these same savings rates through 2016. In 2017, NOPEC changed its savings rates slightly, providing rates that were 4% off the PTC for both commercial and residential users. By 2018, however, the PTC was such that CRES providers were no longer offering rates tied to the PTC. (This shows the power of a functioning competitive market. The PTC is now so close to the market equilibrium price that margins for aggregators and brokers are being squeezed. This is exactly how markets are expected to work—for the financial benefit of consumers.) Aggregators and brokers began to use the mercantile model of basing their rates upon contracts from CRES providers. As a result, the Study Team was unable to obtain a data-base for 2018 non-mercantile contracts in time for this Study. Accordingly, for purposes of this Study, we assumed the savings to be zero for that year.

However, the team was able to analyze non-mercantile shopping savings for both 2016 and 2017, assuming that the flat savings rates tied to the PTC provided by NOPEC were representative of the rates available in the marketplace. Tables 13 and 14 summarize the savings non-mercantile users realized through shopping.

TABLE 13: Total Savings through Shopping, by Utility, for Non-Mercantile Electricity Customers from 2016 to 2017 (millions of dollars)

Utility	Savings
AEP	$56.12
Duke Energy Ohio	$33.54
Dayton Power & Light	$25.06
FirstEnergy	$111.65
Total	**$226.37**

TABLE 14: Total Savings through Shopping, by Year, for Non-Mercantile Electricity Customers from 2016 to 2017 (millions of dollars)

Year	Savings
2016	$132.47
2017	$93.90
Total	**$226.37**

Adding up the savings through shopping from both mercantile and non-mercantile consumers, we find that shoppers saved $1.29 billion from 2016 to 2018. Table 15 outlines the total shopping savings during this time period.

TABLE 15: Total Shopping Savings from Mercantile and Non-Mercantile Electricity Users from 2016 to 2018 (millions of dollars)

Year	Mercantile	Non-Mercantile	Total
2016	$408.30	$132.47	$540.77
2017	$309.69	$93.90	$403.59
2018	$353.45	–	$353.45
Total	**$1,071.44**	**$226.37**	**$1,297.81**

These savings are realized only by those consumers who choose to shop for their electric service providers, rather than accept the default PTC rate.

While the percentage of shopping consumers is increasing, only 57% of all customers purchased electricity from CRES providers in 2018.[52] On the other hand, the savings achieved from competitive auctions driving down SSOs are realized by all electricity consumers of Ohio, whether they shop or not. This excludes those consumers who are outside the PUCO jurisdiction (i.e. customers of municipal and rural cooperative utilities). These consumers comprise a very small fraction of Ohio's electricity users.

2. Savings from Standard Service Offers

Competitive generation markets have delivered savings to all Ohio consumers. The use of a competitive auctions in Ohio to determine the standard service offer, the main component of the Price to Compare, has significantly driven down the cost of electric power purchases since 2011.

To estimate the value delivered to consumers by the decreasing PTC, we used the savings rate from the difference-in-difference model in Section VI. We determined that 2009 was the appropriate inflection point for Ohio, as it is the first year utilities began to use, at least in part, competitive auctions to build their standard service offers (SSOs). After 2009, the estimated cost difference between electricity prices reported by utilities to the Energy Information Agency (EIA) in the six regulated and deregulated Midwest states was an average of 1.96 cents for each kWh consumed. This savings estimate was then multiplied by the total kilowatt hours consumed in Ohio in 2016 and 2017. We used an estimate of 2018 electricity consumption as the basis of that year's calculation. These savings estimates are in Table 16.

Table 16: Savings from Deregulated SSOs in Ohio, Not Including Shopping from 2016 to 2018 (millions of dollars)

Year	SSO
2016	$2,553.9
2017	$2,502.1
2018	$2,612.6 (estimated)
Total	**$7,668.6**

We estimate that all Ohio consumers have saved over $7.6 billion from 2016 to 2018 as a result of deregulated generation markets driving down the PTC.

[52] PUCO. (2019). Retail Market Activity: Switching Rate Percentage (Customer Count). *https://app.powerbigov.us/view?r=eyJrIjoiMjU1ZWRkNGUtYmJmZS00YTEyLTk5NWYtMGE1NmJmZjYxMzVjIiwidCI6IjUwZjhmY2M0LTk0ZDgtNGYwNy04NGViLTM2ZWQ1N2M3YzhhMiJ9*

IX. TOTAL SAVINGS FROM DEREGULATION, FROM 2011 TO 2018

Tables 17 and 18 provide summaries of the savings generated from deregulation from 2011 to 2015 and from 2016 to 2018, respectively. Table 19 highlights the total savings realized by Ohio consumers since 2011.

We have found that Ohio's electricity users saved $4.45 billion by shopping for their power and $19.49 billion by accessing competitive SSOs delivered by deregulated electricity generation. From 2011 to 2018, Ohio consumers saved $23.94 billion as a result of deregulation, averaging just under $3 billion a year.

In 2016 we projected savings of around $2.8 billion per year for the next five years, based upon existing market trends. In fact, savings have been closer to $3 billion a year for 2016, 2017 and 2018. We expect to see these trends continue, so long as there are no major impairments to the retail markets, such as large-scale cross subsidization by regulated Electric Distribution Utilities, price supports of uneconomic generation plants, or the pre-monopolization of alternative energy generating sources by the IOU.

TABLE 17: Total Savings Due to Deregulated Electricity Generation Markets in Ohio from 2011 to 2015 (millions of dollars)

Year	Shopping	SSO	Total
2011	$496.70	$2,395.00	$2,891.70
2012	$443.29	$2,366.00	$2,809.29
2013	$744.11	$2,342.00	$3,086.11
2014	$824.21	$2,380.00	$3,204.21
2015	$645.19	$2,339.00	$2,984.19
Total	**$3,153.30**	**$11,822.00**	**$14,975.30**

TABLE 18: Total Savings Due to Deregulated Electricity Generation Markets in Ohio from 2016 to 2018 (millions of dollars)

Year	Shopping	SSO	Total
2016	$540.77	$2,553.9	$3,094.67
2017	$403.59	$2,502.1	$2,905.69
2018	$353.45	$2,612.6	$2,966.05
Total	**$1,297.81**	**$7,668.6**	**$8,966.41**

TABLE 19: Total Savings from Deregulated Electricity Generation Markets in Ohio from 2011 to 2018 (millions of dollars)

Shopping	SSO	Total
$4,451.11	**$19,490.60**	**$23,941.71**

X. CONCLUSION

The purpose of this report was to analyze the ongoing impact of Ohio's decision to deregulate retail electricity markets. Ohio's deregulation of electricity generation has saved Ohio consumers about $24 billion over the past 8 years. Deregulation, once championed by investor-owned utilities, now faces challenges from these same stakeholders, who have been regularly petitioning both the PUCO and the Ohio General Assembly for subsidies to bailout their loss-making, aging, uncompetitive generation fleets. These efforts, if successful, will erode the significant benefits and financial savings that Ohio's consumers have realized as a result of deregulated electricity generation markets.

Competitive markets drive innovation and investment into new, efficient power plants, and subject to the discipline of the market. In turn, this reduces generation costs and total electricity prices. This impact can be seen in our comparison of regulated and deregulated Midwestern states. Since competitive markets have taken hold, electricity prices in deregulated states have decreased, while electricity costs in the regulated states have increased. Without competition, customers in regulated states were locked into old, inefficient, and costly generation plants. Competitive markets react more readily to economic signals, replacing old facilities with more efficient and cost-effective generation. Additionally, competitive markets shift the risk of these investments to investors. In a regulated market, consumers are saddled with the risk of any utility rate base investment. This is not to say that social and environmental costs of generation choices can never be factored into the Price to Compare or to energy markets in general. Rather, such costs must be reflected in these markets in a manner that does not leak into regulated markets, or otherwise impair free markets.

Ohio's regulatory structure can be improved by reducing utility incentives to seek cross-subsidization for their deregulated legacy generation businesses. The best way to accomplish this would be to require that utilities fully divest their generation assets, as Duke has done, and that the ratemaking process include more rigorous oversight over non-bypassable charges to ensure that generation costs or forgone profits do not leak into the regulated side of the business.

Competitive markets have proven to be a powerful tool to deliver value to Ohio's ratepayers. Competitive rates are attractive to businesses looking to locate in Ohio. Efforts to undermine the efficiency of these markets, like subsidies for uneconomic generating facilities, are a threat to Ohio's economic development and wellbeing. Any attempt to derail competitive generation markets would cause significant harm to all of Ohio's electric consumers and Ohio's economy.

APPENDIX 1.

Average Avoided Costs for Secondary Mercantile Customers 2011-2018

Utility	2011	2012	2013	2014	2015	2016	2017	2018
AEP	20%	24%	29%	30%	18%	6%	11%	11%
Duke Energy of Ohio	34%	7%	14%	17%	13%	14%	10%	7%
Dayton Power & Light	19%	15%	16%	20%	19%	3%	1%	-1%
FirstEnergy	16%	15%	13%	24%	21%	13%	10%	16%
Average	**22%**	**15%**	**18%**	**23%**	**18%**	**9%**	**8%**	**8%**

The Northeast Ohio Public Energy Council (NOPEC) is a non-profit natural gas and electric energy aggregation representing more than 900,000 residential and small business customers in over 230 communities in 17 Ohio counties. NOPEC was founded in 2000. NOPEC operates as a governmental opt-out aggregation. We use bulk-buying techniques to get the most reliable and competitively priced energy we can and then supply that power in the form of electricity and natural gas to our customers. We estimate that since we were founded, we have saved our customers in Northeast Ohio over a quarter billion dollars in cumulative electric savings. We are also increasingly involved in encouraging and implementing energy conservation that saves our customers additional money.

NOPEC℠

No one does more to lower your utility bills.℠

31360 Solon Road, Suite 33 • Solon, Ohio 44139

nopec.org