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Harnessing Competition in a Transitioning Electricity System: Opportunities for Traditional Cost-of-Service States

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Summary

Cost-of-service states with vertically integrated utilities can manage a rapidly changing electricity sector by expanding opportunities for competition, even while maintaining the traditional vertically integrated utility. In fact, competition has been deployed successfully by cost of service states to meet customer needs, bring down costs, and encourage innovation. Building on these models, states can strategically create new opportunities for competition between utilities and third-party providers to manage the risks of a changing sector while seizing new benefits for electricity customers, utilities and third-party providers. This policy brief identifies ways that cost-of-service states can increase third-party participation or utilize competition to spur new utility strategies, products, and services.

INTRODUCTION

A rapidly changing electricity system presents both challenges and opportunities for vertically integrated utilities, electricity customers, third-party providers, and state regulators in cost-of-service states. Low natural gas prices and falling renewable energy costs are driving vertically integrated monopolies to shutter coal-fired power plants and challenging the viability of some of their nuclear power plants. An expanding array of options allow consumers to manage and reduce their electricity use. Firms looking to relocate or expand in traditionally regulated states may demand clean energy to meet corporate sustainability goals and source low-cost power.

The Cost-of-Service Model Briefly Defined

Under a "cost-of-service" model, the state grants a utility an exclusive monopoly right (and obligation) to serve a specific territory and then subjects the utility to economic regulation whereby the utility is compensated for its costs plus a rate of return on capital investment through rates charged to customers. This guaranteed economic return on investment helps a utility attract investors and satisfy debt obligations.

States that have maintained traditional rate-setting for vertically integrated utilities have a broad suite of tools for managing the evolving electricity sector, because they can retain direct oversight of the state's electricity generation mix while opening parts of the market to third-party participation. While state laws shield vertically integrated utilities from many forms of market pressure, competition between utilities and third-party service providers is not new and is wholly consistent with the vertically integrated utility model. It is possible, therefore, to expand opportunities for electricity sector competition without abandoning the traditional vertically integrated utility.

A growing number of states are increasing opportunities for third parties to compete with electric utilities while preserving the cost-of-service model. Third-party leasing, competitive procurement, and green tariffs, for example, utilize market competition to expand consumer choices, support policy goals that deploy renewable energy and storage technologies, and spur monopoly utilities to engage in more robust risk management strategies to meet the rapid changes underway.

This paper focuses on opportunities for cost-of-service states to strategically incorporate competition into their existing approach to electric utility regulation. Part I briefly describes the cost-of-service model and lists the advantages cost-of-service regulators have over their counterparts in restructured states to forge a clear path in times of change. Part II outlines the factors driving change in the electricity sector and notes the potential risks and rewards these changes bring for traditional cost-of-service states. Part III discusses strategies to achieve sector goals through increased competition without abandoning a cost-of-service approach.

I. THE VERTICALLY INTEGRATED UTILITY IN COST-OF-SERVICE STATES

Early in the twentieth century, it became clear that providing electricity service would require large, capital-intensive networks of wires and equipment. States viewed electric utilities as natural monopolies—i.e., a sector where competition would result in increased costs due to redundant infrastructure and the inability to realize the economies of scale offered by centralized electricity generation.[1] Across the United States, a system of monopoly, investor-owned, vertically integrated utilities regulated by state public utility commissions (PUCs) emerged.

PUCs set retail electricity rates that compensate vertically integrated utilities for their costs and ensure the financial viability of the firm, including allowing a reasonable rate-of-return on capital investments to allow the firm to attract investors.[2] The utility is subject to economic regulation in exchange for an exclusive franchise in its service territory.[3] In general, then, an investor-owned utility can only charge customers what the PUC allows it to charge.

[1] J. P. Tomain, "The Persistence of Natural Monopoly," *Natural Resources & Environment* 16(4)(2002): 242, https://www.jstor.org/stable/40924211?seq=1#page_scan_tab_contents.

[2] For a discussion of the history of the electric utility, see W. Boyd and A. E. Carlson, Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law, UCLA Law Review 63(2016): 810, 827.

[3] As discussed in this paper, the utility's exclusive franchise does not mean the utility is completely insulated from competition or that a state cannot subject the utility to competition in specific aspects of its business.

In addition to setting electricity rates, most state utility commissions also oversee vertically integrated utility resource planning efforts, to ensure that utilities are meeting forecasted demand through new investments in generating facilities, or transmission and distribution infrastructure.[4] This planning function, when paired with the certainty of utility cost recovery, represents an important tool for navigating a changing sector.

Today, vertically integrated utilities subject to cost-of-service economic regulation operate in 37 of the 50 states.[5] In the remaining 13 states, regulators have restructured their electricity markets so that utilities are focused solely on retail distribution. Distribution utilities remain subject to state economic regulation in restructured states, but no longer own generation and do not carry out long-term resource planning the way vertically integrated utilities do in traditional cost-of-service states. Instead, restructured states are limited to regulating what electricity purchases their distribution utilities make from competitive providers.

Recent efforts to bolster distressed nuclear power plants illustrate the differences between cost-of-service and restructured states. Low natural gas prices and increased renewable generation can make existing nuclear plants less relatively economic. If a PUC in a traditionally regulated state determines that it is prudent to keep existing nuclear facilities online, it can set rates that allow the vertically integrated utility to recover its costs.[6] In contrast, a restructured state has given up regulatory control over the wholesale energy price and must find another way to improve the economics of existing nuclear plants. Illinois, for example, opted to provide existing nuclear plants an entirely new revenue stream in the form of Zero Emissions Credits and required that the state's distribution utilities purchase those credits.[7]

Similarly, a utility commission may choose to provide a vertically integrated utility cost recovery, including "construction work in progress" rate recovery if allowed by state law, to facilitate investments in generation technologies that might not occur in competitive markets where generators compete on solely, or primarily, based on cost alone.[8] Given the rapid technological change in the sector, described in the following section, this ability to foster investment is another valuable tool for regulators in cost-of-service states.

II. A CHANGING ELECTRICITY SECTOR

The electricity sector is in a period of significant change. According to Edison Electric Institute, U.S. investor-owned utilities invested $112.5 billion in capital improvements in 2016 alone, up $8.5 billion from 2015.[9] On the supply side, sustained low natural gas prices and decreasing renewables costs have changed the generation mix. New solar, wind, and natural gas plants comprise most of the capacity additions in recent years, with renewables making up a majority of new capacity in 5 of the last 10 years.[10] These shifts have pressured uneconomic power plants to retire—primarily coal plants, but also some nuclear plants.[11]

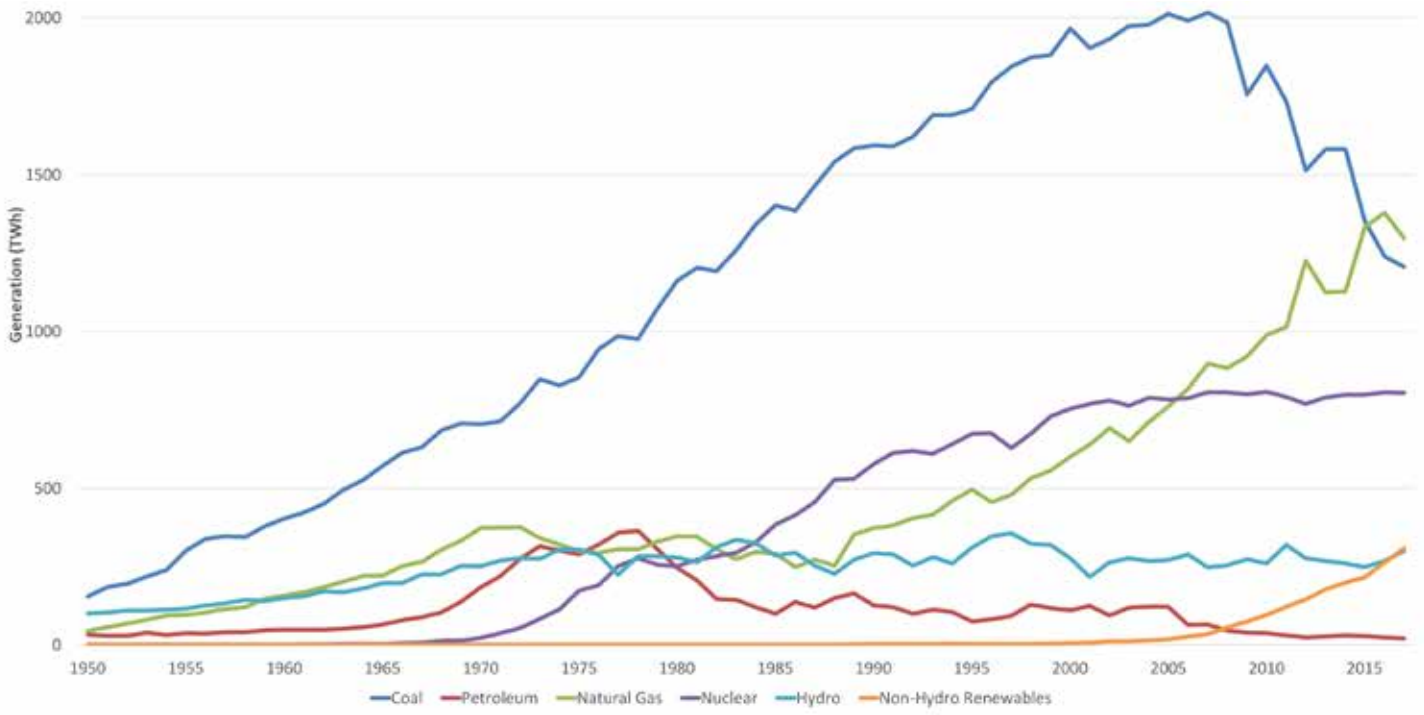
Change has also come to the demand side of the power equation. Electricity demand growth has flattened and is expected to remain flat—until and unless electrification of transportation and other sectors occurs.[12] Customers are demanding more freedom to choose their electricity supply, with some customers turning to self-supply while others seek policy

[4] See Regulatory Assistance Project and Synapse Energy Economics, "Best Practices in Electric Utility Resource Planning," by R. Wilson and B. Biewald, (June 2013), http://www.raponline.org/wp-content/uploads/2016/05/rapsynapse-wilsonbiewald-bestpracticesinirp-2013-jun-21.pdf.
[5] These states are not identical. Many allow their vertically integrated utilities to participate in organized competitive wholesale electricity markets, such as those operated by the Midcontinent Independent System Operator (MISO) and the Southwest Power Pool (SPP). Nevertheless, the states in MISO and SPP (with the exception of Illinois) maintain cost-of-service regulation, usually with some form of regulated resource planning.
[6] The goals might include fuel diversity, zero-emission power generation, and/or the desire to maintain jobs.
[7] See Illinois Public Act 99-0906 (2017), Sec. 1-75(d-5).
[8] Boyd and Carlson, *Accidents of Federalism*, 848–850.
[9] EEI, 2016 Financial Review, Annual Report of U.S. Investor-Owned Utility Industry, p. 1, http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/finreview/Documents/FinancialReview_2016.pdf.
[10] See "Natural Gas and Renewables Make Up Most of 2018 Electric Capacity Additions," U.S. Energy Information Administration, May 7, 2018, https://www.eia.gov/todayinenergy/detail.php?id=36092#tab2.
[11] Over 60 gigawatts of coal capacity have been shuttered since 2010. See "Coal-fired Electricity Generation in the United States and Future Outlook," MJB&A Issue Brief, August 28, 2017, https://www.mjbradley.com/sites/default/files/MJBAcoalretirementissuebrief.pdf; Six nuclear plants have been or are planned to retire. "Three Mile Island Is the Latest Nuclear Power Plant to Announce Retirement Plans," U.S. Energy Information Administration, June 13, 2017, https://www.eia.gov/todayinenergy/detail.php?id=31612.
[12] See "EIA's latest Annual Energy Outlook projects rising production, relatively flat consumption," U.S. Energy Information Administration, February 6, 2018, https://www.eia.gov/todayinenergy/detail.php?id=34833.

changes to allow for more choice. Demand for distributed solar systems has also grown.[13] Information technology and two-way communications between end users and the utility offer the potential for adjusting demand up and down, just as power plants are managed. Staff at the Federal Energy Regulatory Commission estimate that through 2015, advanced metering systems were installed at nearly 43% of U.S. electricity customer sites.[14]

While these trends are visible across the United States, at the state level these changes vary widely. Some variation can be attributed to access or lack of access to specific resources, such as quality wind resources, or proximity to demand centers or transmission. But a portion of the variation can be attributed to state energy policies.[15]

Figure 1. Historical Generation by Fuel Type, 1950–2016 (EIA 2016d).



Values for 2016 are based on a 12-month rolling average through April 2016.

The Challenges and Risks

Traditionally regulated states face significant challenges and risks due to the changes underway. Notably, low natural gas prices, flat demand growth, cost overruns and canceled generation projects present some of the same challenges in traditionally regulated states today that led some states to consider restructuring in the 1990s and 2000s.

The rapid change in the electricity sector presents challenges and risks for cost-of-service regulators of vertically integrated utilities, who must approve utility investments for purposes of cost recovery through electricity rates. Regulators and utility executives face risks of overinvestment, stranded assets, and/or path dependencies that could prevent utilities from offering customers the lowest cost, highest value services.

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[13] See W. Cole, et al., *2016 Standard Scenarios Report: A U.S. Electricity Sector Outlook*, National Renewable Energy Laboratory (Nov. 2016), https://www.nrel.gov/docs/fy17osti/66939.pdf.

[14] See B. Foster, et al., *2017 Assessment of Demand Response and Advanced Metering, Staff Report*, Federal Energy Regulatory Commission (Dec. 2017), https://www.ferc.gov/legal/staff-reports/2017/DR-AM-Report2017.pdf. The 2017 assessment is based on 2015 data. The Southeast region had a penetration rate of 38.7% and the region consisting of Florida a penetration rate of 56.4%. Ibid., 5.

[15] For example, according to the National Renewable Energy Laboratory (NREL), 41 out of 50 states have net-metering policies that allow owners of certain solar voltaic systems to sell their excess generation to the local utility, often at favorable rates. NREL, Net Metering, https://www.nrel.gov/state-local-tribal/basics-net-metering.html (last visited Jan. 6, 2019). Net metering policies are an example of how states have introduced an element of competition within a regulated utility framework to effect outcomes.

Most state PUCs are accustomed to weighing the potential for stranded assets against the benefits of new capacity investments to replace aging infrastructure. However, when technology is changing rapidly, these decisions may present new risks. For example, advanced metering infrastructure can shed light on the usage patterns of customers and identify demand response opportunities to save customers money. Yet smart grid technology is improving rapidly and coming down in cost, making it difficult to determine whether it is more prudent to invest today or wait for the later model. And while it is fair to expect that advanced metering will yield information, the full benefits are not yet known, making it difficult to assess the net benefit of the technology ex ante.

Once investments in data collection are made, the traditional closed approach of the vertically integrated utility presents some challenges to best utilizing that data. Access to smart meter data and information about the distribution system could open the door for new ideas and innovations that utilities may not be in the best position to develop. Providing customer and system data access to third-party problem solvers and innovators represents an important step to creating new value for electricity customers.[16]

Even setting aside the emergence of new technologies, the cost-of-service model does not always yield success where services do not square with cost-recovery incentives. Demand-side energy efficiency investments, for example, have not been pursued as robustly in cost-of-service states overall as in states that have separated supply-side interests from demand-side customers.[17] This underlying challenge remains and presents opportunities for states willing to introduce measured steps toward competition on the demand-side of their electricity systems.

Layered over these challenges is the prospect of carbon regulation. Potential carbon constraints bring not only the need to reduce emissions from the sector, but also increased demand for electricity due to the electrification of the transportation and buildings sectors. While federal carbon constraints remain uncertain, some states have adopted policies to reduce carbon emissions from power production.[18] Moreover, many large corporate users of energy have carbon targets that drive them to seek low- and no-carbon energy sources.[19] Many vertically integrated utilities have absorbed these realities—and the likelihood of a federal constraint in the near-term planning horizon—into their planning and have adopted their own carbon reduction targets. Carbon accountability is just one of a number of federal regulatory uncertainties that present risk for utility investments and state commission decisions.

The Opportunities and Rewards

There are upsides to managing the changes underway in the sector. At the most basic level, a changing electricity sector presents the opportunity of improving system performance with new resources and services at lower operating costs. Low natural gas prices and decreasing renewables costs present opportunities for keeping costs for utility customers low while simultaneously reducing the emissions profile of the power plant fleet, which in turn reduces regulatory risk and improves public health outcomes.[20]

On the demand side, new technologies offer consumers the potential for more control over electricity decisions. Smart thermostats that allow remote control by the utility or a third party, for example, permit customers to participate in demand management programs that were not possible before the availability of the new technologies. In a demand response pilot during the solar eclipse of 2017, Nest reports that 750,000 Nest Thermostat users opted into a program to reduce their energy use by 700 MW.[21] More information and control open new potential for controlling electricity demand in a way that makes the system more reliable and less costly. Provided innovators have access to this information, new ideas in this area are bound to come.

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[16] For example, the Arkansas Public Service Commission has an open proceeding on advanced meter infrastructure (AMI) and data access. See Arkansas Pub. Service Comm'n, Order, In the Matter of Policies Related to Distributed Energy Resources, Docket No. 16-028-U, July 27, 2018, http://www.arkleg.state.ar.us/assembly/Meeting%20Attachments/510/692/9%2027%2018%20Handout%20E%20Thomas-PSC.pdf.

[17] The top five states in the Advanced Energy Efficient Economy's (ACEEE's) State Energy Efficiency Scorecard are restructured states, while 24 out of the bottom 25 are cost-of-service states with vertically integrated utilities. https://aceee.org/state-policy/scorecard.

[18] See, e.g., Virginia Proposed Regulation for Emissions Trading Programs, 9VAC5-140-6010, *Virginia Register of Regulations*, Vol. 34, Issue 10 (Jan. 8, 2018).

[19] B. Plumer, "A Year After Trump's Paris Pullout, U.S. Companies Are Driving a Renewables Boom," *New York Times*, June 1, 2018.

[20] As mentioned above, new renewables capacity has made up the majority of new capacity additions in 5 of the last 10 years for which data are available. In 2018, new natural gas plants are expected to comprise about two-thirds of new capacity additions. See Note 10.

[21] B. Bixby, "Solar Eclipse, Meet the Nest Thermostat," *Inside Nest*, Aug. 10, 2017, https://nest.com/blog/2017/08/10/solar-eclipse-meet-the-nest-thermostat/.

III. HARNESSING COMPETITION TO MANAGE AN EVOLVING ELECTRICITY SECTOR

Despite its exclusive service territory and general assurance of reasonable cost recovery, the vertically integrated utility is not, and has never been, fully insulated from competition. There are numerous examples of competition currently in play for vertically integrated utilities in cost-of-service states. For example, utilities may participate in wholesale electricity markets for the benefit of their customers and investors, such as those operated by the Midcontinent Independent System Operator (MISO) and the Southwest Power Pool (SPP). State-level net metering and third-party leasing policies may require a utility to purchase renewable energy generated by residential and commercial customers. Competitive procurement programs may allow third parties to directly compete with utilities. Utilities deploying smart grid technologies may also face calls for increased access to customer data, allowing third-party providers to design new business models to address consumer needs. The attached appendix describes existing examples of electricity sector competition in cost-of-service states.

Some options have major impacts on the role of the state regulator, such as a Nevada law allowing large energy consumers to exit the utility's service territory to expand generation options.[22] This option, crafted by the legislature during the California energy crisis when Nevada wanted to relieve demand pressures on the regional power system, allows market participants to construct or contract for their own generation. This enables a section of the state's electricity sector to operate without regulatory oversight, which could impact electricity rates for the utility's remaining consumers. Alternatively, such an option might induce incumbent utilities to be more responsive to large consumer needs, to prevent erosion of the customer base.

Opting into an RTO such as MISO or SPP can help manage wholesale electricity prices and take advantage of economies of scale for reserve capacity and new transmission investments, but also requires regulators to cede some control over transmission investments and related cost allocation. In addition, a 2016 Supreme Court case,[23] as well as threats by states in 2018 to leave the PJM capacity market,[24] underscore the tensions between state generation preferences and the generation mix offered by competitive markets.

Other options included in the appendix, such as third-party leasing and green tariffs, maintain the existing regulatory structures. The expanding opportunities for competition present mechanisms to leverage the vertically integrated utility and cost-of-service model to achieve specific results such as reducing costs, enhancing reliability, or expanding consumer choice. This section discusses two broad approaches for states to strategically expand electricity sector competition to achieve state energy goals while maintaining the traditional role of the utility and state utility commission.

1. Implementing Public Policy Goals via Third-Party Participation

As cost-of-service states look to incentivize lower-carbon or innovative technologies, they may invite third parties to participate in niche markets, alongside the vertically integrated utility. For instance, Florida enables nonutilities to install and own EV charging stations,[25] while Georgia allows third parties to offer solar leasing to homeowners.[26]

More commonly, states have begun to use competitive procurement as a method for engaging third parties in the power generation space. Competitive procurement is contributing to falling renewable energy costs globally and could play a broader role in U.S. states within the cost-of-service model.[27] North Carolina's new renewable energy legislation (HB 589) provides a useful example. Stripping the competitive bidding provisions in North Carolina's law down to its core elements, the law sets a target of an additional 2.6 GW of solar capacity within 45 months, and establishes a competitive process to achieve the public policy goal.[28] This process allows third parties and the electric utility to compete with one another to achieve the target, permits the utility or its nonregulated subsidiaries to earn revenue if their bids are accepted,

[22] Nevada Assembly Bill 661 (2001).
[23] *Hughes v. Talen Energy Marketing, LLC,* 136 S. Ct. 1288 (US 2016).
[24] See, e.g., R. Sweeney, "NJ Regulator Threatens to Exist PJM Amid States' Complaints," *RTO Insider* (July 2, 2018).
[25] Fl. Stat. § 366.94 (2019).
[26] Georgia H.B. 57 (2015).
[27] International Renewable Energy Agency, *Renewable Power Generation Costs in 2017*, "Key Findings and Executive Summary," (2017), 2, http://irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018_summary.pdf?la=en&hash=6A74B8D3F7931DEF00AB88BD3B339CAE180D11C3.
[28] N.C. Gen. Stat. § 62-110.8 (2017).

and ensures the utility does not exercise undue market power. Together, these provisions achieve the public policy goal of increased investment in utility-scale solar energy and allow rate payers to benefit if independent (i.e., nonutility) companies can meet the goal at a lower cost than the utility. North Carolina's law caps utility participation in the auctions, but states could make different choices to expand or restrict a utility's role in the bidding process. If policymakers and stakeholders view solar procurement programs as successful, they could design similar approaches for other technologies such as energy storage, demand response, and energy efficiency projects.

2. Utilizing Competition to Spur New Utility Strategies

Policymakers in traditionally regulated states may also utilize competition as a strategy to spur vertically integrated utilities to develop new responses to changing market conditions. For example, expanding consumer choices through programs such as net metering, third-party sales, and green tariffs empowers customers to pursue alternate means of electricity generation if they are not satisfied with their respective utilities' offerings.

Net metering—a state-based mechanism with roots in the federal PURPA statute and state renewable energy goals—compensates residential and commercial customers for renewable energy generation fed into the electricity grid.[29] These programs offer a credit on the bills of retail and commercial customers reflecting the volume of electricity they provide to local utilities or grid operators, allowing these customers to recoup a portion of the cost of installing the solar panels and associated equipment. Many state net metering programs, which generally compensate the residential and commercial customers at the full retail electricity rate (which includes both the cost of electricity and the cost of maintaining the grid), have been in place for decades.[30] The policies are now under increasing scrutiny because the price of solar panels has fallen to a point that allows many more consumers to take advantage of net metering opportunities. Some utility executives and policymakers are raising concerns that compensating owners of rooftop solar at the full retail rate amounts to an unfair subsidy for customers who can afford to install photovoltaic systems because they are not paying their full share of the grid's fixed costs.[31] Utilities and policymakers concerned that net metering shifts a larger share of fixed costs to customers without photovoltaic systems have proposed adding a minimum charge to net metering customers' bills or reducing compensation to net metering customers.

While more customers are taking advantage of net metering, these customers represent a small fraction of most utilities' total number of ratepayers.[32] The actual cost that net metering currently imposes on most electricity consumers is therefore low.[33] Viewed from a different perspective, net metering enables consumers to exert greater influence over the generation mix on the grid. Allowing customers to connect photovoltaic systems to the electricity grid, and providing compensation to help cover the system costs, creates competitive pressures that could spur utilities to expand the services offered to customers. For example, if utilities are concerned that a growing number of retail and commercial customers may take advantage of net metering opportunities, they can develop cost-effective strategies to respond to consumer demand for renewable energy. Net metering, therefore, is an example of a limited opportunity for competition that could motivate utilities to pursue, and utility regulators to approve, new programs that provide societal benefits while maintaining affordable and reliable power.

Other state programs may also spur incumbent utilities to consider alternate investment strategies and expand options for ratepayers. Similar to net metering programs, leasing for residential and commercial installations of solar energy remove financial barriers to renewable energy. State laws allowing third-party leasing generally permit independent (i.e., nonutility) companies to sell a limited amount of electricity to retail consumers alongside utility leasing programs.[34] Utility programs such as green tariffs, which offer consumers the option of paying to directly source renewable energy

[29] NREL, Net Metering.
[30] See *State Net Metering Policies*, National Conference of State Legislatures (Nov. 3, 2016), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx.
[31] See, e.g., M. Wara, "Competition at the Grid Edge: Innovation and Antitrust Law in the Electricity Sector," *NYU Environmental Law Journal* 25(2) (2017): 176, 189; T. A. Rule, "Solar Energy, Utilities, and Fairness," *San Diego Journal of Climate and Energy Law* 6(2015): 115, 118–19.
[32] U.S. Energy Information Administration, Short-Term Energy Outlook Supplement: Expanded Forecasts for Renewable Energy Capacity and Generation, July 2017, https://www.eia.gov/outlooks/steo/special/supplements/2017/2017_sp_02.pdf.
[33] See M. Muro and D. Saha, "Rooftop Solar: Net Metering Is a Net Benefit," Brookings, May 23, 2016, https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/.
[34] See, e.g., Solar Power Free-Market Financing Act of 2015, Ga. Code Ann., § 46-3-65.

and the associated Renewable Energy Certificates (RECs), and community solar installations are two strategies that could expand in response to consumer-focused competition.

Requiring utilities to share smart meter data with third parties is another strategy to enhance customer benefits via market forces. Utilities are often reluctant to share the data out of concern for customer privacy, legal constraints, or the utilities' own business interests.[35] However, if privacy concerns are properly navigated, perhaps by offering customers the ability to "opt-in" or "opt-out" of data sharing, opening access to customer data can allow third parties to offer tailored demand response, energy efficiency, and rooftop solar programs. Utilities would then face the choice of developing similar products or risk losing market share.

The recent Nevada ballot initiative to restructure the state's electricity sector is another example of the threat of competition spurring the incumbent utility to undertake new strategies.[36] Voters rejected this initiative but passed a separate initiative to require utilities to source half of their load from renewables by 2030.[37] NV Energy committed to increased renewable energy investments as part of its effort to defeat the restructuring measure.[38]

CONCLUSION

Traditionally regulated cost-of-service states have numerous tools to manage a rapidly changing electricity sector. A number of states have introduced competitive mechanisms to achieve positive results for electricity customers. These mechanisms suggest there is a wide continuum of policies that may be deployed to enable competition within a rate-regulated structure, alongside vertically integrated utilities.

[35] See, e.g., D. Ferris and S. Rahim, "Tech Companies to Utilities: Give Us Your Data," *E&E News*, Dec. 22, 2016, https://www.eenews.net/stories/1060047592.
[36] State of Nevada, Statewide Ballot Questions 2016, p. 34, https://www.leg.state.nv.us/Division/Research/VoteNV/BallotQuestions/2016.pdf.
[37] C. Crowell, "Nevada Voters Want the State to Hit 50 Percent Renewable Energy by 2050," *Solar Builder,* Nov. 12, 2018. Voters will have to approve this constitutional amendment a second time in 2020.
[38] B. Schultz, "NV Energy New Clean Energy Investment Relies on Question 3," *Las Vegas Review-Journal*, May 31, 2018, https://www.reviewjournal.com/business/energy/nv-energy-new-clean-energy-investment-relies-on-question-3/.

APPENDIX: EXAMPLES OF ELECTRICITY SECTOR COMPETITION IN COST-OF-SERVICE STATES

- ***Public Utility Regulatory Policies Act (PURPA)***. In 1978, Congress passed PURPA to introduce a new element of competition by allowing certain forms of independent power production and requiring utilities to purchase that power.[39] PURPA requires a vertically integrated utility to purchase electricity generated at "qualifying facilities" (generally renewable energy or combined heat and power facilities with a capacity factor of less than 80MW) at the utility's avoided cost (the amount the utility would otherwise spend to generate or procure the same amount of power).[40] PURPA did not throw out the public utility model but rather harnessed it to drive the CHP and renewable energy projects that were not otherwise happening on the system.

- ***Net metering.*** Net metering is a state-based approach to encouraging distributed renewable energy generation—most commonly rooftop solar.[41] Similar to PURPA, net metering allows small distributed generation facilities (typically owned by commercial or residential customers) to sell power generated to the utility, usually at the full retail electricity rate. In essence, commercial and residential end users are invited to compete with the utility's own generating assets, and to do so at a guaranteed premium. Net metering also allows those commercial and residential customers to collectively exert influence on the makeup of a state's generating assets.

- ***Third-party leasing***. Similar to net metering, and often paired with it, third-party leasing can provide a means for nonutility renewable power producers to contract with utility customers to site distributed systems and sell the power to utilities. The arrangement often amounts to a creative financing mechanism for homeowners or business owners that might not otherwise be in a position to fund installation of a distributed system. Third-party leasing also opens up the system to third-party competition, although a DER compensation system must enable third parties to recover investments within a reasonable time, for competition to be anything more than theoretical.

- ***Direct procurement***. A number of states utilize a direct procurement approach that enable nonutility entities to supply renewable energy or other services. This kind of direct procurement model can foster competition in the response to a utility's request for bids, while leaving the utility in control.

- ***Competitive procurement for utility-scale solar***. North Carolina's Competitive Energy Solutions for North Carolina Act (HB 589) includes a competitive procurement process for solar generation,[42] limited opportunities for third-party leasing,[43] a new community solar program,[44] and revisions to the standardized contract and to net metering payments.[45] Major military installations, the University of North Carolina system, and large customers may contract for renewable energy.[46] The key elements of HB 589's competitive bidding process—an aggressive 2.6 GW target, a bidding process that allows third parties and the utilities (or their unregulated subsidiaries) to compete, and an independent monitor to ensure that the utility does not control the process by exerting market power—provide a model for additional competition in traditionally regulated states.[47] Under the law, Duke Energy may develop up to 30% of the target capacity; the balance is reserved for development by independent companies.[48]

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[39] Public Utility Regulatory Policies Act, Pub. L. 95-617 (1978), 92 Stat. 3117.
[40] 16 U.S.C. § 824a-3(e)(1). "Avoided costs means the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source." 18 C.F.R. § 292.101
[41] NREL, Net Metering.
[42] N.C. Gen. Stat. § 62-110.8.
[43] HB 589 limits third-party leases the lesser of 1MW or 100% of contract demand for nonresidential customers, 20kW or 100% of estimated electrical demand for residential customers, and it is intended only to offset the customer's electrical consumption at that premises. *Id.* at § 62-126.3(14). Duke Energy may offer leases. *Id* at § 62-126.5.
[44] *Id.* at § 62-126.8. A community solar facility is a "facility whose output is shared through subscriptions." *Id.* at § 62-126.3(3).
[45] The law instructs Duke Energy to file revised net metering rates for utility commission approval for customers with leasing arrangements and those who own distributed solar installations. *Id.* at § 62-126.4. The final version of the law also imposed an 18-month moratorium on new wind generation. 2017 N.C. Sess. Laws 192, Part XIII.
[46] N.C. Gen. Stat. at § 62-159.2. Large customers are those with a contract demand equal to or greater than 1 MW at one site or more than 5 MW in aggregate from multiple service locations. *Id.* at § 62-159.2(a). HB 589 establishes generation limits as part of the direct contract provisions. *Id.* at § 62-159.2(c)&(d).
[47] The N.C. Utilities Commission will identify the independent market monitor and promulgate rules governing the monitor's role. *Id.* at § 62-110.8.
[48] *Id.* at § 62-110.8(b)(4).

- ***Third-Party Access to Customer Data***. The Arkansas Public Service Commission issued an order in October 2017 focused on advanced metering infrastructure (AMI).[49] The order raises a number of questions for exploration as part of the Arkansas PSC's Distributed Energy Resources Collaborative, as well as pending dockets related to the deployment of AMI. The Arkansas Commission is contemplating a requirement that all data from the deployed AMI be aggregated and shared with third parties to enable those third parties to participate in demand response programs, targeted energy efficiency measures or present other innovative ideas to the commission.[50] This effort is an example of one commission's desire to remain open to participation by third parties who may being strong ideas that enhance the benefits of the utility's AMI investments.

- ***Allowing consumers to exit the monopoly service.*** Nevada law enables large customers, with PUC permission, to exit the utility's energy system and find an alternative electricity supply. The law was enacted in the wake of the California energy crisis, when Nevada policymakers sought to induce large energy users to self-generate and ease pressure on the regional power system.[51] In 2015, the Nevada PUC approved the departure of three casinos from NV Energy's system after paying an exit fee. The Nevada PUC denied a similar petition from Switch, a data company in Las Vegas, resulting in a lawsuit.[52] The companies and Nevada PUC staff reached a settlement[53] in which NV Energy agreed to construct a 100 MW solar energy facility and provide 100% renewable power to Switch through the new solar facility, geothermal power, and wind power. Allowing a customer to exit the utility's service empowers that customer to self-generate or seek other suppliers when a utility does not meet its needs.

- ***Green tariffs***. Utilities in 17 states offer green tariff programs that allow customers to pay a premium for utility-delivered renewable energy.[54] As of October 2017, regulated utilities had installed nearly 1 GW of renewable energy through green tariff programs.[55] For example, the Switch settlement described above triggered an expansion of NV Energy's "Green Energy Rider" program, which began in 2013. In North Carolina, Duke Energy offered a pilot program targeting "new demand" customers; when it ended in 2016, three companies had participated—Google, Amazon, and Apple.[56] HB 589 revived the green tariff in North Carolina, although a procurement cap and lower credits on customer bills may reduce the program's potential.[57]

- ***Community choice aggregation.*** Community choice aggregation (CCA) laws authorize cities, counties, and other local governments to directly purchase energy to supply their residents. In many ways, this type of program is a public sector version of Nevada's legislation enabling big energy users to exit a utility and self-supply. While CCA legislation first appeared in states choosing to restructure their utility industry (including Ohio, Massachusetts, Illinois, and California), there is no legal barrier to deploying this tool in cost-of-service states. In fact, Virginia enacted CCA legislation in 2018.[58] Local governments may be able to procure cleaner or cheaper energy than the local utility, making this a competitive choice for residents. However, CCA laws enable individual customers to opt out of[59] (or opt into[60]) the program.

- ***Organized competitive wholesale electricity markets for vertically integrated cost-of-service utilities***. The vast majority of investor-owned utilities participating in the organized wholesale electricity market operated by the

[49] In the Matter of an Investigation of Policies Related to Distributed Energy Resources, Docket No. 16-028-U, Order No. 5, November 9, 2017, http://www.apscservices.info/pdf/16/16-028-U_97_1.pdf.
[50] Id.
[51] D. Roberts, "This Nevada Company Wanted to Break Up with Its Electric Utility. The Government Said No," *Vox*, June 12, 2015, https://www.vox.com/2015/6/12/8767927/switch-nevada-utility.
[52] Application of Switch Ltd. To Purchase Energy, Capacity, and/or Ancillary Services from a Provider of New Electric Resources, PUC of Nevada, Docket No. 14-11007, June 11, 2015; *Switch, Ltd. v. Nevada Power, et al*., Nevada Dist. Ct., 2:2016cv01629 (filed July 12, 2016).
[53] Application of Switch Ltd. To Purchase Energy, Capacity, and/or Ancillary Services from a Provider of New Electric Resources, PUC of Nevada, STIPULATION, Docket No. 14-11007, July 7, 2015.
[54] P. Barua and C. Bonugli, *Emerging Green Tariffs in U.S. Regulated Electricity Markets*, World Resources Institute, October 2018.
[55] EPA: Green Power Partnership, *Utility Green Tariffs: What are Utility Green Tariffs?*, https://www.epa.gov/greenpower/utility-green-tariffs.
[56] J.Downey, "Solar Bill Expands Duke Energy 'Green Source' Power Program," *Charlotte Business Journal*, June 8, 2017, https://www.bizjournals.com/charlotte/news/2017/6/08/solar-bill-expands-duke-energy-green-source-power.html.
[57] E. Ouzts, "North Carolina Solar Bill May Help Breweries Go Solar, But Not Google," *Energy News Network*, June 22, 2017, https://energynews.us/2017/06/22/southeast/north-caroina-solar-bill-may-help-breweries-go-solar-but-not-google/.
[58] Virginia House Bill 1590 (2018), Utility regulation; community choice aggregation.
[59] See, e.g., Massachusetts General Laws Ann. Ch. 164, § 134(a).
[60] Ohio Revenue Code § 4928.20(A).

Midcontinent Independent System Operator (MISO) and the Southwest Power Pool (SPP) are vertically integrated utilities under cost-of-service regulation.[61] In order to participate in the MISO and SPP markets, the utilities bid their generating units into day ahead and hour-ahead energy auctions. They then allow MISO or SPP to determine which units are dispatched to supply power in the region based on which units clear the auctions. MISO and SPP also allow the utilities to share reserve capacity to meet required reserve margins. In all other respects, the utilities function as vertically integrated, cost-of-service utilities. Participation in the wholesale markets provides benefits to customers in the form of lower power prices and profits from the sale of excess power generated and imported.

Moreover, a number of vertically integrated cost-of-service utilities participate in the California ISO's Energy Imbalance Market.[62] These arrangements do not require the out-of-state vertically integrated utilities to cede control of their transmission assets, offering a middle-of-the-road market participation model for other regions to consider.

- ***Merchant transmission***. Nonincumbent transmission developers have been slow to emerge, in part due to the onerous transmission siting process and "right-of-first-refusal" statutes favoring projects by in-state regulated utilities.[63] However, as an aging grid, changing generation mix, and public policy-driven investments in renewables stress the existing system, merchant transmission could fill the infrastructure gap—and build where rate-regulated utilities are not interested or cannot recover costs.[64] EPACT 2005 offers a public-private partnership opportunity to build renewable transmission in parts of the American West;[65] the firm Clean Line is using this authority to build lines in Oklahoma, New Mexico, and through Kansas, Missouri, Illinois, and Indiana.[66] FERC's Order 1000 requires public utility transmission providers to participate in regional planning processes and consider transmission needs to meet Public Policy Requirements; merchant transmission companies are invited to participate (and required if they seek regional cost allocation).[67] Companies like Anbaric Development Partners are pushing for competitive transmission solicitations from Atlantic Coast states, to encourage development of a transmission backbone for offshore wind.[68]

[61] K. Maize, "MISO: Avoiding the Mess Facing Other Wholesale Competitive Electric Markets," *Power* (July 1, 2017), https://www.powermag.com/miso-avoiding-the-mess-facing-other-wholesale-competitive-electric-markets/?pagenum=2; SPP Monitoring Unit, 2014 State of the Market, (July 20, 2015), 27, https://www.rtoinsider.com/wp-content/uploads/2014-State-of-the-Market-Report-SPP-MMU.pdf.
[62] Western Energy Imbalance Market: About (listing utility participants in the California ISO western Energy Imbalance Market), https://www.westerneim.com/Pages/About/default.aspx (last visited Jan. 6, 2019).
[63] See, e.g. *LSP Transmission Holdings LLC v. Lange*, Case No. 17-cv-04490 (D. Minn. June 21, 2018), https://statepowerproject.files.wordpress.com/2018/06/minnesota-decision.pdf (upholding Minnesota's right of first refusal law against a dormant Commerce Clause challenge).
[64] J. Pfeifenberger, J. Chang, and J. Tsoukalis, *Investment Trends and Fundamentals in U.S. Transmission and Electricity Infrastructure*, JP Morgan Investor Conference Presentation, July 17, 2015, http://files.brattle.com/files/7623_investment_trends_and_fundamentals_in_us_transmission_and_electricity_infrastructure.pdf.
[65] 42 U.S.C. 16421.
[66] Clean Line Energy Partners, https://www.cleanlineenergy.com/.
[67] FERC Order 1000, July 21, 2011, https://www.ferc.gov/whats-new/comm-meet/2011/072111/E-6.pdf.
[68] M. Kuser, "Anbaric Pushes Offshore Grid Plans," *RTO Insider*, July 22, 2018.