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REPORT

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COMPETITION IN ELECTRICITY MARKETS

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KEY TAKEAWAYS

- Electricity prices in Missouri are slightly below the national average but have risen at the fourth-fastest rate in the nation since 2008.
- Electricity markets in Missouri (and 34 other states) operate under a monopolistic model that eliminates competition and requires regulatory approval for nearly every decision.
- Regulated monopolies were granted to protect customers from price increases and ensure sufficient investment in electric utilities, but states with electricity competition are now achieving these goals more successfully than monopolized states are.
- Competitive electricity markets have developed across the country, leading to lower prices, more products offered, and more industry flexibility than in monopolized states.
- Missouri policymakers can imitate other states' competitive electricity markets to encourage cost competition among electric service providers to help lower electricity prices in Missouri.

ADVANCING LIBERTY WITH RESPONSIBILITY BY PROMOTING MARKET SOLUTIONS FOR MISSOURI PUBLIC POLICY

INTRODUCTION

Back in 2008, electricity prices in Missouri were well below the national average; Missouri ranked 43rd among states for the highest average retail cost of electricity. But since 2008, the news hasn't been good. Electricity prices in Missouri have risen at the fourth-fastest rate in the country, and we now rank 29th for the highest electricity rates nationwide. What happened?

This paper contends that the monopoly model under which Missouri residents and businesses purchase electricity is serving the state poorly, and that competition at the retail level is likely to make electricity cheaper for Missourians. When other states opened up their retail electricity markets to competition, prices went down. In fact, all 14 jurisdictions (13 states plus Washington, D.C.) that have introduced retail electrical competition have seen the inflation-adjusted price of electricity go down since 2008. In Missouri, the cost has gone up by 17% during that period.

In the sections that follow, I first trace the evolution of electricity markets, from the establishment of the first vertical monopolies (under which power generation, transmission and distribution, and retail sale were all monopolized) through the establishment of competitive markets in power generation, to the current era in which several states have introduced competitive markets at the retail level. Next I look at the recent experiences of two states, Texas and California, to see how they might be instructive to policymakers in Missouri considering the introduction of retail electric competition here. I then examine in more detail some of the aspects of retail electric competition (including better incentives for innovation and operational efficiency) that have translated into lower costs for customers.

Bringing Competition to Electricity Markets

Could competition in electricity markets benefit Missourians? If other states are a guide, the answer is yes. However, Missouri's electricity markets still operate under a monopoly structure that blocks competition and discourages innovation, meaning reform would be necessary.

Some basic background information will facilitate a discussion of electricity markets. Bringing electricity from a fuel source to your home is a multi-step process. Electricity is first generated from fuel sources (coal, natural gas, wind, etc.). It is then transmitted from generation sites to the larger area where it will be used (like a city) through transmission lines and distributed at the local level (such as a town, neighborhood, or home) after a transformer reduces its voltage to safe levels.[1] Finally, electricity is sold to the end-use customer. Electricity cannot be stored on the electrical wires that make up the grid, and utility-scale battery storage is not yet commercially viable on a large scale, so electricity generation and demand must match as closely as possible on a moment-by-moment basis.

Traditionally, all aspects (generation, transmission and distribution, and sale to a customer) have been owned and operated by a single, government-approved utility that has a monopoly in its service area (Figure 1). The utility is granted a monopoly and in return accepts an obligation to provide service to every customer in its territory. A state public utility or service commission then regulates the utility's every activity, determining what power plants it can build and what its budget for repairing transmission lines is, as well as the rates it can charge its customers. Regulators from the state's utility commission set rates to allow utility companies the opportunity to earn a profit based on their total amount of capital that still has economic value (or undepreciated capital), such as power plants, transmission lines, and substations. These assets that still have value are known as the "rate base," and the utility commission determines the rates utility companies can charge customers by calculating a reasonable rate of return based on the value of their rate bases.[2]

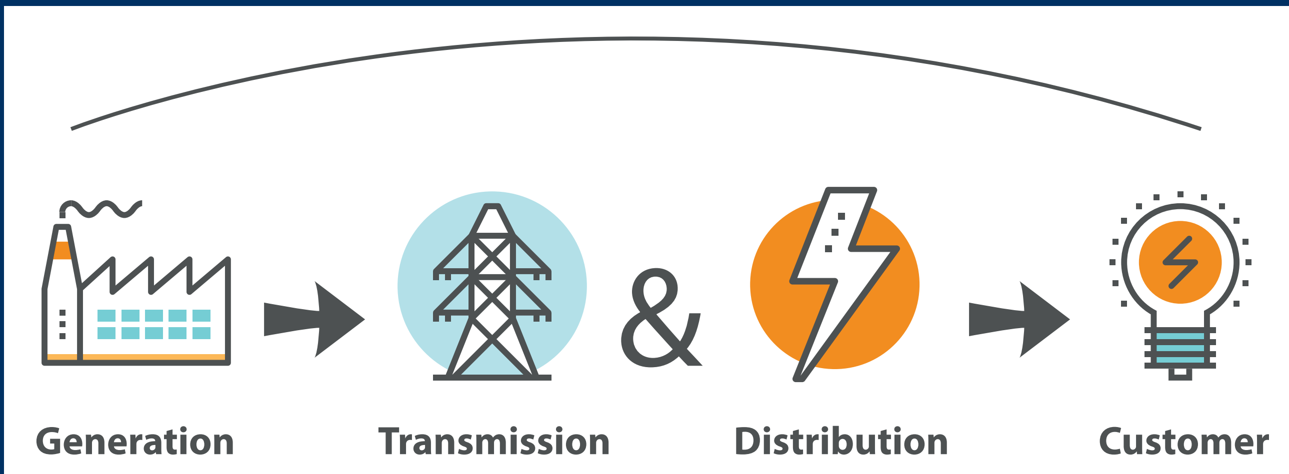
This is called "rate of return" regulation, and the mathematical expression for it is as follows:

$$RR = O + (V - D) \times r$$

RR is the revenue requirement for utilities, O is the operating costs (fuel, labor, etc.), V is the accounting value of the utility's assets, D is the accounting depreciation of those assets, and r is the rate of return that the utility is allowed to earn as determined by the public utility commission.[3] The term $(V - D)$ is commonly referred to as the "rate base." In essence, the more money a utility spends on capital $(V - D)$, the more profit it is entitled to

Figure 1:
Traditional Energy Market Structure

One government-approved utility handles generation, transmission and distribution, and retail sale of power to all customers in its territory.



Source: Shutterstock/Bloomicon

make on those expenses. Utilities cannot make a profit on operating expenses, but they are allowed to recover these costs from ratepayers. Some of the undesirable incentives this creates will be discussed below.

In its retail electricity market, Missouri still uses the monopoly model. That is, the final customer, whether a business or a household, does not get to choose its electricity provider. (Missouri's wholesale electricity market does not operate in this way, as will be described in Figure 2.) Missouri's Public Service Commission (PSC) is the state's utility commission, and it regulates four-investor owned utilities: Ameren Missouri, Empire District Electric Company, Evergy Missouri Metro, and Evergy Missouri West.[4] These utility monopolies provide all the electricity in their service territories, and combined they provide 67 percent of Missouri's electricity. The remaining electricity is provided by municipal utilities and electric co-ops, which also have monopoly status but are regulated at the local level rather than by the PSC.[5]

Monopolized utility regulation emerged in the early 20th century due to the perception that the electric utility market would give rise to natural monopolies, with a single company being able to spread out its fixed infrastructure costs across more and more customers, driving out potential competitors. State regulators sought to preempt some of the worst features of eventual monopolies, such as price hikes and captive customer bases, by overtly granting utilities monopoly status in return for state oversight and regulation.[6] Another goal of the regulated monopoly model was to avoid wasteful duplication of capital—for instance, redundant power lines—that would ultimately lead to increased costs. Given the potential for expensive, wasteful, overlapping facilities, policymakers at the time believed that only a single entity could provide least-cost service. As increased electricity usage was associated with economic growth, regulators sought to increase certainty for investors by providing the regulatory assurance of the rate-of-return model. Regulators also set the rates utilities could charge to prevent these newly minted monopolies from charging customers extremely high prices.[7]

Despite its simplicity, the monopoly model has several disadvantages:

1. The rate base (the value of a utility's capital) is multiplied by the assigned rate of return to

determine how much revenue a utility can take in from ratepayers, but operating expenses are essentially billed to ratepayers at cost. As a result, the utility benefits by spending money on capital regardless of whether that capital is necessary to provide the best service possible. However, utilities have little incentive to pursue improvements in operating efficiency, because any cost savings generated would be passed along to customers without benefitting the utility.[8] Utility capital expenses must be approved by the respective public utility commission, but regulatory capture—whereby a regulator is co-opted to serve the private interests of the entity being regulated rather than the public—often influences these decisions.[9]

2. In Missouri, the PSC staff can file a complaint if a utility earns too much money. PSC staff are not the same as the commissioners themselves, and just because the PSC staff initiates a report does not mean the commissioners will agree. Over-earnings cases are then determined by the PSC commissioners.[10] Utilities are thus incentivized to earn just enough, but not too much. This is one reason that utilities have little reason to operate most efficiently.

3. The regulated rate of return model discourages innovation, including in research and development (R&D). Costs that utilities seek to pass on to customers must be deemed "prudent" by state regulators. In Missouri, these costs must pass a "used and useful" test.[11] As a result, regulators who might be more risk-averse than the utility can overrule a utility's decision to assume the risk of an up-front investment in research and development. Further, even if an R&D project is approved initially, regulators can pull the plug if they change their minds about the value of a project. In such cases the utility must absorb the costs already incurred (which it had believed would be passed on to ratepayers).[12] Finally, as mentioned earlier, the upside of investment in R&D is diminished by the fact that utilities don't profit from innovations that reduce operating costs, because those savings go directly to ratepayers. Unsurprisingly, the electric utility industry spends very little on R&D compared to other tech-heavy industries. Electric utilities routinely spend less than 1 percent of their revenue on R&D, compared to other tech-heavy industries, which spend over 10 percent.[13]

4. Finally, the monopoly model encourages rent-seeking behavior by utilities.[14] Utilities often spend large sums of money to curry favor with regulators. There are numerous high-profile cases from the past decade where officials were bribed to increase a utilities' rate base. The real losers are the ratepayers stuck footing the bill. So long as government officials heavily control utilities, there will be a strong incentive for utility companies to unduly influence public officials.[15]

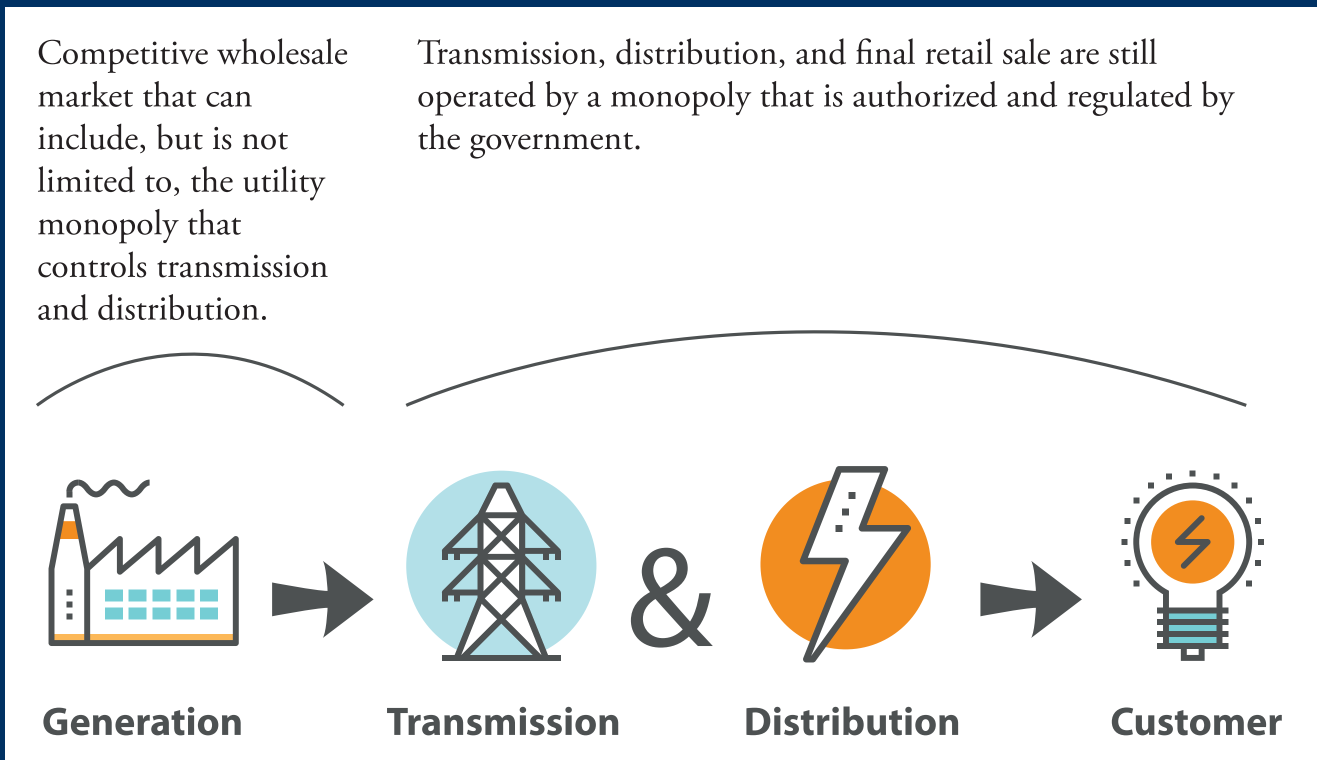
Cracks in the Foundation

In the 1970s and 1980s, problems with the monopoly model became evident. After declining for decades, electricity prices began to rise steadily starting in 1973 due to higher coal, petroleum, and natural gas prices.[16] Prices increased 55 percent, even when adjusted for inflation, from 1973 to 1982.[17]

Utilities were forced to raise rates to cover the costs of overbuilding capacity. Higher prices resulted in a sharp decrease in the rate of growth of electricity usage. The pattern of growth switched from exponential to linear. If growth had continued at the previous rate, electric consumption would be almost twice as high as it is today.[18] Utilities, which failed to foresee this decline, built far more electricity generation capacity than was needed. In addition, many large new plants (larger than necessary due to the declining electricity demand growth rate) suffered cost overruns and delays, making them even more expensive. Many were only completed to avoid penalties for delaying or canceling construction, while some utilities abandoned plant construction that had already begun.

In a normal market, an oversupply would lead to lower prices. The reverse occurs in a rate-of-return regulated monopoly market, with overinvestment driving *up* prices as the monopoly—with regulators' approval—seeks to recoup costs by spreading them across a diminishing usage base and with customers unable to opt out. Public utility

Figure 2:
Energy Market Structure after PURPA (1978)



Wholesale market: **Buying and selling of power between generators and distributors/resellers.**

Retail market: **Selling of power from resellers to end users.**

Resellers can be utility companies (in still-monopolized states), competing power providers, or electricity marketers/traders (in competitive states).

Source: Shutterstock/Bloomicon

commissions had little choice but to put ratepayers on the hook for these additional costs, as the commissions were responsible for approving the investments in the first place.[19]

The side effects of rate-of-return regulations have become major problems. With cost overruns and plants built beyond cost effectiveness, rate-of-return regulation allowed utilities to continue recouping these cost overruns plus profit from customers. Given the previously mentioned risks of pursuing R&D spending, utilities had little incentive to innovate to solve these problems.[20]

Rising electricity prices prompted calls for reforms to deregulate and allow competition. The first attempt at the federal level came when Congress passed the Public Utilities Regulatory Policy Act (PURPA) of 1978. PURPA required utilities to buy power from independent power producers—non-utility electric generators—if the independent producer generated electricity at a lower cost than the utility. PURPA added some competition at the generation stage without dismantling the monopoly model (Figure 2).[21]

Wholesale Electricity Markets

In the late 1990s, in an attempt to lower electricity service costs while maintaining reliability, the Federal Energy Regulatory Commission (FERC) authorized the creation of electric grid operators independent from utility companies.[22] Known as Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs), these entities are charged with balancing electric supply and demand and operating transmission services over large geographic regions.[23] (While there are minor differences between RTOs and ISOs, they are functionally the same.)

RTOs and ISOs are nonprofit organizations responsible for managing electricity grids within the territories of their member utilities. RTOs and ISOs deal with the wholesale market phase of electricity production—generation and transmission—rather than the retail market. The retail market is where electricity is sold to final customers and is still regulated by state laws. RTOs and ISOs are regulated by FERC, not by state utility commissions, because they bring together utility companies from several states and thus engage in interstate commerce. Utility membership in an RTO or ISO is voluntary, and is mainly driven by the cost savings, reliability benefits, and emissions reductions that come when utilities share their resources.[24] The funding for their operations comes from fees utilities pay to join and use their services.[25]

As grid operators, RTOs and ISOs do not own any generation or transmission infrastructure. RTOs and ISOs also conduct transmission investment planning in their regions, although they cannot force a utility to build transmission lines. The idea behind RTOs and ISOs is to ensure a reliable supply of electricity over a power grid with a larger geographical footprint. RTOs and ISOs also serve to minimize reliability challenges that might arise after opening the generation market to competition. These wholesale markets—called "energy markets"—work as follows: Power plants submit competitive bids, generally a day ahead but also hourly, for how much electricity they can produce and at what cost for the following day, or during hourly bidding windows. The RTO/ISO selects the generators that can meet demand at the lowest price. The price of the final generator called upon to run (or the marginal price supplying the final unit of electricity) sets what is called the "clearing price." (Generators both within and outside of the monopoly model participate in this process.) All units called upon to run are paid at the market clearing price.[26] A visual representation of this process is shown in Figure 3.

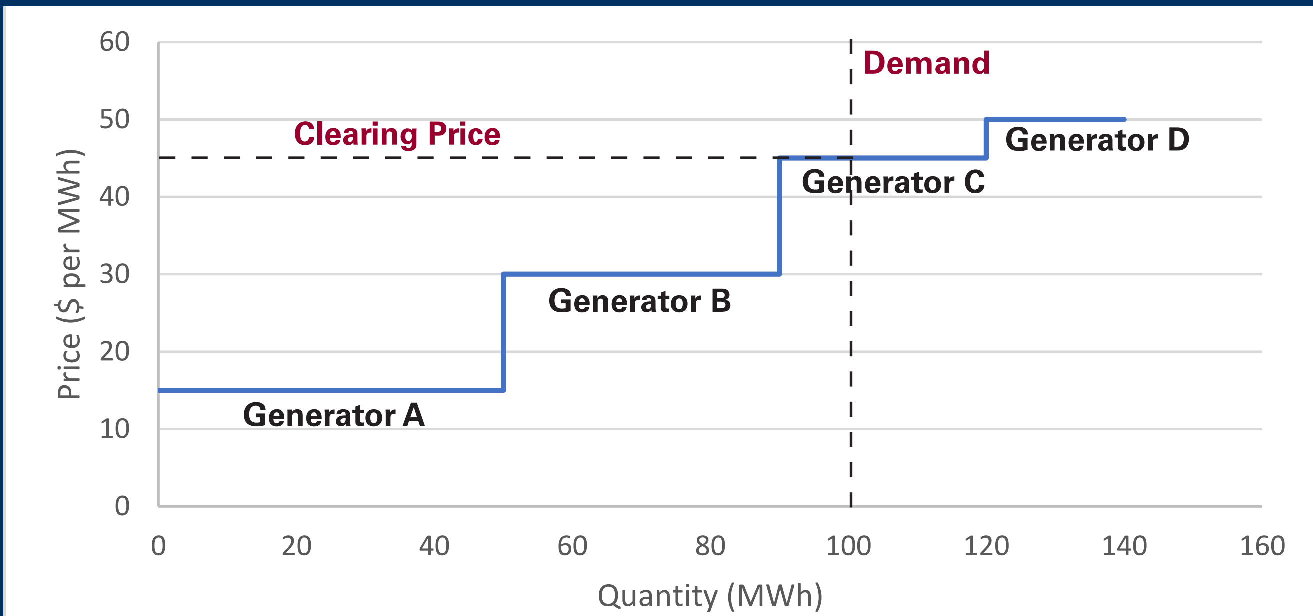
In this case, electricity demand is 100 megawatt hours (MWh), and four power plants are bidding. Generator A can provide 50 MWh at $15/MWh, Generator B can provide 40 MWh at $30/MWh, and so on. Generator C provides the final 10 MWh at $45/MWh; $45/MWh thereby becomes the clearing price. Generators A, B, and C are paid the clearing price. Generator D is not called upon to run and is paid nothing.

Since RTOs and ISOs are responsible for the reliability of the electric system under their authority, most also operate capacity markets. Capacity markets are essentially markets for electric capacity that provide monetary incentives from the RTO or ISO for suppliers (utilities and independent power producers) to keep necessary assets online and to induce investment in new generation. The purpose is to ensure there will be enough generation capacity to call upon to operate in the event of the failure of a large amount of generating capacity or if electricity prices drop low enough for a prolonged period during which demand outstrips investment in adequate capacity. Capacity markets operate to ensure there will be enough capacity to meet projected demand several years into the future. Monopolized utilities can present RTO/ISO capacity solicitation as evidence of their need to construct more capacity to their respective public utility commissions. Most RTOs and ISOs operate capacity markets to help ensure reliability, although operating capacity markets can result in plants being paid to sit idle for extended periods of time.[27]

RTOs and ISOs also operate ancillary service markets. Ancillary service markets cover operations used to meet sudden, unanticipated changes in electricity demand. "Spinning reserves" (generators that are already running,

Figure 3:
Regional Transmission Organization Wholesale Market Bidding

Only generators that can sell for under the clearing price are called upon to run, but all such generators are paid at the clearing price.



but at less than full capacity) can be called upon to quickly produce more electricity. Fast-start reserves can also be used. These are generators that are not running at the moment but can be up and running very quickly—usually within 10 to 30 minutes.[28] For instance, if a demand surge required extra electricity to be produced within the hour, it would be procured through an ancillary service market on a platform provided by the RTO or ISO.[29] RTOs and ISOs use these three markets to ensure electric reliability over long time scales (capacity markets), day-ahead and hourly time scales (energy markets), and instantaneous time scales (ancillary services markets).[30]

Nationwide, there are seven RTOs and ISOs that manage 60 percent of America's power supply. Missouri utilities and co-ops participate in two of them—the Midcontinent Independent System Operator (MISO) and the Southwest Power Pool (SPP).[31]

Competition and Market Forces in RTOs and ISOs

How do RTOs and ISOs bring market forces to electricity generation, and how does this benefit Missourians?

By selecting the lowest-cost electricity production to meet demand, RTOs and ISOs incentivize power plant operators to operate more efficiently. These markets also allow utilities that can produce more electricity than they need to sell the surplus to other utilities.[32] In the past, utilities would simply trade with each other; RTOs and ISOs create larger markets with more buyers and sellers, which lowers prices for consumers.[33]

In addition, the broad geographic range of RTOs and ISOs benefit to consumers. Because RTOs and ISOs ensure transmission lines are available for all to use, power plants from across the region can be called upon to operate when needed, reducing the need for each utility to build additional power plants to generate small extra amounts of "peak demand" electricity. A larger transmission system creates a wider network and more competition, lowering costs for customers. Further, the vast open transmission network increases overall reliability by having a larger pool of generation resources. If one power plant experiences an outage, there are many more alternative options to help cover temporarily.[34]

RTOs and ISOs also encourage competition from emerging technologies, such as renewable energy. Renewable energy generation firms can benefit from joining an RTO or ISO. Many renewable energy sources are inherently volatile, and an RTO or ISO can use its considerable resources and large transmission network to cover for unexpected shortages and outages.

Numerous studies have highlighted how RTOs and ISOs reduce energy costs and increase reliability.[35] Further, RTOs and ISO publish reports on their activities. MISO estimates it saved at least $3.2 billion in energy costs in 2019 that would have been incurred in its absence, and SPP estimates it saves roughly $2 billion annually—although we should bear in mind that these are self-reported data.[36] State regulators still retain a firm grip on Missouri's utilities, as they must approve utilities' financial and investment decisions, decreasing the role of market signals. However, the competition that exists in wholesale markets has benefitted customers.[37]

Competition in wholesale markets is only one side of the coin, though. Customers would likely benefit further if state regulators allowed competition in retail electricity markets.

Retail Competition

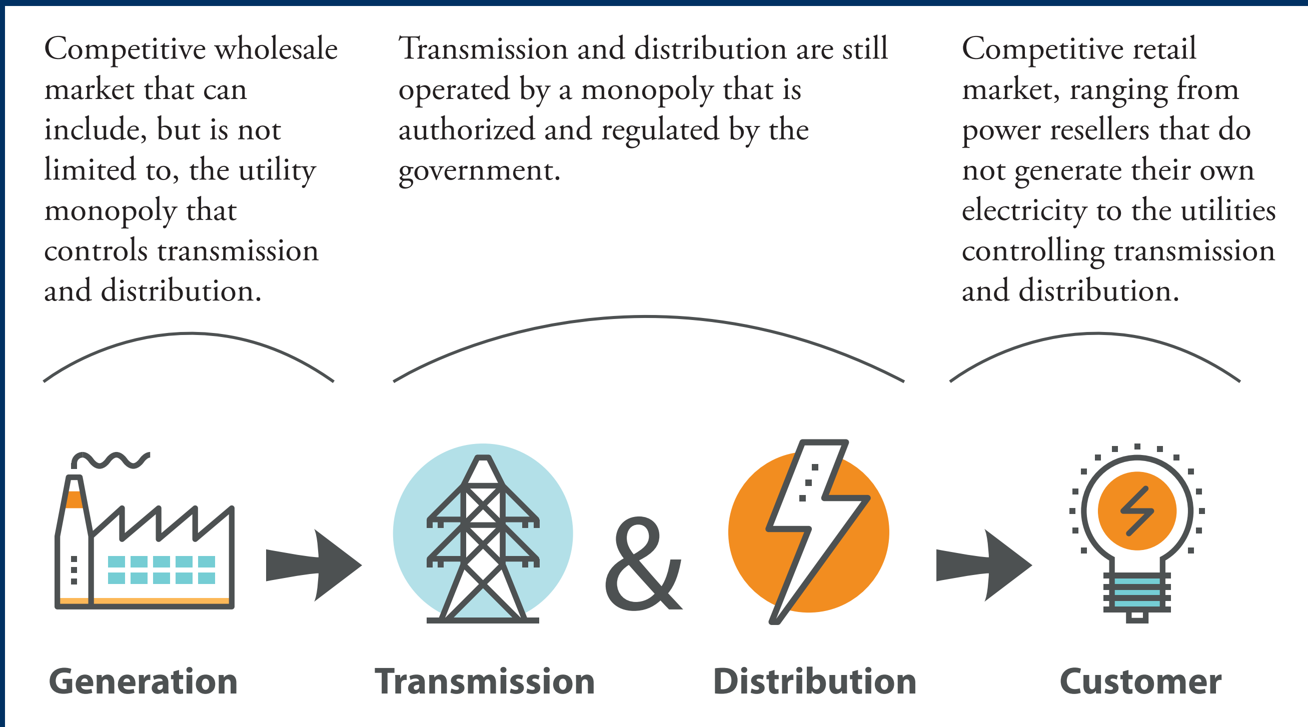
Missourians must buy their electricity from one company, with no choice to pick another. This is because Missouri's retail electricity market—where electricity is sold to end users—whether those are homes, businesses, or factories—is monopolized. While the decision to establish a regulated-monopoly system a century ago was well intentioned, there are reasons for considering a change in course today.

With competitive retail electricity markets, customers—residential, commercial, and industrial—could choose from electric service providers other than their former monopoly utility (Figure 4). The transmission wires and distribution breakers would still be monopolized and regulated as a public utility (to take advantage of economies of scale and avoid capital redundancy), but new companies could transport electricity over those wires to end-use customers. The physical, regulated transmission and distribution infrastructure is essentially the platform that retailers use for their services. Utilities operating transmission and distribution services charge a fee for entities that transport electricity over their physical infrastructure, and that fee would presumably be passed on to end-use customers. But customers could choose from new, competing suppliers offering different rates and services such as demand-response measures, time-variant pricing, and green energy plans. Customers could choose among such options because of retail competition, shown in the final arc in Figure 4.

Customers in most states that have adopted competitive retail markets have a wider array of products available than those in monopolized states.[38] These customers can often choose between options that suit their electricity usage patterns, preferences, and budget. It is this variety of products that helps customers realize price savings. Electric service providers offering options like real-time pricing (which allows electricity prices to vary based on the overall hourly electricity demand) can help customers take advantage of the changing wholesale market price of electricity. Demand response programs can help them save money by reducing their electricity usage at high-demand times throughout the day. Customers can shop between different fixed-price plans and plans with deals like free weekends.[39] Large commercial and industrial customers, which account for most electricity consumption, are often able to take advantage of time-variant pricing, which can help drive prices down, and flexible contracts to adjust to market developments.[40] Customers who want more of their electricity to be sourced from renewable energy can pay a premium to support its development.

While some of these options are available in monopolized states, they are much more prevalent in competitive states.[41] Competition forces electric service providers to respond to customer demands, and the ability to offer such

Figure 4:
Energy Market Structure with Retail Competition



Source: Shutterstock/Bloomicon

services without needing state approval every step of the way makes it easier to operate with flexibility.

Most competitive retail electricity markets began in the late 1990s and early 2000s. There was a steep learning curve in the early years; electricity prices fluctuated more than usual during the initial years for a few reasons. Retail electricity prices became more closely aligned to fuel prices as the cost of power plant operation and maintenance declined. Natural gas was gaining market share as a fuel for electricity generation, but the price of natural gas had not yet fallen to its present lows. This meant that as natural gas prices fluctuated while the fuel was becoming more commonly used, electricity prices fluctuated as well. Further, utilities had to be compensated for assets recently constructed following public utility commission approval with the expectation of a continued monopoly. To counter the uncertainty, some states that allowed retail competition used price controls, which both distorted the new market and discouraged customers from seeking alternative electricity suppliers. It was not until 2008 that the main issues from this transitional phase were largely resolved.[42]

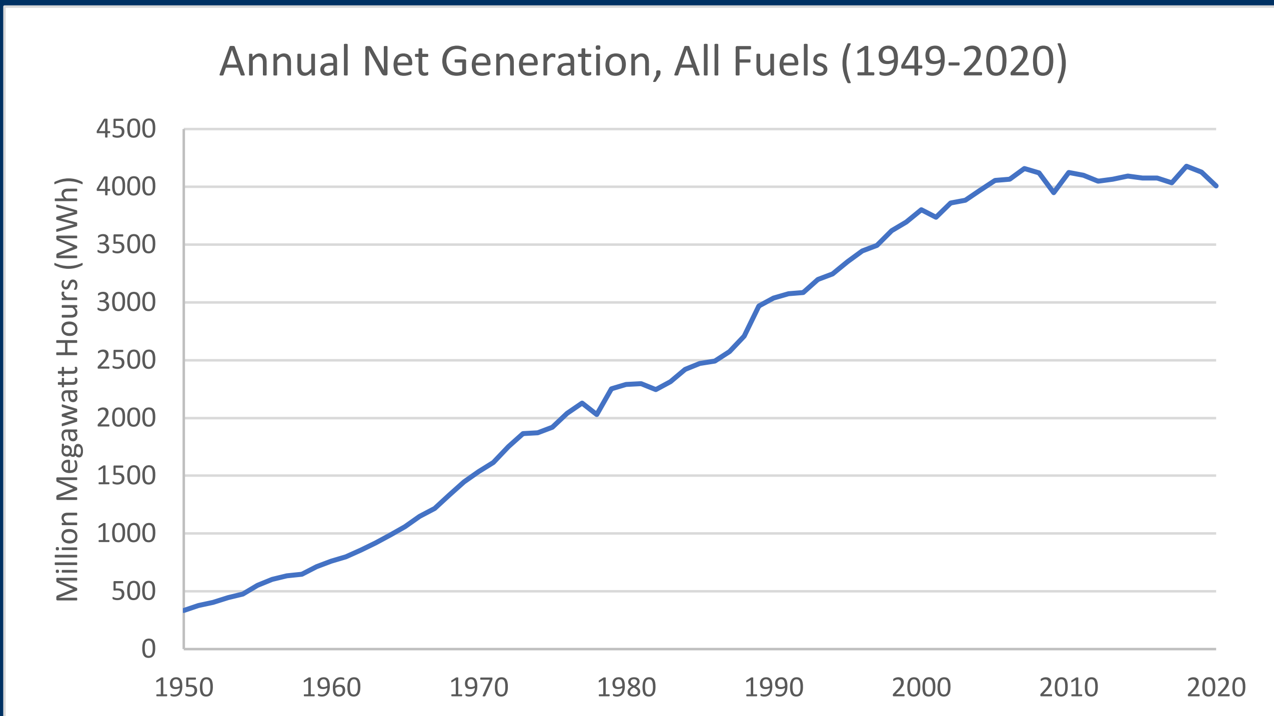
2008 was also when the "flat-load" era began. The flat-load era is characterized by relatively flat electricity demand growth. Electricity demand grew steadily from 1950 until 2007 and leveled off beginning in 2008, as can be seen in Figure 5. Further, the Energy Information Administration's fall 2020 short-term outlook projects generation to decrease through the end of 2022, both nationwide and in Missouri's region.[43]

The end of retail electric competition's transition phase and the beginning of a new phase of flat electricity generation allow us to compare how competitive and monopolized markets responded to changing electricity demand.

Fourteen jurisdictions (13 states plus Washington, D.C.), mostly in the Northeast, allow customers to choose their

Figure 5:
The Dawn of the Flat-Load Era

Beginning in 2008, demand for electricity has been relatively stable compared to previous years.



Source: Energy Information Administration.[44]

electricity provider. A handful of other states allow a small portion of customers to choose their provider, while denying choice to the vast majority. As these states are still largely monopolized, they will be grouped with the fully monopolized states for the subsequent comparisons.[45]

It is important to acknowledge that electricity prices can be driven by several factors beyond state policies, including proximity to fuel, the type of generating plants, and transmission line status. Naturally, these can differ widely between states. A comparison of how electricity prices have changed over time within competitive and monopolized states is better able to capture their differences than a snapshot at a particular time. A comparison over time is also valuable because most states that pursued competitive restructuring had higher electric rates before allowing competition than monopolized states that stayed monopolized.[46] It would be a mistake to conclude that competition drove their prices higher, as their absolute prices were already higher.

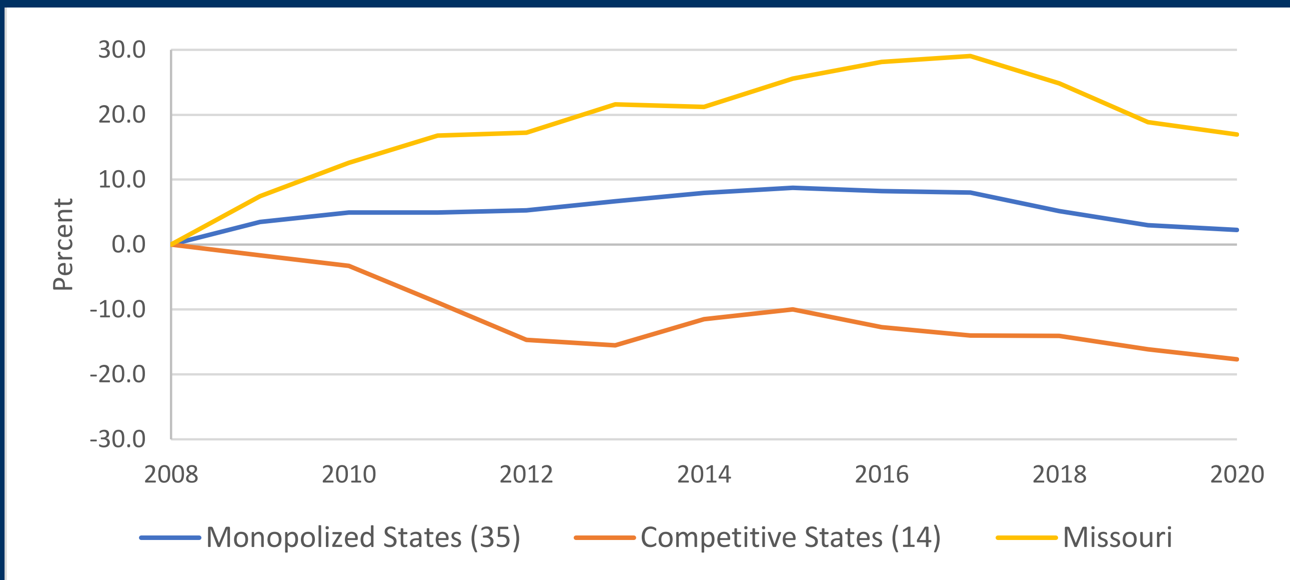
The inflation-adjusted percentage change in electricity prices since 2008 (including contiguous states and D.C.) can be seen in Figure 6.[47] Customers in states with retail competition have seen electricity prices decrease, whereas monopolized customers have seen prices increase slightly. Missourians were hit with particularly large price increases.

These dynamics can also be seen within states that de-monopolized in some but not all of their jurisdictions. For example, as discussed later, the parts of Texas that were subjected to retail competition saw faster price declines and greater power plant efficiency gains than the locations in Texas that remained monopolized.[48]

After adjusting for inflation, electricity prices in competitive states in 2020 were 17 percent lower than

Figure 6:
Monopolized versus Competitive Electricity Prices

Even compared to other monopolized states, Missouri has seen relatively high levels of growth in electricity prices.



Source: Energy Information Administration Electricity Data Browser. Inflation-adjusted totals were calculated by author. Indexed to 2008 prices.

in 2008, whereas prices in monopolized states rose two percent. During this same time in Missouri, prices rose 17 percent. It should be noted that the decrease in average electric rates around 2017 and 2018 was a result of utility corporate tax savings from the Tax Cuts and Jobs Act being passed on to ratepayers, not sudden improvements in the monopoly utility model.[49]

These data are not being driven by outliers. In the contiguous United States plus Washington, D.C., 10 of the 15 states with the largest electricity price drops since 2008 are competitive states. Of the 19 states that saw inflation-adjusted electricity prices increase, none were competitive. In fact, Missourians have seen the fourth-largest electricity price increase in the country, as shown in Figure 7. (Alaska and Hawaii are often excluded from continental comparisons because of their distance and isolation.)

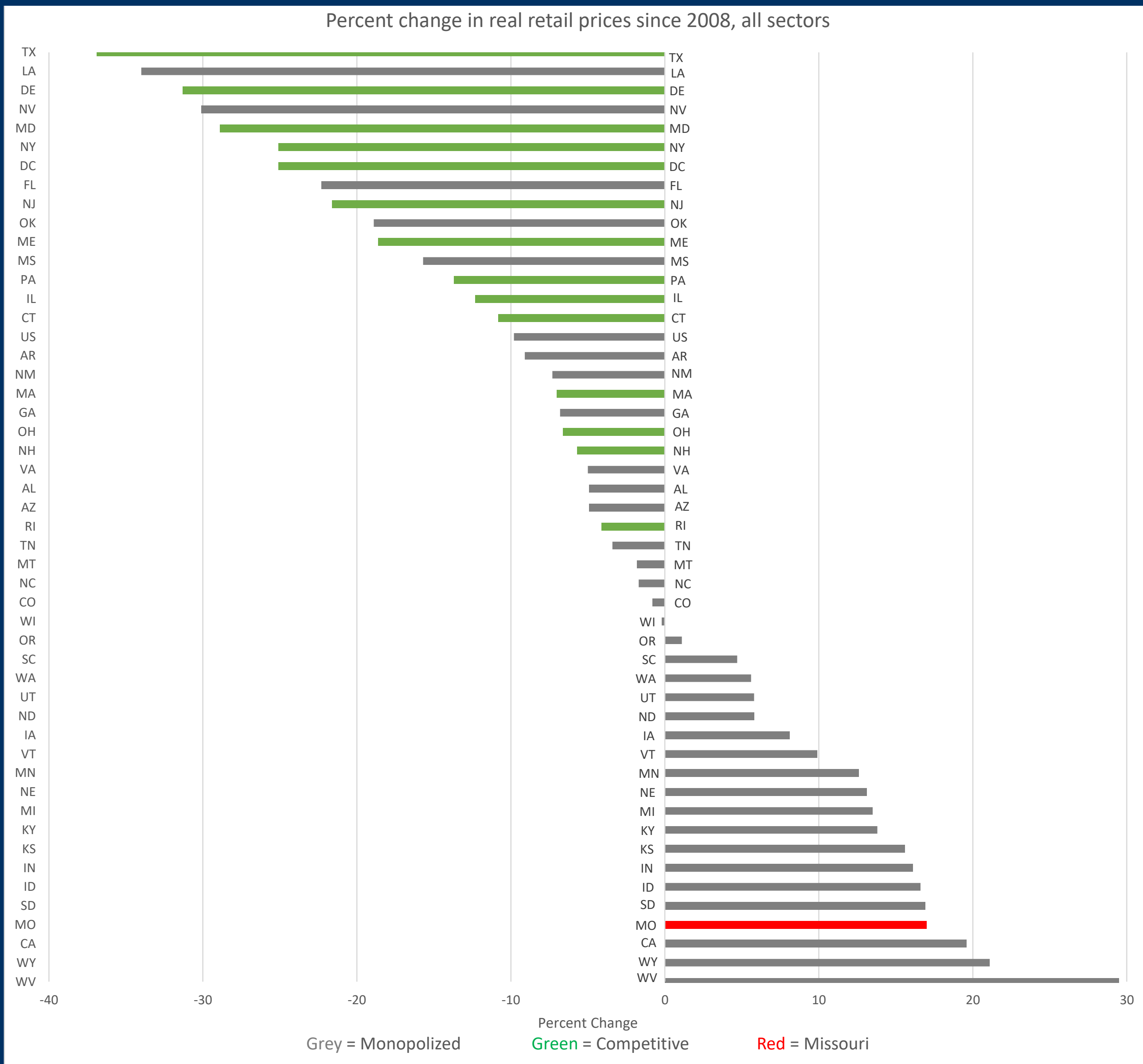
Retail competition supports lower prices for several reasons. Power plants in retail competition jurisdictions operate more efficiently, and competitive power producers are faster to pass on savings from lower fuel costs than their monopolized counterparts.[53] Additionally, prices in competitive jurisdictions are driven more by market forces, while prices in monopolized jurisdictions are driven more by political forces.[54] Lastly, competitive electric suppliers must respond to customer demands or face losing business, a prospect that monopolized electric suppliers do not face.

These comparisons suggest that Missourians would benefit from competition in retail electricity markets. As discussed in the next section, there are certain policies Missouri lawmakers can pursue to achieve the full potential of retail electric competition and not leave undue market power in the hands of former electric utility monopolies.

*Midwest states considered are Illinois, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, and Missouri.

Figure 7:
Change in Monopolized versus Competitive States' Electricity Prices since 2008

Competition in retail electricity markets is associated with decreases in electricity prices for customers.



Source: Energy Information Administration Electricity Data Browser. Inflation-adjusted percentage changes were calculated by author.

CASE STUDY: ELECTRIC COMPETITION IN THE MIDWEST

Two Midwestern states—Illinois and Ohio—have adopted retail electric competition and reduced their electricity prices from among the highest in the Midwest to among the lowest, both in percent change and absolute prices.[50] In 2008, Illinois had the highest average retail price of electricity per kilowatt hour at 9.26 cents and Ohio had the fourth-highest at 8.39 cents, while Missouri had the lowest at 6.84 cents.[51] In 2020, Illinoisans paid 9.75 cents for an inflation-adjusted price reduction of 12 percent. Ohioans paid 9.44 cents for an inflation-adjusted price reduction of 7 percent, while Missourians paid 9.64 cents for an inflation-adjusted increase of 17 percent. Only Iowa had lower electricity prices among Midwestern states (despite inflation-adjusted prices increasing), and Wisconsin was the only other state to see inflation-adjusted prices decrease (despite still having the third-highest absolute prices).[52] Adopting competitive reforms launched Illinois and Ohio from worst to near first in the Midwest, demonstrating the benefits of electric competition.

In the Midwest, competition has proved beneficial to customers. Ohio and Illinois experienced their own turnaround stories, with lower electric rates and more product options leading to more businesses moving to the state and residents saving money. While these two states implemented competition in flawed ways (which will be discussed in the next section), competition has still brought benefits.[55]

Which Example to Follow?

If Missouri were to allow retail electricity competition, which state's example should lawmakers follow, and why?

Texans have seen their electricity bills drop the fastest in the nation since 2008 and have also had a plethora of electricity plans to choose from. (While price comparisons can hide other factors, they can still be made within relevant timeframes, such as when states with retail electricity competition completed their transition phase.) Since 2008, Texas electricity prices have decreased 36.9 percent (adjusted for inflation) despite the state using 22.73 percent more electricity. All competitive states saw electricity usage decrease by at least 2.53 percent, while the nationwide average was a 0.44 percent decrease.[56] During the same timeframe, Missouri's average retail electricity prices increased 17 percent while Missourians used 10.26 percent less electricity.

Most competitive states met constant or decreasing demand with modest reductions in electricity prices, but Texas met significantly increased demand with even lower prices. Compare this to the rate-of-return regulation model, where utilities would build more power plants to meet rising demand and pass these new costs on to customers. How did Texas achieve this success?

One big part of Texas's success was its decision to "quarantine the monopoly."[57] This means that a monopoly is only allowed to operate in its regulated, monopolized market. It is not allowed to offer services in a market where it would face competition. For electric utilities, the monopoly that once controlled the generation of electricity, its transmission, its distribution from the power plant to other destinations, and the retail sale of electricity to end-use customers is broken up into two or three separate companies. The only part of the electricity process that remains monopolized is transmission and distribution; companies must split apart ownership and operation of their power plants and retail services.

Why is this important? Unless the monopoly is fully broken up and power generators and electric retailers are independent from transmission and distribution companies, monopolized transmission and distribution companies can use their monopoly power in one market to make up for losses in competitive markets. For instance, a utility can raise transmission charges on customers to make up for losses its power plants incurred by being forced to compete, as happened in Ohio.[58] In Ohio, customers of the only utility that fully divested its generation assets experienced greater price decreases than customers of utilities that simply moved their generation assets to a different part of the same holding company.[59] While this was likely not the sole factor in the price divergences, academic and industry literature attributes a major share to it.[60]

Texas also ended what is called "incumbent default service."[61] This is when former monopolies or their affiliated retail electricity providers (after being separated in ownership and operation) are the default electric service providers for the service territories they covered as a monopoly.

Why should this be ended? Incumbent default service discourages customers from seeking alternative suppliers and hinders potential competitors from entering the market. Allowing former monopolies to be the default service provider makes switching electric providers seem more costly to customers than it often is, leading to status quo bias. Incumbent default service providers are presented as the governmental "preferred" option, undercutting the goal of allowing competition. Having a default provider in an area also makes it difficult for other firms to enter the market, which suppresses competition. Ending incumbent default service and quarantining the monopoly has led to over 90 percent of Texans switching providers at least once.[62]

An academic study of deregulation found that Texas's support of electric competition has resulted in lower residential electricity prices for customers and encouraged electricity service providers to be more efficient. Approximately 75 percent of electricity in Texas is sold competitively,[63] and between 2002 and 2016 (competition began in 2002), prices for competitive customers declined significantly more than for customers in still-monopolized jurisdictions. The decline in retail prices in competitive areas was larger than the decline in the underlying wholesale prices, indicating that competitive suppliers became more efficient and had lower operating costs than monopolized suppliers. Findings from the study also suggest that prices in monopolized areas were driven more by political influence and less by supply and demand than in competitive areas.[64]

It should also be kept in mind that, in addition to pursuing these policies, Texas has other advantages. Texas electricity policies brought the price of electricity closer to the cost of fuel. At the same time, the fuel being used was increasingly natural gas, which was experiencing a price decline due to the mass application of hydraulic fracturing. This meant that customers could more quickly reap the benefits of declining fuel costs, as they were paying less for operation and transmission and distribution costs. Further, Texas is seated on numerous oil and gas fields and was in prime position to access this fuel immediately and at low cost.

For decades, Missouri's laws have outlawed competition in electricity markets. Pursuing these two policies could help the state reverse the trend and foster competition.[65]

2021 Texas Blackouts and Retail Competition

What, if any, were the connections between the February 2021 blackouts in Texas and Texas's competitive retail electricity market? It is first important to describe what happened during the Texas blackouts, keeping in mind the differences between Texas's competitive retail electricity market and power generation in wholesale electricity markets overseen by an RTO/ISO.

A severe winter storm swept through Texas in mid-February 2021, with temperatures dropping below zero degrees Fahrenheit. On February 14, the Electric Reliability Council of Texas (ERCOT)—Texas's RTO—experienced a winter record for electricity demand. On February 15, electricity production suddenly dropped sharply, leading to a shortage of supply during a period of high demand.[66] ERCOT was caught off guard by how quickly demand began to exceed supply but delayed in instituting rolling blackouts to keep supply and demand in balance. Rolling blackouts are necessary to prevent voltage and frequency on the power grid from dropping too quickly when there is a mismatch in supply and demand. However, ERCOT's failure to "load shed" by implementing rolling blackouts meant that many fossil-fuel plants (mainly natural gas plants) automatically tripped offline for safety reasons.[67] Keeping them online with an electrical overload could have destroyed their equipment. This was a failure of the grid operator, not power plants. That evening, 4.4 million Texans were without power.[68]

By the time ERCOT instituted rolling blackouts, wind production had resumed to expected levels, but the natural gas plants that had tripped offline were unable to resume production quickly after shutting down for an extended period of time.[69] The extreme cold conditions meant that their equipment, which had not been weatherized, was too cold to use. Roughly one third of Texas's total electric capacity—all sources included—was rendered unusable.[70] Rolling blackouts continued for several days until ERCOT ended the emergency on February 19 and power was restored.[71]

When examining the causes of the failures, it's important to remember that Texas's retail market was not related to the failures of either power generators or grid operation. If the extent of the problem had been foreseen, power plants would have adequately weatherized and their operators could have made massive profits during a supply shortage.[72] Moreover, it is important to ultimately realize that weatherization is an insurance policy. It is a costly process to pay for continued operation during unexpected events. Some RTOs and ISOs use capacity markets as an insurance policy, paying for capacity to be available in the future. ERCOT does not have a capacity market, and instead uses a much higher price cap on wholesale prices than other RTOs and ISOs do. ERCOT caps the allowable wholesale market price of electricity at $9,000 per megawatt hour, whereas other RTOs and ISOs are capped at $2,000, as required by the FERC.[73] ERCOT can set its own cap because, unlike every other regional grid, ERCOT's grid operates only within Texas's borders and thus is not subject to interstate regulation. ERCOT did allow the market price of electricity to reach $9,000 per megawatt hour on February 15 to incentivize more production.[74] It should also be noted that all power plants, whether in a competitive or monopolized state, must meet federal reliability regulations set by the FERC. It is not as if Texas's power plants were unsupervised due to Texas policymakers preferring competition to monopoly.[75] On the other hand, renewable power alone cannot shoulder the blame for Texas's blackouts. Although wind power did drop the first night, it met ERCOT's expectations thereafter.[76] The delay in action by ERCOT in implementing rolling blackouts turned what could have been a manageable, temporary problem into a days-long disaster.

The Texas Legislature passed two bills in response to the blackouts that emphasized the distinction between competitive retail markets and power generation in wholesale markets. SB 2 reduced ERCOT's board from 16 to 11 members and imposed a Texas residency requirement on holding such a position. It also gave the governor, lieutenant governor, and speaker of the house more control over who is appointed to ERCOT's board.[77]

The other reforms came from SB 3, which requires that all power plants (except natural gas plants) be weatherized under the direction of Texas's Public Utilities Commission. SB 3 also creates a new body to determine which natural gas plants are critical infrastructure deemed necessary to maintain service. These selected plants are to be weatherized under the direction of the Texas Railroad Commission (which regulates Texas's oil and gas industries).[78] Noncompliance will result in a $1 million penalty.[79] The bill also requires state regulators and electric utilities to agree on standardized rolling blackout procedures and creates a new alert system for when power supply is in danger of being insufficient to meet demand.[80] The changes from SB 2 and SB 3 relate to power producers and the grid operator, not to Texas's competitive retail electricity market.

There is also a major differentiating factor between Missouri's regional electric grids and the parts of Texas's grid that experienced the blackouts. ERCOT services 85 percent of electric demand in Texas, with the other 15 percent being serviced by SPP, MISO, and municipal utilities. The parts serviced by SPP and MISO were able to import electricity from across state lines, which ERCOT was not able to do. As a result, the effects of the storm were much less severe in SPP and MISO serviced areas of Texas.[81] Other states also experienced the same storm to varying degrees but were able to manage importing electricity and implementing rolling blackouts better than ERCOT was.[82] ERCOT lacks this geographic diversity of electric resources available to non-ERCOT regions. In contrast, Missouri is part of the eastern interconnection grid covering all states east of Colorado, as well as two regional grids (SPP and MISO) within that interconnection. If a similar storm limited the operational ability of power producers in Missouri, grid operators would be able to import power from several other states not as affected to cover the shortfall.

Texas's competitive retail market was unrelated to the blackouts, and the problems related to its competitive wholesale market had more to do with the structure and operation of Texas's market specifically. The extreme cold, coupled with disastrously slow decision making from ERCOT, turned the problem into a crisis. The inability of power suppliers to import electricity from power producers outside of ERCOT created a problem that did not exist for non-ERCOT regions of Texas.

What does this mean for Missouri regarding potential retail electric competition?

Missouri should still look at Texas's example for competitive retail electricity markets and the policies that differentiate Texas's deregulation from the rest of the country. Quarantining the monopoly and ending incumbent default service are policies that complement deregulation well and should be considered by policymakers here.

Retail and wholesale markets are different. The problems leading to Texas's blackouts were related to Texas's unique wholesale market. Missouri can keep its current wholesale market structure in MISO and SPP, with their differences from ERCOT, while imitating Texas's retail market structure.

2001 California Power Crisis

Many readers may recall California's attempt at wholesale deregulation in 2001. However, like Texas's situation, the challenges California encountered were relegated to the wholesale market and power provision rather than retail market competition. California's electricity crisis was the product of several factors unique to that state's market as well as a few factors outside of California's control.

The power market that California's ISO attempted to construct (the Power Exchange [PX]) was poorly designed and wide open to manipulation, allowing companies like Enron to game the system to the tune of tens of billions of dollars. For instance, remarkably poor market oversight rules resulted in Enron unnecessarily but deliberately scheduling massive amounts of power to be transmitted on small lines at the risk of frying them, only to be paid handsomely by the California ISO not to do so. This and many other market-gaming strategies were not against the rules of the PX and allowed several companies to exploit its shortcomings, costing Californians billions of dollars.[83] No RTO or ISO currently operating is as poorly structured as the PX was.[84]

The problem was exacerbated by other factors that were unrelated to the design of California's wholesale electricity market. A drought in the Pacific Northwest deprived California of significant amounts of hydropower, reducing the amount of electricity available. A major natural gas pipeline serving California exploded and its owner delayed reconstruction (illegally, as was later determined) in order to raise natural gas prices. Since much of California's electricity came from natural gas, this increased prices.[85] California relied on imports from surrounding states for one third of its electricity, but population booms in nearby cities in Arizona and Nevada, combined with a heatwave prompting their residents to use more electricity than usual, meant that less electricity was available to flow to California.

California's 2001 power crisis is instructive regarding poor wholesale market design, but it has little bearing on whether Missouri should adopt a competitive model for retail electricity. Missouri is already part of two well-functioning RTOs (MISO and SPP), neither of which have the market design problems of California's PX, and Missouri imports six percent of electricity usage in contrast to California's one-third.[86] Additionally, California's problems did not pertain to retail competition (or the lack thereof). Challenges in procuring power and the competitive retail sale and distribution of that power are separate issues, the latter of which is the focus of this paper.

Looking Ahead

The discussion thus far has shown how electric choice has lowered prices for customers compared to the monopoly model, but are there other reasons competitive models are better?

In addition to the price and customer choice benefits accompanying competitive retail markets, a competitive environment also makes it easier to incorporate innovation from other aspects of the energy industry. For instance, when innovation in hydraulic fracturing dramatically lowered natural gas prices, customers in competitive states were able to take advantage of low prices more quickly than their monopolized neighbors.[87] Competitive firms passed these savings on to customers to avoid being undercut by other firms and did not have to engage in a lengthy rate review process with a public service commission, whereas monopolized firms had no such pressure or freedom to act. Moreover, as natural gas plants became more competitive compared to other types of plants during the fracking boom, investors were willing to make capital available to expand natural gas plant capacity, undercutting the monopolists' argument that only a regulated monopoly market can attract capital at favorable rates.[88] This flexible environment also makes it easier to adapt to future innovations, whether revolutions in battery storage or small modular nuclear reactors. Innovation is central to competitive markets but peripheral in a monopoly.

Further, the coming wave of distributed energy resources (DER), where customers generate electricity on-site using technology such as residential solar panels, poses a larger challenge to monopolized states than competitive markets. Large amounts of DER pose a challenge to regulatory ratemaking, as customers no longer simply consume electricity from utilities but can also generate it and sell it back to utilities. This often results in non-DER customers subsidizing DER customers.[89] For instance, a policy called net metering allows customers to offset their electric bill with electricity generated from rooftop solar panels. When the solar panels produce more electricity than a home is using, excess electricity is put back onto the grid. The meter "spins" backward, deducting the electricity generated from the customer's bill. As a result, homeowners pay only for the net amount their meter records. Under Missouri law, net metering customers are compensated at the retail electric rate for the electricity they generate.[90] However, retail electric prices include more than just generation. Transmission and distribution costs are also included in a ratepayer's retail electricity price and comprise well over half of a ratepayer's bill.[91] As a result, when net metering customers are compensated at retail rates, they receive payments not only for the electricity they produce but also for the parts of retail rates used to maintain the electric grid, which they use but neither provide nor maintain. To make up for lost revenue, utility companies pass these costs onto non–net metering customers.[92] However, the electricity fed back onto the grid by DER customers does have benefit beyond just the physical electricity generated, such as reducing power plant activity during near-peak times, which relieves pressure on the grid.[93] Accordingly, fairly compensating DER customers is challenging, and even more so in a monopoly.[94] The lengthy ratemaking process in Missouri is subject to competing special interests, which results in costs being unfairly allocated across different classes of customers.

In contrast, competitive electricity markets are compatible with voluntary, market-driven investments of DER that offer fair pricing for relevant parties. Customers who want residential solar panels are free to find an electric service provider with desirable rooftop solar rates, and customers without solar panels are free to find a provider that does not subsidize rooftop solar customers at their expense.[95] For instance, Texas continues to have more rooftop solar customers, despite the state having no policy that requires rooftop solar generation or prescribes a reimbursement rate. Some of this growth is likely due to residential solar power being an emerging market and Texas possessing excellent solar energy resources, but it also demonstrates that, under the right conditions, residents will undertake these actions voluntarily without a need for a government-backed monopoly. In short, competition and retail choice reduce regulatory barriers and encourage more efficient DER development.[96]

Additionally, electricity generation in competitive states is well suited for operational efficiency. Starting in the early years of deregulation, power plants under new pressure to compete increased their fuel efficiency and operational efficiency by nine to ten percent, depending on the plant type.[97] Removing the ability to simply pass costs along to customers created incentives for more efficient power plant operation and fuel procurement.[98]

Competitive electricity generators are more effective at attaining lower-cost emissions reductions than monopolized utilities because they have an incentive to procure green energy in the most cost-effective way at the most economical time. Monopolies, on the other hand, often procure green energy regardless of the market price. This should not be surprising, given their incentive to spend more money to make more money. Monopolies can even encourage green energy production when it is counterproductive, such as when electricity prices are negative and the utility pays the market to take its product but still makes money due to generous federal tax credits.[99] This can happen when sudden surges in renewable production result in more overall electricity being generated than consumed. In some of these cases, ramping down baseload plants would be more expensive than paying customers to take the excess electricity off the grid. Additionally, electricity generators subject to competition are more compatible with emissions pricing policies. For instance, compliance costs under the largest market-based emissions reduction program attempted in the United States (the Acid Rain Program) were estimated to be roughly half the cost for competitive electricity generators than monopolized generators.[100]

Customers in states that have adopted competitive markets also have easier access to real-time pricing (or dynamic pricing) programs.[101] In addition to giving customers the opportunity to save money, dynamic pricing can also reduce electricity usage (and therefore emissions) at peak usage times. This, in turn, eliminates emissions from the power plants that are not needed to run at peak times.[102]

It's impossible to know what environmental policy will be enacted in the future in Missouri or at the federal level. However, those proposals would still require compliance, and a competitive electricity market allows more flexibility in dealing with environmental policies.

CONCLUSION

Missouri has operated on an electric utility monopoly model at the retail level for decades, with little progress made toward competition. While the reasons for the state preemptively granting a monopoly may have been valid a century ago, these reasons no longer hold water. Pursuing retail electric competition achieves some of the monopoly model's primary goals while also countering some of its main deficiencies. Competition promotes innovation and keeps costs down. Further, carefully structured competition can prevent rent seeking. Monopolized electric utilities are no longer needed to protect customers from rising prices and attract necessary capital investments in generation.

It is beyond the scope of this paper to determine how much Missourians could save if policymakers embraced retail choice. However, it should be recognized that states that have pursued electric competition have seen decreasing electricity prices, a wider array of products, and industry flexibility.

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