

RESTRUCTURING THE ELECTRICITY MARKET IN NEVADA?

Possibilities,
Prospects,
and
Pitfalls

Guinn
CENTER



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Executive Summary

Background

Question 3: The Energy Choice Initiative (ECI) is a statewide constitutional ballot initiative that will be placed before Nevada’s registered voters at the November 6, 2018, General Election. Question 3 seeks to amend the *Nevada Constitution* by adding a new section to its Declaration of Rights regarding the provision of electric utility service in the State. Question 3 reads:

Shall Article 1 of the *Nevada Constitution* be amended to require the Legislature to provide by law for the establishment of an open, competitive retail electric energy market that prohibits the granting of monopolies and exclusive franchises for the generation of electricity?

This policy report summarizes and evaluates the primary arguments made by supporters and opponents of Question 3, which relate to (1) electric rate behavior, and (2) whether a restructured market will promote or hinder the development of renewables in Nevada (see below).

YES on 3: “Energy choice will lower electric bills for all Nevadans.”

NO on 3: “Dismantling Nevada’s existing electricity system would cost billions of dollars....These costs would be paid for by all Nevadans in the form of higher electricity rates....”

YES on 3: “Energy choice will expand Nevada’s clean energy options.”

NO on 3: “Threatens Nevada’s progress toward a clean energy future.”

In addition, we consider additional issues surrounding restructuring, in particular, organized wholesale markets (ISO creation or participation), divestiture/stranded assets, consumer impact, and implementation. While the Guinn Center does not take a position on Question 3, we seek to inform the debate so that Nevadans better understand the issue.

In compiling this Technical Report, the Guinn Center conducted an extensive review of federal energy data and more than two dozen interviews with energy industry experts around the country, and reviewed research documenting the experiences of other states that restructured their electricity markets (and adopted “energy choice”). Following its standard protocol, the Guinn Center distributed drafts of this report to subject matter experts—some of whom support, oppose, or have remained neutral on Question 3—for review. The Guinn Center relies on these subject matter experts to review its reports for accuracy and for an assessment of balanced treatment of the subject.

Given that the evidence we reviewed is comparative and historical, rather than predictive, we cannot demonstrate conclusively that energy choice (Question 3) is either “good” or “bad” for Nevada. That can be known only with the wisdom of hindsight. The Guinn Center notes, however, that the transition to a restructured (or “energy choice”) electricity is accompanied by variability in rate behavior, implementation challenges, and, for residential ratepayers, increased uncertainty resulting from heightened exposure to wholesale electric prices.

A Restructured Electricity Market (Energy Choice)

Historically in Nevada, the four components (i.e., generation, transmission, distribution, and retailing) of electricity delivery to the end-user (e.g., residential, business) were bundled together, with the delivery functions coordinated by a vertically integrated electric company, or utility. This means that “...the utility owns all levels of the supply chain” and retains the exclusive right to sell electricity in a designated service territory. In Nevada, the vertically integrated utility is NV Energy.

Question 3 would **restructure** the electricity market in Nevada and may require the monopoly electric utility (e.g., NV Energy) to unbundle its services. Restructuring is often referred to as retail choice, energy choice, customer choice and/or direct access. If Question 3 passes, we would expect:

- Monopoly utilities (e.g., NV Energy) likely would no longer manage or be involved in the generation of electricity and would be expected to sell their generation assets (known as “divestiture”).
- New (additional) participants could enter the electricity market. These include: (1) independent power producers (IPPs), or owners of power plants and other generation assets; (2) competitive suppliers, which are brokers between the wholesale electric market and customers in the retail market; and (3) an independent system operator (ISO), which manages sales in an organized wholesale market and coordinates generation with the other components of electricity delivery—transmission and distribution—to ensure resource adequacy and reliability.
- Nevada would have to participate in an organized wholesale market. Currently, the monopoly utility (i.e., NV Energy) participates in a **traditional** wholesale market where utilities enter into both short- and long-term bilateral contracts to trade electric power. In contrast, if Question 3 passes, actors would be required to participate in an **organized** wholesale market, which is coordinated by an independent system operator (ISO) or regional transmission organization (RTO).

Summary of Findings

The combination of technological advances (e.g., demand side management, distributed generation), policy and regulatory actions, and the belief that choice would lead to lower electricity costs, led several states to consider restructuring their electricity markets in the mid-1990s and through the early 2000s. To date, 22 states restructured their markets (i.e., energy choice for residential, commercial, and industrial customers), and two states are considering it. Seven states later repealed it (at least, in part), and two to four are currently considering ways to repeal it. We reviewed the experiences of other states, and our conclusions are presented below.

Rate Behavior

- Most studies that evaluate rate behavior use data from the U.S. Energy information Agency (EIA) data. However, electricity rates reflect different inputs including fuel prices, weather, and

regulatory costs, among others. As such, comparisons of energy prices over time and across states are challenging, if not impossible. In fact, EIA stated explicitly that its data should not be used for these purposes, describing it as a “proxy” that “does not capture the statewide variation in price determinants” and that any such methodology would result in an “apples-to-oranges” comparison, leading to biased results. Accordingly, we cannot make a conclusive determination as to whether restructuring, all else equal, contributes to rate increases or rate decreases.

- Research suggests that a restructured electricity market may lead to either increases or decreases in electric rates. Evidence reveals the experiences of other restructured states have been uneven; some customers benefit from energy choice, while others encounter adverse effects.
- In a restructured market with energy choice, the wholesale price of natural gas is the most important determinant of customer electricity rates. While wholesale electric costs influence electric rates in both traditionally regulated markets and restructured markets, consumers are exposed more directly to changes and volatility in commodity pricing under restructured markets. When natural gas prices are low, consumers in restructured states—by virtue of their increased exposure to the wholesale market—realize benefits from lower fuel costs. But when they rise, consumers may pay higher electricity bills. Other issues that could influence rates include stranded costs and participation in an organized wholesale market.
- Under current Nevada law, the monopoly utility (NV Energy) cannot profit from fuel and purchased power costs. However, in energy choice states, the state utility regulatory body does not retain its authority over pricing, and the Federal Energy Regulatory Commission (FERC) does not have authority over sales at retail. Under energy choice, the Public Utilities Commission of Nevada likely would no longer be able to intervene to protect consumers against higher rates, as that likely would undermine the intent of the initiative petition, which requires that the Nevada Legislature establish “an open, competitive retail electric energy market.”
- With the exception of Maine, all states that pursued restructuring (energy choice) implemented some form of rate caps, rate freezes, and/or rate reductions to stabilize markets, protect consumers, and smooth the transition to a fully competitive market.
- Market design efforts used by states to stabilize markets also complicates efforts to evaluate rate behavior after states adopted energy choice: (1) most of the research that showed a link between restructuring and decreased electric rates was published prior to the expiration of rate caps, and to the extent that prices were found to be lower in restructured areas, these results may be skewed by the depressive effects of rate caps, freezes, and reductions; and (2) many states confronted simultaneous expirations in rate caps, freezes, and reductions—when prices became aligned more closely with wholesale costs—and volatility in those very same wholesale electric costs in electricity markets, which either exacerbated the problem or helped mitigate it.
- In short, wholesale electric prices and market design (i.e., rate caps, freezes, and reductions) influence rate behavior, and the effects are amplified in restructured (“energy choice”) markets. In some restructured states, competition has not flourished for residential customers as originally

intended, and/or many residential customers have experienced electric rate price spikes resulting from the expiration of rate caps and fluctuations in wholesale market energy prices.

Renewable Energy

- Question 3 does not explicitly require that Nevada integrate more renewables onto the grid. Research indicates there is no correlation between restructuring (“energy choice”) electricity markets and increased renewables. The type of retail market model in a given state matters less than policy choices, such as a state’s Renewable Portfolio Standard (RPS). (Note that voters will consider Question 6 in the 2018 General Election, which seeks to increase the state’s RPS from 25 percent by 2025 to 50 percent by 2030.)
- Under a restructured market, the independent system operator (ISO) manages the organized wholesale markets and the auction process. If Question 3 passes, the choice of organized wholesale market/ISO Nevada joins could influence whether Nevada consumes more renewable energy, as the fuel portfolios differ considerably across the proposed markets.
- A related point addresses the issue of net metering, which credits solar energy system owners for the electricity they add to the grid. At present, it is not clear what will happen to net metering customers in Nevada if Question 3 passes. Central to this issue are questions of existing law, the obligations of the incumbent utility (e.g., NV Energy), and the Public Utilities Commission of Nevada’s (PUCN) authority under energy or retail electric choice. In 2017, Assembly Bill (AB) 405 was enacted, which established a rate structure for net metering customers. It is not clear that approval of Question 3 would invalidate this preexisting statutory authority. But, if Question 3 passes, NV Energy likely would no longer be involved in the generation of electricity and would not provide retail rates. However, if the measure passes, the Legislature or PUCN, in theory, could enforce net metering rules on a new competitive supplier that wants to participate in the market.
- Increased renewable energy (solar) generation assets may come online regardless of whether Question 3 passes in November 2018.

Consumer Impact

- Irrespective of market structure, the procurement of electricity has different impacts across ratepayer classes. Large commercial and industrial (C&I) customers tend to enjoy lower rates, relative to their residential and small commercial counterparts, under both vertically integrated utilities and energy (retail electric) choice.
- Consumers in states with restructured markets have experienced mixed results. Residential and small commercial consumers, who typically are unfamiliar with the energy choice structure, may be disadvantaged under restructured markets in the absence of strong consumer protection regulations. Across multiple states, many consumers have been enticed by low teaser rates offered by electric suppliers to sign up for variable-rate electricity contracts, but were unaware that their bills could increase at any time, and often did, as market conditions changed.

- The most common consumer complaints are: (1) unknown fees; (2) poor customer service; (3) meter reading; (4) slamming and cramming (“Cramming is the illegal act of placing misleading charges on your bill that you did not agree to. Slamming is the process of switching your energy service to another provider without your permission[.]”); (5) switch hold rules, or the inability to switch retail providers until a back bill is paid in full; and (6) fluctuating prices.

Implementation

- Experience suggests that implementation of a restructured market has not followed a simple, straightforward path (e.g., restructuring the Pennsylvania market was a “16-year process”).
- Many states that restructured had to enact multiple pieces of legislation and/or issue regulatory orders to address the unanticipated outcomes and unintended consequences of restructuring; in 2006, Michigan’s Public Service Commission, for example, had to issue 40 regulatory orders to “further establish and implement the framework” for its energy choice program. Many implementation hurdles required an expanded role for the government.
- Question 3: The Energy Choice Initiative seeks to restructure Nevada’s electricity market through an amendment to the *Nevada Constitution*. In contrast, all other states, with the exception of one, did so through legislation; New York restructured its electricity market through a regulatory order issued by its Public Service Commission.
- The Nevada Legislature allows investor-owned utilities in Nevada to be monopolies, granting the utility exclusive franchise over a designated service territory. This suggests that, historically, electric utility service has been understood as a policy/regulatory issue, not a constitutional one.
- Using the *Nevada Constitution* as a regulatory tool forces the Nevada Legislature to proceed with restructuring. Even if legislators find that restructuring is infeasible, the constitutional imperative takes precedence. Should Nevadans become concerned about the prospects of restructuring, they would have to repeal the constitutional amendment with another constitutional amendment. This would entail circulation of a new petition to obtain the requisite number of signatures to appear on the ballot and then passage in two successive elections.

Conclusion

- In other states that adopted energy choice and restructured their electricity markets, decision-makers subsequently had to intervene to stabilize markets and protect consumers, facilitate competition, and establish new or revise existing regulatory frameworks.
- The experiences of other states suggest that restructuring is a complex and prolonged process that will take time, and only after retail electric choice is realized fully would Nevadans be able to determine if restructuring was the “right” path.

Restructuring the Electricity Market in Nevada?

Possibilities, Prospects, and Pitfalls

Technical Report

Objective

This policy report reviews issues regarding the ballot initiative, Question 3: The Energy Choice Initiative, that registered Nevada voters will consider on November 6, 2018. The subject of Question 3—namely the proposed restructuring of Nevada’s electricity markets—is complex. Supporters and opponents of Question 3 are providing data and arguments that appear to conflict with each other. This policy report summarizes and evaluates the primary arguments for and against passage of Question 3: The Energy Choice Initiative.

Specifically, we assess the validity of assertions regarding: (1) the direction of rate behavior—that is, if electricity rates will increase or decrease; and (2) the proposition that energy (retail electric) choice will or will not result in the integration of increased renewable energy onto the grid. In addition, we consider additional issues surrounding restructuring, in particular, organized wholesale markets (ISO creation or participation), divestiture/stranded assets, consumer impact, and implementation.

While the Guinn Center does not take a position on Question 3, we seek to inform the debate so that decision-makers, ratepayers, and voters better understand the issue.

In compiling this policy report, the Guinn Center has conducted an extensive review of existing federal energy data and more than two dozen interviews with energy industry experts around the country, and synthesized research documenting the experiences of others states that restructured their electricity markets (and adopted “energy choice”).

I. Introduction

Question 3: The Energy Choice Initiative (ECI) is a statewide constitutional ballot initiative that will be placed before Nevada’s registered voters at the November 6, 2018, General Election. Question 3 seeks to amend the *Nevada Constitution* by adding a new section to its Declaration of Rights regarding the provision of electric utility service in the State.¹

Question 3 reads:

Shall Article 1 of the *Nevada Constitution* be amended to require the Legislature to provide by law for the establishment of an open, competitive retail electric energy market that prohibits the granting of monopolies and exclusive franchises for the generation of electricity?²

Initiative petitions that propose to amend the *Nevada Constitution* require passage by the voters “in two successive elections before [they] can be added to the Nevada Constitution.”³ ECI passed at the 2016 General Election.⁴ If a majority of Nevada voters approve the ballot initiative in 2018, the Nevada Legislature and the Governor must enact statutes that set forth implementation for the amendment’s provisions by July 1, 2023.⁵

The Nevadans for Affordable Clean Energy Choices Political Action Committee (PAC) circulated the original petition to obtain the requisite number of signatures to appear initially on the 2016 ballot.⁶ The PAC characterizes the Energy Choice Initiative (ECI) as follows: the establishment of a new energy policy, the creation of new rights for Nevadans, and the creation of a new mandate for the Nevada Legislature.⁷ Pursuant to the initiative petition and amongst other related policy matters, ECI generally would “establish an open, competitive retail electric energy market.”⁸

In general, ECI proposes to *restructure* the electricity market in Nevada. Restructuring is defined by the U.S. Energy Information Administration (EIA) as: “The process of replacing a monopoly system of electric utilities with competing sellers, allowing individual retail customers to choose their electricity supplier but still receive delivery over the power lines of the local utility. It includes the reconfiguration of the vertically-integrated electric utility.”⁹ Restructuring is sometimes referred to as retail choice, energy choice, customer choice, and/or direct access.^a Simply put, if a majority of voters approved Question 3, retail choice would permit customers in Nevada to purchase electricity from competitive suppliers.¹⁰ It would disallow a single provider from having the exclusive right to sell electricity in a designated service territory, which is permitted under current law in Nevada.

In public messaging about Question 3, supporters and opponents often refer to restructuring as deregulation or re-regulation. However, restructuring should not be construed as deregulation, which is defined by EIA as: “The elimination of some or all regulations from a previously regulated industry or sector of an industry.”^{b, 11} The ballot measure, Question 3: The Energy Choice Initiative, does not propose to *eliminate* regulation from the preexisting electricity delivery paradigm, but rather requires the Nevada Legislature to adopt a new regulatory framework for a market-based model of retail electric choice. In fact, as we shall discuss throughout this report, new and additional regulations may be necessary to establish and maintain a choice-driven retail electric energy market. Additionally, the term “re-regulation” is not appropriate or accurate, as it refers to the restoration of

^a We will use these terms interchangeably.

^b We only use the terms “deregulation,” “deregulating,” and “deregulated” when quoting source material directly.

vertical integration after efforts to restructure the electricity market have been suspended or repealed.^{c, 12}

The ECI initiative petition contains specific directives to the Nevada Legislature, including, but not limited to:

- 1) forming open and competitive electricity markets;
- 2) affording meaningful choices among different [electricity] providers;
- 3) minimizing economic and regulatory burdens to promote competition and choices in the electric energy market; and
- 4) eliminating the grant of monopolies and exclusive franchises for the generation of electricity.¹³

In recognition that certain legal, policy, and procedural issues attendant to ECI required input from various interested parties across Nevada on legislative, regulatory, and executive actions for effective and efficient implementation of the initiative—should it pass again in 2018—Governor Brian Sandoval issued Executive Order 2017-03 in 2017 at the outset of the 79th Legislative Session (in February 2017).¹⁴ This Order established the Governor’s Committee on Energy Choice (CEC), a 25-member committee of stakeholders drawn from the Nevada Legislature, the Executive Branch, NV Energy, the Public Utilities Commission of Nevada (PUCN), businesses, community organizations, and ratepayers, amongst others.¹⁵

On June 18, 2018, the CEC delivered its report, as required by the Governor, with findings and recommendations.¹⁶ The report is available on the official website of the Nevada Governor’s Office of Energy, Governor’s Committee on Energy Choice ([*The Governor’s Committee on Energy Choice: Draft Report of Findings & Recommendations, July 1, 2018*](#)). The PUCN released a report on April 30, 2018, and included an addendum dated April 29, 2018.¹⁷ The report ([*Energy Choice Initiative Final Report: Investigatory Docket No. 17-10001*](#)) and the addendum ([*prepared by Commissioner Ann C. Pongracz to supplement the Draft Report in Docket No. 17-10001*](#)) may be accessed through the PUCN’s official website.

As a complement to the existing body of information, the Guinn Center has reviewed and analyzed the data and experiences of other states to provide an independent assessment of the primary arguments as presented by those who support Question 3 (Yes on Question 3) and those who oppose Question 3 (No on Question 3). As part of this undertaking, our team has conducted a comprehensive, albeit not exhaustive, analysis of the implications of market restructuring. Along with the primary arguments offered by supporters and opponents of Question 3, which center on rate behavior and renewable energy, this policy report addresses other issues related to retail electric choice, specifically, consumer impact and implementation.

^c We only use the term “re-regulation” when quoting source material directly.

Our point of departure, which underscores the methodological value in examining the experiences of other states, is the following statement from testimony before the first meeting of the CEC by Josh Weber, Davison Van Cleve, P.C., serving as counsel to the Energy Choice Initiative/Nevadans for Affordable Clean Energy Choices (i.e., Yes on Question 3):

So, one thing we want to, right off the top, suggest is that the Committee and the Legislature would do well to look carefully at what's happened in other states that have successfully carried out deregulation, and, you know, it's good also to look at those who were unsuccessful. A decade or so ago, there were some attempts at deregulation and customer choice that didn't work out well. In places where it has worked very well, it's been an ongoing evolution. And so we'd like to encourage...the Committee here to talk to experts who have seen it, been through it, and done it...[.]¹⁸

While the Guinn Center neither represents the CEC nor the Nevada Legislature, the advice is very instructive, as an examination of other states' histories with restructuring illuminates the prospects, possibilities, and pitfalls for the Silver State. Were ECI to pass again in November 2018 by a majority of Nevada voters, more than 20 years of "lessons learned" from other states would provide guidance to decision-makers in Nevada. There are commonalities across those states with restructured electricity markets that manifested in comparable outcomes. That these states encountered similar policy questions and regulatory issues as they implemented retail electric choice, while not deterministic for Nevada, lends insight into what the Silver State and its residents may confront should it move forward with restructuring.

A review of the research and experiences of other states collectively reveals that restructuring the electric energy retail market is accompanied by variability in rate behavior, implementation challenges, and, for residential ratepayers, increased uncertainty resulting from heightened exposure to wholesale electric prices. We caution the reader not to interpret the recurrence of these themes as the conveyance of any normative value judgment; insofar as the evidence is comparative and historical, rather than predictive, it does not demonstrate conclusively that energy choice is either "good" or "bad" for Nevada. That can be known only with the wisdom of hindsight.

Methodology

The basis for this report is the following methodology:

- 1) Interviews with approximately two dozen industry experts, academics, federal officials, organized wholesale market representatives, and current/former utility regulators nationwide;
- 2) A review of legislation, utility regulation reports, and official electric shopping websites in restructured states;
- 3) A study of secondary sources from industry leaders (including competitive suppliers), the federal government, academia, and journalists;

- 4) Testimony/exhibits from the Governor's Committee on Energy Choice (CEC) and the Legislative Committee on Energy; and
- 5) Consultation of the CEC report and the PUCN report, which are available publicly.

The Guinn Center did not review any private or proprietary data that had not been evaluated previously by an independent, third party. Following its standard and well-established protocol that mirrors the practice used by academic researchers and national policy institutes, the Guinn Center distributed drafts of this report to subject matter experts, some of whom support, oppose, or have remained neutral on Question 3: The Energy Choice Initiative. The Guinn Center relies on these subject matter experts to review its reports for accuracy and for an assessment of balanced treatment of the subject.^d

The following pages are organized into four parts. Section II provides a primer on electricity delivery and market restructuring, which establishes a foundation for the discussion to follow. Section III assesses the validity of the arguments promulgated by those who support Question 3 and those who oppose it, with an emphasis on rate behavior and renewable energy. Section IV addresses some additional issues related to restructuring, specifically, organized wholesale markets (ISO creation or participation), divestiture/stranded assets, consumer impact, and implementation. Section V concludes with a synthesis of the material presented herein. We recap our findings below.

Findings

This policy report finds the following:

Rate Behavior

- Most studies that evaluate rate behavior use data from the U.S. Energy information Agency (EIA) data. However, electricity rates reflect different inputs including fuel prices, weather, and regulatory costs, among others. As such, comparisons of energy prices over time and across states are challenging, if not impossible. In fact, EIA stated explicitly that its data should not be used for these purposes, describing it as a “proxy” that “does not capture the statewide variation in price determinants” and that any such methodology would result in an “apples-to-oranges” comparison, leading to biased results. Accordingly, we cannot make a conclusive determination as to whether restructuring, all else equal, contributes to rate increases or rate decreases.
- Research suggests that a restructured electricity market may lead to either increases or decreases in electric rates. Evidence reveals the experiences of other restructured states have been uneven; some customers benefit from energy choice, while others encounter adverse effects.

^d The Guinn Center board of directors includes several individuals who have a direct interest in the outcome of Question 3. Here, we note that the Guinn Center board does not interfere with, direct, or review the research and analysis of the staff. Drafts of Guinn Center policy reports are reviewed by external subject matter experts who read for accuracy, relevance, and appropriate and fair treatment of the subject matter.

- In a restructured market with energy choice, the wholesale price of natural gas is the most important determinant of customer electricity rates. While wholesale electric costs influence electric rates in both traditionally regulated markets and restructured markets, consumers are exposed more directly to changes and volatility in commodity pricing under restructured markets. When natural gas prices are low, consumers in restructured states—by virtue of their increased exposure to the wholesale market—realize benefits from lower fuel costs. But when they rise, consumers may pay higher electricity bills. Other issues that could influence rates include stranded costs and participation in an organized wholesale market.
- Under current Nevada law, the monopoly utility (NV Energy) cannot profit from fuel and purchased power costs. However, in energy choice states, the state utility regulatory body does not retain its authority over pricing, and the Federal Energy Regulatory Commission (FERC) does not have authority over sales at retail. Under energy choice, the Public Utilities Commission of Nevada likely would no longer be able to intervene to protect consumers against higher rates, as that likely would undermine the intent of the initiative petition, which requires that the Nevada Legislature establish “an open, competitive retail electric energy market.”
- With the exception of Maine, all states that pursued restructuring (energy choice) implemented some form of rate caps, rate freezes, and/or rate reductions to stabilize markets, protect consumers, and smooth the transition to a fully competitive market.
- Market design efforts used by states to stabilize markets also complicates efforts to evaluate rate behavior after states adopted energy choice: (1) most of the research that showed a link between restructuring and decreased electric rates was published prior to the expiration of rate caps, and to the extent that prices were found to be lower in restructured areas, these results may be skewed by the depressive effects of rate caps, freezes, and reductions; and (2) many states confronted simultaneous expirations in rate caps, freezes, and reductions—when prices became aligned more closely with wholesale costs—and volatility in those very same wholesale electric costs in electricity markets, which either exacerbated the problem or helped mitigate it.
- In short, wholesale electric prices and market design (i.e., rate caps, freezes, and reductions) influence rate behavior, and the effects are amplified in restructured (“energy choice”) markets. In some restructured states, competition has not flourished for residential customers as originally intended, and/or many residential customers have experienced electric rate price spikes resulting from the expiration of rate caps and fluctuations in wholesale market energy prices.

Renewable Energy

- Question 3 does not explicitly require that Nevada integrate more renewables onto the grid. Research indicates there is no correlation between restructuring (“energy choice”) electricity markets and increased renewables. The type of retail market model in a given state matters less than policy choices, such as a state’s Renewable Portfolio Standard (RPS). (Note that voters will consider Question 6 in the 2018 General Election, which seeks to increase the state’s RPS from 25 percent by 2025 to 50 percent by 2030.)

- Under a restructured market, the independent system operator (ISO) manages the organized wholesale markets and the auction process. If Question 3 passes, the choice of organized wholesale market/ISO Nevada joins could influence whether Nevada consumes more renewable energy, as the fuel portfolios differ considerably across the proposed markets.
- A related point addresses the issue of net metering, which credits solar energy system owners for the electricity they add to the grid. At present, it is not clear what will happen to net metering customers in Nevada if Question 3 passes. Central to this issue are questions of existing law, the obligations of the incumbent utility (e.g., NV Energy), and the Public Utilities Commission of Nevada's (PUCN) authority under energy or retail electric choice. In 2017, Assembly Bill (AB) 405 was enacted, which established a rate structure for net metering customers. It is not clear that approval of Question 3 would invalidate this preexisting statutory authority. But, if Question 3 passes, NV Energy likely would no longer be involved in the generation of electricity and would not provide retail rates. However, if the measure passes, the Legislature or PUCN, in theory, could enforce net metering rules on a new competitive supplier that wants to participate in the market.
- While retail suppliers may promise "100% Renewable" contracts, that does not mean that more renewable energy is delivered onto the grid, only that the company must purchase Renewable Energy Credits (RECs) to comply with the terms of the contract offered or the RPS in the state. A high RPS may dissuade suppliers from entering the market, as RECs can be costly.
- Increased renewable energy (solar) generation assets may come online regardless of whether Question 3 passes in November 2018.

Consumer Impact

- Irrespective of market structure, the procurement of electricity has different impacts across ratepayer classes. Large commercial and industrial (C&I) customers tend to enjoy lower rates, relative to their residential and small commercial counterparts, under both vertically integrated utilities and energy (retail electric) choice.
- Consumers in states with restructured markets have experienced mixed results. Residential and small commercial consumers, who typically are unfamiliar with the energy choice structure, may be disadvantaged under restructured markets in the absence of strong consumer protection regulations. Across multiple states, many consumers have been enticed by low teaser rates offered by electric suppliers to sign up for variable-rate electricity contracts, but were unaware that their bills could increase at any time, and often did, as market conditions changed.
- The most common consumer complaints are: (1) unknown fees; (2) poor customer service; (3) meter reading; (4) slamming and cramming ("Cramming is the illegal act of placing misleading charges on your bill that you did not agree to. Slamming is the process of switching your energy service to another provider without your permission[.]"); (5) switch hold rules, or the inability to switch retail providers until a back bill is paid in full; and (6) fluctuating prices.

Implementation

- Experience suggests that implementation of a restructured market has not followed a simple, straightforward path (e.g., restructuring the Pennsylvania market was a “16-year process”).
- Many states that restructured had to enact multiple pieces of legislation and/or issue regulatory orders to address the unanticipated outcomes and unintended consequences of restructuring; in 2006, Michigan’s Public Service Commission, for example, had to issue 40 regulatory orders to “further establish and implement the framework” for its energy choice program. Many implementation hurdles required an expanded role for the government.
- Question 3: The Energy Choice Initiative seeks to restructure Nevada’s electricity market through an amendment to the *Nevada Constitution*. In contrast, all other states, with the exception of one, did so through legislation; New York restructured its electricity market through a regulatory order issued by its Public Service Commission.
- The Nevada Legislature allows investor-owned utilities in Nevada to be monopolies, granting the utility exclusive franchise over a designated service territory. This suggests that, historically, electric utility service has been understood as a policy/regulatory issue, not a constitutional one.
- Using the *Nevada Constitution* as a regulatory tool forces the Nevada Legislature to proceed with restructuring. Even if legislators find that restructuring is infeasible, the constitutional imperative takes precedence. Should Nevadans become concerned about the prospects of restructuring, they would have to repeal the constitutional amendment with another constitutional amendment. This would entail circulation of a new petition to obtain the requisite number of signatures to appear on the ballot and then passage in two successive elections.

II. Electricity Delivery and Market Restructuring: A Primer

This section serves as an “Electricity 101,” laying the groundwork for the analyses to follow in Section III and Section IV. It begins with a discussion of the components of electricity delivery: generation, transmission, distribution, and retailing/customer service. To understand what would change through the restructuring process, our readers first must have a sense of the current market structure. As such, we explain the terms “vertical integration” and “natural monopoly,” as well as describe the role of the current regulatory authority. Next, we outline the basis for restructuring, which include technological advances and legislative/regulatory changes at the federal level. We also present a map of residential choice and non-choice states, along with those that have repealed choice for residential customers; this should provide the reader with an idea of the geographic concentration of retail electric choice in the United States.

We conclude the section with an overview of institutions and market design that tend to accompany restructuring and contrast these with the structure that exists under traditional regulation (e.g., a utility such as NV Energy). Under restructuring, there are new ways of doing business and new participants in the market, including: (1) independent power producers (IPPs), or owners of power plants and other generation assets; (2) competitive suppliers, which are brokers between the wholesale electric market and customers in the retail market; and (3) an independent system operator (ISO), which manages sales in an organized wholesale market and coordinates generation with the other components of electricity delivery—transmission and distribution—to ensure resource adequacy, and, accordingly, reliability.^e These features of restructured markets are important to understand, as the differences between them and a traditional market structure are considerable.

The Components of Electricity Delivery

Electricity delivery is the process of moving produced electric power to an end-use customer, such as a residence or a business. It consists of four components: generation, transmission, distribution, and retailing (sometimes called customer service).¹⁹ The EIA definitions for the first three components are useful in establishing an agreed-upon understanding of terms throughout this report:^f

Generation: “The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in kilowatthours [kWh].”²⁰ The forms of energy used to generate electric energy are varied and usually include natural gas, coal, solar, geothermal, and wind.

Transmission: “The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery

^e Nevada currently does not participate in an organized wholesale market but would need to join one or establish its own, were Question 3 to pass, as discussed later in this section.

^f This report will emphasize the first three components, as they are the most salient to a discussion of retail electric choice, though we will address the fourth component, where necessary.

to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.”²¹

Distribution: “The delivery of energy to retail customers.” The distribution system is: “The portion of the transmission and facilities of an electric system that is dedicated to delivering electric energy to an end-user.”²²

Retailing/Customer Service: While there is no official definition, retailing encompasses the administrative costs associated with electricity delivery, such as metering, billing, and customer service, amongst others.^{9, 23}

In short, power plants—regardless of whether they use natural gas, coal, or renewables—generate electric power, which is delivered over transmission lines to electrical substations; from there, electricity is carried over the distribution system to customers.²⁴ The transmission and distribution system may be referred to as the grid.²⁵ Others term this the “wires,” and we will use both interchangeably when referring to transmission and distribution in concert with one another.

Historically, the four components (i.e., generation, transmission, distribution, and retailing) were bundled together, with the delivery functions coordinated by a vertically integrated electric company, or utility.²⁶ This means that “...the utility owns all levels of the supply chain – generation; transmission of bulk, high-voltage power; and distribution of lower-voltage power to end users. However, utilities also purchase electricity in power purchase agreements (PPAs) with independent generators, and they send power over transmission lines owned by other organizations.”²⁷

Vertical Integration, Natural Monopoly, and Regulatory Authority

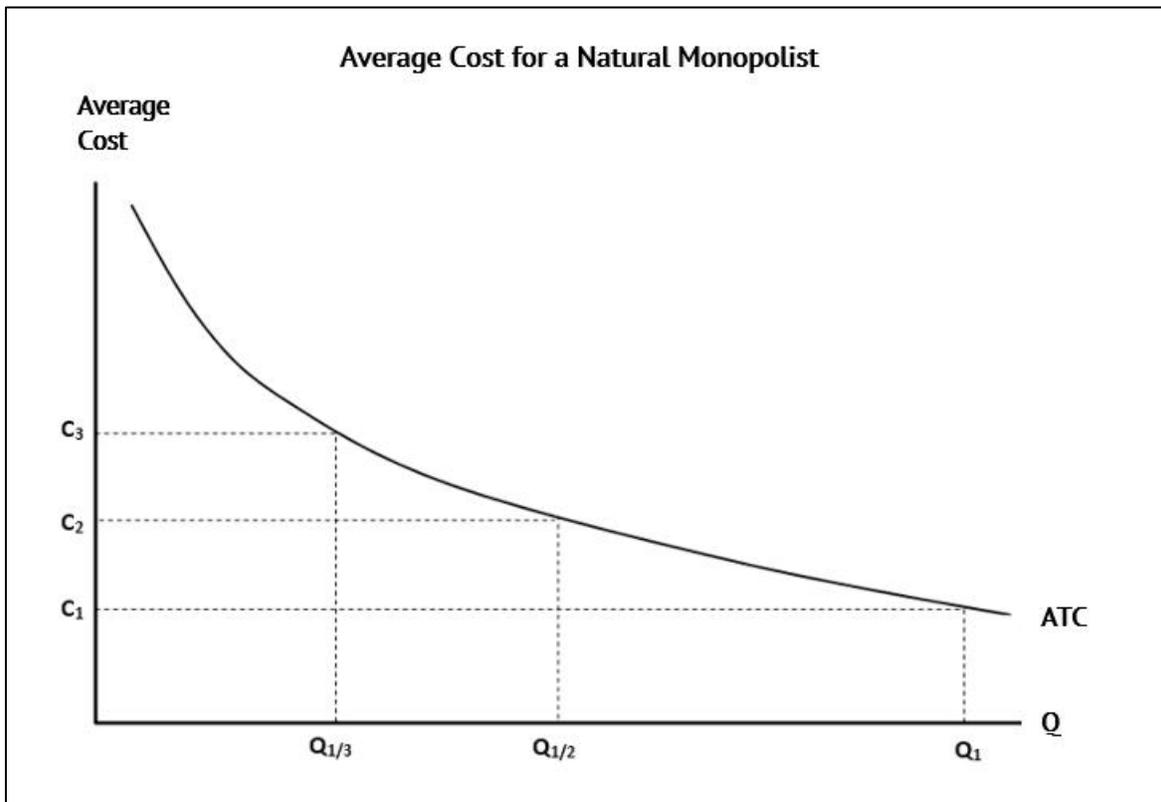
The basis for vertical integration was a recognition by Congress that, by virtue of providing a public service, utilities had a “natural monopoly” over a given service area.²⁸ Monopoly, or the presence of a single seller in a market with multiple buyers, is viewed by classical economists as inefficient insofar as it can restrict choice and drive up prices.

⁹ The three main customer classes are: residential, commercial, and industrial. The residential sector is defined as: “An energy-consuming sector that consists of living quarters for private households.” (*Source:* U.S. Department of Energy, U.S. Energy Information Administration. “Glossary: R.” Available: <https://www.eia.gov/tools/glossary/index.php?id=R>.) The commercial sector is defined as: “An energy-consuming sector that consists of service-providing facilities and equipment of businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities.” (*Source:* U.S. Department of Energy, U.S. Energy Information Administration. “Glossary: C.” Available: <https://www.eia.gov/tools/glossary/index.php?id=C>.) The industrial sector is defined as: “An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity manufacturing (NAICS codes 31-33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23).” (*Source:* U.S. Department of Energy, U.S. Energy Information Administration. “Glossary: I.” Available: Industrial sector: <https://www.eia.gov/tools/glossary/index.php?id=I>.)

The concept of a natural monopoly is distinct, however. Where there is a natural monopoly, the government may grant an entity, such as a utility, exclusive franchise over a designated service territory, as it can supply electricity at a lower cost than any other market entrant. Expressed in economic terms, “It defines a single firm that is technologically able to serve an entire market at a lower cost than multiple firms could. Natural monopoly is associated with extraordinary economies of scale and of scope, often coupled with high fixed costs that serve as barriers to entry. These factors, when present, can allow a single big firm to serve multiple customers at a lower cost than multiple firms serving the same market.”²⁹ The concept of natural monopoly is depicted graphically in Figure 1.³⁰

Figure 1 shows that, under conditions of natural monopoly, when there is one seller in the market (Q_1), it has an average cost C_1 , which is lower than the costs for two sellers in the market ($Q_{1/2}$; average cost C_2) or three sellers in the market ($Q_{1/3}$; average cost C_3). If an industry is considered a natural monopoly, the expectation is that average costs for the end-use customer would be lower than what could be provided in a competitive market.³¹

Figure 1. Average Cost for a Natural Monopolist



As of 2016, there were nine electricity service providers in Nevada with service territories designated by the PUCN: seven cooperative associations (Harney Electric Cooperative, Inc.; Mt. Wheeler Power, Inc.; Plumas-Sierra Rural Electric Cooperative, Inc.; Raft River Rural Electric Cooperative, Inc.; Surprise Valley Electrification Corporation; Valley Electric Association, Inc.; and Wells Rural Electric

Company) and two subsidiaries of one investor-owned electric utility (Nevada Power Company and Sierra Pacific Power Company, doing business as NV Energy).³² There is also a municipal power authority, City of Fallon, and two public utility districts, Lincoln County and Overton.^{h, 33} NV Energy supplies electricity to 1.25 million end-users (residential, commercial, and industrial customers) over a near-46,000 square-mile service territory.³⁴ With gas and electric combined, NV Energy provides service to 90 percent of Nevada’s residential, industrial, and commercial customers.³⁵

The Public Utilities Commission of Nevada (PUCN) is responsible for regulation of investor-owned utilities in Nevada. According to the PUCN website:

The Nevada Legislature has passed laws which allow investor-owned utilities in Nevada to be monopolies. A monopoly exists when there is no competition for a product or service. In the case of utility companies, this means that there is only one provider of a utility service in a given area, or service territory. In return for being granted the right to be sole provider in a service territory, the investor-owned utility submits to price and service quality regulation by the PUCN. Regulation of investor-owned utilities exists because the investor-owned utility is motivated by the pursuit of a reasonable profit. Regulation ensures that the utility provides reliable service at just and reasonable rates. In other words, the PUCN’s role is to prevent utilities from price gouging and/or providing substandard service because their customers have no available alternative provider of service.³⁶

The Basis for Restructuring

Over time, the idea that electric utilities constituted a natural monopoly has been called into question. “Significant technological improvements...provided for deployment of larger and more efficient combined cycle natural gas-fired power plants, supplanting previous utility reliance on less-efficient single-cycle fossil-fired steam units,” which contributed to the idea that the generation component could be subject to competition.³⁷ Specifically, “...the efficient scale of a power plant is now sufficiently small so as to allow effective competition among generators.”³⁸ Improvements to electricity transmission equipment allowed for the delivery of power over long distances.³⁹ This meant that geographic siting of generation assets and transmission lines in tandem—that is, physical proximity—became less salient for the purposes of electricity delivery, which translated into the belief that the generation component was not necessarily constrained by the natural monopoly concept.

^h Question 3: The Energy Choice Initiative theoretically applies to all electricity providers in the State, not just NV Energy, as the ballot initiative grants a right to each person, business, et cetera, to choose the provider of its electric utility service. See: Nevada Secretary of State. 2016. “Statewide Ballot Questions: To Appear on the November 8, 2016 General Election Ballot: Initiative Petition - Constitutional Amendment: THE ENERGY CHOICE INITIATIVE.” Page 42. Available: <http://nvsos.gov/sos/home/showdocument?id=4434>.

Concurrently, federal legislative and regulatory changes supplied institutional mechanisms that helped facilitate competition.ⁱ With respect to regulation, the Federal Energy Regulatory Commission (FERC) issued a series of rules, including Orders 888, 889, and 2000, which mandated that utilities open their transmission lines “to outside, unregulated suppliers on a non-discriminatory basis.”⁴⁰ These orders, collectively, also established independent system operators (ISOs) and regional transmission organizations (RTOs)—discussed below with regard to organized wholesale markets—which required the creation and operation of wholesale competitive electric markets across all utilities on a fair and transparent basis.⁴¹

Many rationales for retail electric choice have been offered over the years. But the primary one is captured perhaps most comprehensively by the Distributed Energy Financial Group (DEFG) LLC, a management consulting firm specializing in energy that produces the *Annual Baseline Assessment of Choice in Canada and the United States* (ABACCUS) report, which scores “U.S. states and Canadian provinces with respect to their efforts and achievements in the promotion of retail competition in the electric sector.”⁴² DEFG views retail choice as a three-step process, beginning with competition on price, then moving through to competition on service, and then finally to competition through innovation.⁴³ The U.S. General Accounting Office (GAO) outlined the goals of restructuring as lower prices and a more diverse, innovative array of retail services, both of which might be achieved through competition.^j ⁴⁴ Several reports point out that choice may give customers control over the types of retail products they prefer, such as “green” electricity.⁴⁵

The combination of technological advances (e.g., demand-side management, distributed generation), policy and regulatory actions, and the belief that choice would lead to lower electricity costs, paved the way for several states to consider the viability of restructuring their electricity markets in the mid-1990s and through the early 2000s.^k As one report notes, “Restructuring actions vary by region and by state, but they are typically characterized by the ‘unbundling’ of ownership and regulation of electricity generation, transmission, distribution, and sales, with large variations in how restructuring is implemented across regions and states.”⁴⁶ In practice, the vast majority of states that pursued

ⁱ The Public Utility Regulatory Policies Act (PURPA) of 1978 required utilities to purchase energy produced by all qualified electric facilities (QFs) in their territory through long-term contracts. The Energy Policy Act (EPAct) of 1992 introduced power suppliers into the market and permitted the interconnection of new generating plants (not just QFs) to the regional wholesale transmission system, allowing sales at the wholesale level. (Source: Reishus Consulting, LLC. “Electric Restructuring in New England – A Look Back.” Prepared for New England States Committee on Electricity (NESCOE). December 21, 2015. Available: <http://nescoe.com/resource-center/restructuring-dec2015/>.)

^j The U.S. General Accounting Office was redesignated the U.S. Government Accountability Office in 2004; the acronym GAO was retained. (Source: Frederick M. Kaiser. 2008. “GAO: Government Accountability Office and General Accounting Office.” Congressional Research Service. Available: <https://fas.org/sgp/crs/misc/RL30349.pdf>.)

^k Per the U.S. Environmental Protection Agency (EPA), “Distributed generation refers to a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power.” (Source: U.S. Environmental Protection Agency. “Distributed Generation of Electricity and its Environmental Impacts.” Available: <https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts>.)

restructuring did so by unbundling generation only—that is, they opened up the generation component to competitive supply—while reserving the right to exclusive franchise over the wires (transmission and distribution) to the utilities. Unbundled generation typifies the retail electric choice model in the United States.

Residential Retail Electric Choice, Non-Choice, and Suspended/Repealed States

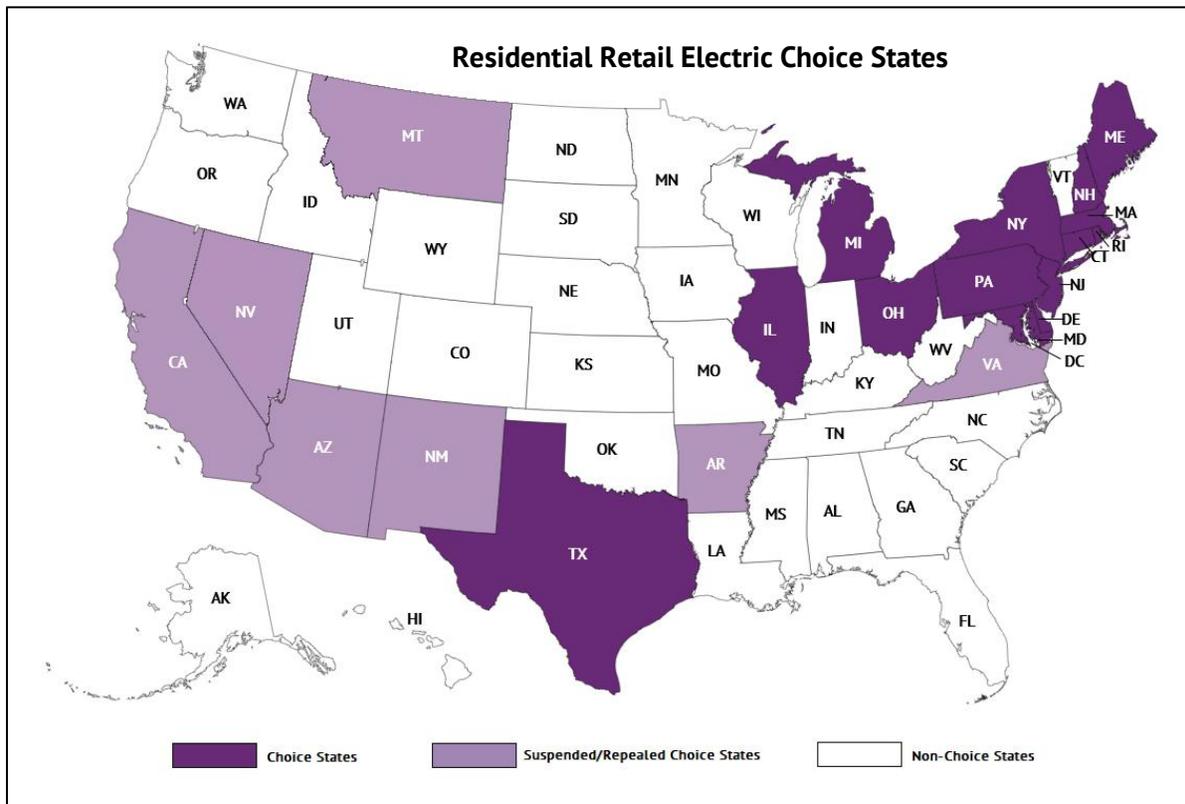
Figure 2A presents a map of states that provide or have provided retail electric choice to residential ratepayers. The figure displays “Choice States,” which are the current states that permit residential retail electric choice, “Non-Choice States,” which are the current states that do not permit residential retail electric choice, and “Suspended/Repealed Choice States,” which are the states that permitted residential retail electric choice but do not currently do so by virtue of suspension or repeal.¹ As

¹ Effective Date of Suspension or Repeal: **Arizona**: January 27, 2004. *Source* (for year): ASU Energy Policy Innovation Council. 2013. “An Introduction to Restructuring of Electricity Markets.” Arizona State University. Available: https://energypolicy.asu.edu/wp-content/uploads/2012/03/AZ-restructuring-status_final.pdf. *Source* (for reference to actual date per Arizona Court of Appeals): Ariz. Ct. App. 2004. “Phelps Dodge et al. v. Az. Corp. Comm’n: CV 01-0068.” Available: <http://www.azcourts.gov/Portals/89/opinionfiles/CV/CV010068.pdf>. **Arkansas**: February 21, 2003. *Source*: Arkansas State Legislature. 2003. “HB1114 - An Act to Repeal Chapter 19 of Title 23 and to Reform Electric Utility Regulation.” Available: <http://www.arkleg.state.ar.us/assembly/2003/R/Pages/BillInformation.aspx?measureno=HB1114>. **California**: September 20, 2001. *Source*: Channele Carner. 2003. “Status of State Electric Industry Restructuring Activity – as of February 2003 –.” U.S. Department of Energy, U.S. Energy Information Administration. Available: <http://large.stanford.edu/publications/coal/references/docs/restructure.pdf>. **Montana**: October 1, 2007. *Source*: Montana Legislature. 2007. “Detailed Bill Information: HB 25, Generally Revise Electric Industry Restructuring Laws.” Available: [http://laws.leg.mt.gov/legprd/LAW0210W\\$BSIV.ActionQuery?P_BILL_NO1=25&P_BLTP_BILL_TYP_CD=HB&Z_ACTION=Find&P_SESS=20071](http://laws.leg.mt.gov/legprd/LAW0210W$BSIV.ActionQuery?P_BILL_NO1=25&P_BLTP_BILL_TYP_CD=HB&Z_ACTION=Find&P_SESS=20071). **Nevada**: Before July 1, 2003. *Source*: Channele Carner. 2003. “Status of State Electric Industry Restructuring Activity – as of February 2003 –.” U.S. Department of Energy, U.S. Energy Information Administration. Available: <http://large.stanford.edu/publications/coal/references/docs/restructure.pdf>. **New Mexico**: April 8, 2003. *Source*: New Mexico Legislature. 2003. “SB718: Public Utility Transition Cost Recovery.” Available: <https://www.nmlegis.gov/Legislation/Legislation?Chamber=S&LegType=B&LegNo=718&year=03>. **Virginia**: December 31, 2008. *Sources* (allowed retail choice for residential customers until the expiration or termination of capped rates): HB 3068 (§ 56-577(4)) at: Virginia’s Legislative Information System. 2007. “Chapter 888.” Available: <http://lis.virginia.gov/cgi-bin/legp604.exe?071+ful+CHAP0888>; and Virginia Legislative System. 2007. “HB 3068: Electric Utility Service; Advances Scheduled Expiration of Capped Rate Period. Summary as Enacted with Governor’s Recommendation (April 11, 2007).” Available: <http://lis.virginia.gov/cgi-bin/legp604.exe?071+sum+HB3068>. *Sources* (companion bill for dates of advancing of scheduled rate caps): “The bill [SB 1416] advanced the scheduled expiration of the capped rate period from December 31, 2010, to December 31, 2008.” See: James M. Van Nostrand. 2008. “Constitutional Limitations on the Ability of States to Rehabilitate Their Failed Electric Utility Restructuring Plans.” *Seattle University Law Review*. Vol. 31, No. 3. Page 624. Available: <https://digitalcommons.law.seattleu.edu/cgi/viewcontent.cgi?article=1058&context=sulr>. For a summary of SB 1416, see: Virginia Legislative System. 2007. “SB 1416 Electric Utility Service; Advances Scheduled Expiration of Capped Rate Period. Summary as Enacted with Governor’s Recommendation (April 11, 2007).” Available: <http://lis.virginia.gov/cgi-bin/legp604.exe?071+sum+SB1416>.

Figure 2A indicates, current residential retail electric choice states tend to be concentrated in the Northeast and Upper Midwest, with Texas as the exception in the Intermountain West. Vermont is the only state in New England to retain a traditionally regulated electric utility structure, and Virginia is the only state to repeal residential retail electric choice on the East Coast. Outside of Arkansas, the other states to suspend or repeal their residential direct access (energy choice) programs are located in the western United States, including Arizona, California, Montana, Nevada, and New Mexico. (See the discussion of implementation in Section IV, which contains timelines of restructuring in the applicable states.)

^k (cont'd): California/Michigan: There is no consensus as to whether California and Michigan should be considered residential retail electric choice states. Some reports count just one (or the other), while some count both. The Guinn Center treats California as a “Suspended/Repealed Choice State,” as the California Public Utilities Commission (CPUC) suspended retail choice on September 20, 2001. Neither the California State Legislature nor the CPUC has overturned the ruling. The state does permit Community Choice Aggregation (CCA), which “allows for communities to join together to purchase electricity on behalf of their community members.” *Source*: CalCCA. “CalCCA Advocates for Community Choice in California.” Available: <https://cal-cca.org/about/#top>.) Pursuant to Assembly Bill (AB) 117 in 2002, see: California Public Utilities Commission, Staff White Paper. 2017. “Consumer and Retail Choice, the Role of the Utility, and an Evolving Regulatory Framework.” Available: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/Retail_Choice_White_Paper_5_8_17.pdf. While California’s CCAs are “an alternative to the incumbent utility,” they do not operate in a retail electric choice context (see: Nicolas Chaset, California Public Utilities Commission, Chief of Staff to Commission President Michael Picker. “Customer and Retail Choice in California.” Exhibit Prepared for the Governor’s Committee on Energy Choice, May 10, 2017. Available: http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/TaskForces/2017/Agenda_item_4_-_California_Presentation.pdf). (Regarding partial access, “In October 2009, Governor Arnold Schwarzenegger signed into law, Senate Bill 695, which provided for a limited reopening of the DA [direct access] market for only non-residential customers beginning in April 2010. Subsequently, the CPUC issued two Decisions, D.10-03-022 and D.10-05-039 which established Annual Load Caps for a phased reopening over a 4 year period and an Overall Load Cap of 9,520 GWh.” See: PG&E. “Direct Access Electric Service.” July 1, 2018. Available: https://www.pge.com/en_US/business/services/alternatives-to-pge/electric-services/direct-access-electricity/direct-access-electricity.page.) Michigan technically permits residential retail electric choice, though “no more than 10 percent of an electric utility’s average weather-adjusted retail sales for the preceding calendar year may take service from an alternative electric supplier at any time.” This means that “[c]urrently, no licensed alternative electric suppliers are marketing or enrolling residential customers.” (See: Michigan Public Service Commission. “Electric Customer Choice Frequently Asked Questions for Customers.” Available: https://www.michigan.gov/mpsc/0,4639,7-159-16377_17111-42899--,00.html.) While Michigan’s residents do not have access to retail electric choice currently, the law theoretically permits it, and, as such, the Guinn Center treats it as “Choice State.”

Figure 2A. Residential Retail Electric Choice States



Some states have partial access to choice (including but not limited to those that have suspended or repealed residential retail electric choice), as shown in Figure 2B.^m Among these states is Nevada, which allows nongovernmental commercial or industrial end-use customers with average annual loads (i.e., demand) of one megawatt (mW) or more in the service territory of an electric utility to procure energy from an alternative supplier; in Nevada, they must pay an exit fee to the utility to do so and continue to pay the utility for wires service.^{n, 47}

^m Partial Access to Retail Choice/Load-Permitted Access to Retail Choice: All states with residential retail electric choice have full access to choice (i.e., all ratepayer classes). Of the states that suspended/repealed choice, Arizona, California, Montana, Nevada, and Virginia have load-permitted access to retail choice. (Source: Wayne Kuipers and Laura Chappelle. “Electricity Customer Choice Out-Performs Traditional Monopoly.” *Utility Dive*. August 23, 2016. Available: <https://www.utilitydive.com/news/electricity-customer-choice-out-performs-traditional-monopoly-1/424986/>.) Georgia permits retail choice for those customers with more than 900 kW of load, as does Oregon for certain large electricity customers. (Source: Mathew J. Morey and Laurence D. Kirsch [Christensen Associates Energy Consulting LLC]. 2016. “Retail Choice in Electricity: What Have We Learned in 20 Years?” Prepared for Electric Markets Research Foundation. Available: https://sites.hks.harvard.edu/hepg/Papers/2016/Retail_Choice_in_Electricity_for_EMRF_Final.pdf.) Following the preceding footnote, Michigan is treated as a full-access state.

ⁿ Exit fee: the mechanism to ensure that remaining, captive customers are not burdened by the exit of another customer. Cite: Guinn Center conversation with industry expert. This process is referred to as 704B in Nevada.

that “[t]he Legislature need not provide for the deregulation of transmission or distribution of electricity in order to establish a competitive market consistent with this Act.”⁵² This language has been interpreted to mean that while the Nevada Legislature must restructure the generation component of electricity delivery, it may determine whether or not transmission and distribution should be subject to restructuring, as well.^o However, the conventional understanding is that transmission and distribution would continue to constitute a natural monopoly.^{p, 53}

Our operating assumption, based on extensive testimony and interviews, is that if Question 3 were to pass in November 2018 by a majority of registered Nevada voters, divestiture of generation assets would be required, and NV Energy would retain its ownership of transmission and distribution of electric energy. (See Section IV for a detailed discussion of divestiture and stranded assets.)^q

As previously noted, under a vertically integrated utility structure, the utility coordinates all components of electricity delivery and is regulated by a public utilities commission. The utility determines resource adequacy to meet demand and thus is able to deliver service with reliability.⁵⁴ If its generation assets and power-purchase agreements (PPAs) are insufficient at a given time, such as when demand peaks during hot summers in southern Nevada or cold winters in northern and rural Nevada, the utility can enter into bilateral contracts with generators for short-term purchases.⁵⁵

Retail electric choice would introduce a new way of doing business into Nevada’s electricity market. Primary participants in this new system are: (1) independent power producers (IPPs), which own generation assets, such as power plants; and (2) competitive suppliers. The responsibility for electricity supply thus is separated into retail suppliers and IPPs, each of which plays a crucial, albeit distinct, role in the market.

An independent power producer is defined by EIA as: “A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.”⁵⁶ IPPs may construct new generation facilities, enter into long-term PPAs, and/or own generation assets previously held by the utility but sold through divestiture.

In a restructured market, a retail supplier (or electric supplier) is a critical participant. It “...is a company that sells the energy that the utility delivers.”⁵⁷ Electric suppliers typically are licensed by the state, and under energy choice, customers can choose amongst suppliers in the market.⁵⁸ These

^o The CEO of NV Energy, Paul Caudill, has signaled to the CEC that the utility would consider transitioning to a wires-only company if that is what the State wants. See: Paul Caudill, NV Energy, CEO. “Statement to the Governor’s Committee on Energy Choice During Question and Answer Session with Pat Wood (Texas Presentation).” May 10, 2017. Available: http://nvleg.granicus.com/MediaPlayer.php?publish_id=6c23a1ae-35cf-11e7-b343-f04da2064c47.

^p As is true in all states but Michigan, per our research. (See pages 43 and 69 for details on Michigan’s “hybrid structure.”)

^q The incumbent utility’s assets become “stranded” through the divestiture process. Assets may be sold for a loss, resulting in stranded costs, or they may be sold for a gain, resulting in negative stranded costs (i.e., stranded benefits).

retail suppliers act as brokers between the end-use customer and independent power producers (IPPs).

In sum, under retail electric choice, a single entity would no longer manage the generation component of the supply chain.

In theory, retail electric choice affords the wholesale electric market greater prominence than under a traditional model of electricity delivery, in which utilities typically own a considerable amount of generation assets. While vertically integrated utilities participate in wholesale markets, these markets—known as traditional wholesale markets or “bilateral” wholesale markets—are used for both short- and long-term transactions to trade electric power.⁵⁹ A short-term transaction is entered into by a utility and a generation facility for the procurement of power when the utility is confronted with resource inadequacy; a long-term transaction is a power purchase agreement (PPA).

Retail electric choice requires participation in an organized wholesale market, which is coordinated by the aforementioned independent system operator (ISO) or regional transmission organization (RTO). (ISOs and RTOs are functionally equivalent, but, for consistency, we will use the term ISO hereafter.)⁶⁰ Organized wholesale markets are where both short- and long-term energy power transactions are conducted.⁶¹ All states with retail competition participate in organized wholesale markets, and some states that have not restructured participate in organized wholesale markets, as well (i.e., their utilities do). See, for example, Minnesota, as shown in Figure 3 (page 22).

While this may sound similar to the way traditional wholesale markets function, the process is quite different under a restructured market. Under retail electric choice, PPAs are permitted. However, in large part, electricity prices are set through an auction process characterized by competitive bidding.⁶² Specifically, in organized wholesale markets after a state has embraced retail choice, pricing is determined through auction-based market pricing, real-time (“spot market”) pricing, and bilateral contracts.⁶³ The following should be noted:

...when power is generated, it becomes part of the wholesale electricity market where it is traded like any other commodity by the players granted permission to operate in that specific market. These electricity grids, also known as Regional Transmission Organizations (RTOs) or Independent System Operators (ISOs) are considered to be *interconnected*, which allows for broad-based trading of electricity across geographies.⁶⁴

Independent power producers (IPPs) operate in the organized wholesale market, and electric suppliers broker the transactions between the IPPs and the end-use customer.⁶⁵ The latter can be understood as an intermediary between the wholesale electric market and the retail market, as most ratepayers normally do not conduct transactions directly with the IPPs.⁶⁶ (The exception may be large

commercial and industrial ratepayers, depending on the laws of the state in which they are located.)^{r,67}

As such, there are several reasons why states who restructure their electricity market must participate in the organized wholesale market/ISO:

- 1) The multiplicity of actors in a restructured market, including retail suppliers and IPPs, precludes traditional approaches to energy procurement. In other words, the presence of many buyers and sellers necessitates a market structure that allows competition to thrive.⁶⁸
- 2) In the absence of the vertically integrated utility acting to ensure reliability, or that supply is sufficient to meet demand, a central coordination body, such as an ISO, must assume this function.⁶⁹ The ISO “oversees the process” in that it “predicts hourly demand” and “selects the winning bids.”⁷⁰
- 3) The ISO combines transmission operations with market operations to maintain grid reliability and serves as a market operator to dispatch transmission to maintain voltage and frequency (i.e., balancing and grid reliability services).⁷¹
- 4) Purchases in wholesale markets are made over various time frames, such as year-ahead, month-ahead, days-ahead, day-ahead, and real-time.⁷² Generally, vertically integrated utilities operating in traditional wholesale markets participate in all but the day-ahead market and real-time market.⁷³ NV Energy joined the western Energy Imbalance Market (EIM), which provided access to the real-time market.⁵ ⁷⁴ Nevada’s participation in the real-time market likely would be “grandfathered in” under retail electric choice, but the day-ahead market, which is a key feature of an organized wholesale market, cannot be accessed without membership in an ISO.⁷⁵ One ISO executive speaks to the importance of the day-ahead market in noting, “The day-ahead market allows buyers and sellers to hedge against price volatility in the Real Time Energy Market by locking in energy prices before the operating day.”⁷⁶
- 5) Under retail electric choice, smaller retail providers may enter the market to serve various end-use customers. Given their size, they may have a smaller fraction of the load (i.e., demand), but they would not be able to function well in the absence of participation in an organized wholesale market, as they would not secure good prices at smaller quantities.⁷⁷ Thus, lack of access to an organized wholesale market could dampen retail market entry or spur retail market exit.

^r The average end-use customer in a restructured state who selects a retail supplier enters into a contract with said provider and is billed for electric supply by that entity, either through a consolidated bill provided by the wires company or in two separate bills (one for supply and one for wires service and administrative costs). The structure of billing is determined by the laws of the state in question.

⁵ “The California ISO’s western Energy Imbalance Market (EIM) is a real-time bulk power trading market...[.]” See: Western Energy Imbalance Market. “About.” Available: <https://www.westerneim.com/Pages/About/default.aspx>.

As will be addressed in greater detail in Section IV, Nevada seemingly has three options with regard to organized wholesale markets: creation of its own organized wholesale market as an ISO (e.g., NV-ISO); membership in the Southwest Power Pool (SPP); or participation in the California Independent System Operator (CAISO). However, discussions of a regional grid are underway already, irrespective of the outcome of Question 3: The Energy Choice initiative.⁷⁸ NV Energy's joining the EIM signals a potential move in that direction. The CAISO membership pricing estimates outlined in Section IV, notably, are for NV Energy, not retail electric choice, specifically. And Valley Electric Association, Inc. (VEA), "a member-owned electric cooperative headquartered in Pahrump, Nevada," that "provides service to more than 45,000 people within a...6,800-square-mile service area located primarily along the California-Nevada border," "became the first out-of-state utility to join the California Independent System Operator Corporation (CAISO)" in 2013.⁷⁹

Given the intricacies of organized wholesale markets, an additional regulatory layer has been deemed necessary to regulate the exercise of market power: "Every ISO market operates with FERC-approved market power controls, implemented by FERC-mandated independent market monitors, including price caps and auction market offer mitigation."^t ⁸⁰ That is, FERC prohibits market manipulation. However, while it regulates rates and services for electric transmission and electric wholesale power sales, FERC does not have statutory authority over sales of electric energy to end users (i.e., sales at retail).^u ⁸¹ It should be noted, however, that, along with the PUCN, FERC already exerts some regulatory power over NV Energy: for example, "[i]n today's market in Nevada, wholesale energy sales – including NV Energy's sales of its excess supply – are subject to FERC's oversight for market power; FERC authorizes sales at market- or cost-based rates based on whether owner has concentrated ownership in the market."⁸²

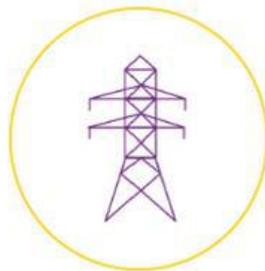
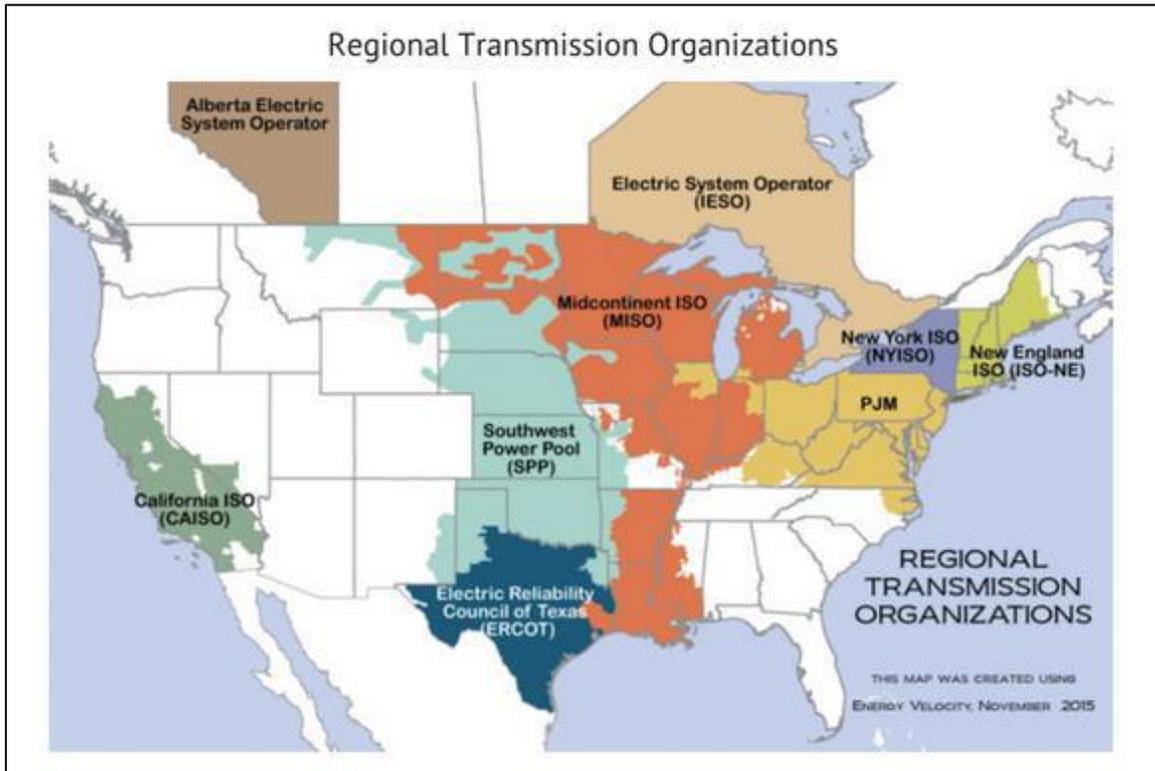
Section IV outlines the opportunities for organized market participation, along with related costs and time frames were ECI to pass in 2018, but it may be helpful here for the reader to have a visual sense of the ISOs based in the United States and Canada. Figure 3 provides such a map.⁸³

There are many more dimensions to retail electric choice, but this foundation should serve as context for the analysis to follow. In the next section, we examine the validity of the arguments put forth by supporters of Question 3 and those who oppose it.

^t Note that Texas's independent system operator, the Electric Reliability Council of Texas (ERCOT), is regulated by the state, not FERC, in restructured areas. On ERCOT as an ISO, see: ERCOT. "About ERCOT." Available: <http://www.ercot.com/about>. On state regulation of FERC, see: Philip R. O'Connor, Ph.D., and Erin M. O'Connell-Diaz. 2015. "Evolution Of The Revolution: The Sustained Success Of Retail Electricity Competition." Available: https://yesquestion3.com/wp-content/uploads/2018/05/Massey_Evolution-of-Revolution.pdf.

^u In the earlier sub-section on vertical integration, natural monopoly, and regulatory authority, we addressed the current role of the Public Utilities Commission of Nevada (PUCN). It is unknown how its responsibilities would change under restructuring, as that would be determined by the Nevada Legislature were Question 3 to pass in November 2018. We will discuss this further in Section IV, in the sub-section on implementation.

Figure 3. Regional Transmission Organizations



III. Primary Arguments For and Against ECI: Rate Behavior and Renewable Energy

This section evaluates the primary arguments for and against Question 3: The Energy Choice Initiative (ECI), specifically, those related to rate behavior and renewable energy. The discussion on rate behavior indicates that restructuring is correlated with increases in electric rates *and* decreases in electric rates. Notably, both supporters and opponents of Question 3 use the same data to support their findings. We argue that the conflicting results are a function of the limitations of the data itself, which should not be used to infer causation, as the data is not comparable across states—or even within states. Restructuring cannot be isolated from other factors, such as fuel prices, weather, regulatory costs, and more, all of which contribute to end-user electric rates. In fact, wholesale electric prices and policy decisions about market design have been far more deterministic in shaping rate behavior, the effects of which are amplified in restructured markets. Our examination of other states' experiences with rates demonstrates that some customers have benefited from retail electric choice, while others have encountered adverse effects.

In the discussion on renewable energy, we find that there is no relationship between restructuring and renewable energy. The type of retail market model in a given state matters less than policy choices, such as a state's Renewable Portfolio Standard (RPS), and the willingness of some entity to invest significantly in renewable generation assets. Arguments that favor retail electric choice as a pathway to more renewables typically fail to consider the auction process in organized wholesale markets, as the variability of renewable energy can mean that the independent system operator (ISO) may choose not to use those assets. The RPS can act as a deterrent in a competitive market, as suppliers typically must purchase Renewable Energy Credits (RECs) to maintain compliance; (RECs are paper transactions that are not necessarily related to actual renewable generation, and they can be cost-prohibitive).

Market structure aside, both NV Energy (the incumbent utility) and Switch (a technology infrastructure corporation) have committed to the construction of one gigawatt (gW) of solar projects. Increased renewable energy generation assets may be expected to come online, regardless of whether Question 3 passes in November 2018. Rather, the choice of organized wholesale market/ISO, were Question 3 to pass and the State decided to join a preexisting ISO, could influence whether Nevada consumes more renewable energy, as the proposed markets' fuel portfolios differ considerably.



Rate Behavior in States with Restructured (Energy Choice) Electricity Markets

Text Box 1. Rate Behavior Arguments (from Official Websites)^{v, 84}

YES on 3: “Energy choice will lower electric bills for all Nevadans.”

NO on 3: “Dismantling Nevada’s existing electricity system would cost billions of dollars....These costs would be paid for by all Nevadans in the form of higher electricity rates....”

What one often hears in the debate over retail electric choice in Nevada is “will” statements regarding rates. That is, retail choice *will* lower electric bills, or retail choice *will* increase electricity rates. Which claim is true?

Our research finds that there is evidence to support claims on both sides. And, interestingly, the vast majority of analyses use the same data source. How, then, can we reconcile these differences, given the contradictory findings?

We submit the following: (1) the data used to argue that restructuring causes electric prices to increase or decrease should not be used for those purposes; and (2) we cannot make a conclusive determination as to whether restructuring, all else equal, contributes to rate increases or rate decreases. However, our analysis of the experiences of other choice states does suggest that restructuring exposes ratepayers to the imperfections and challenges of the wholesale electric market, leading to heightened uncertainty around rate behavior.

This section is organized as follows: first, we present annual average retail electricity prices for 2017, which is intended to be a starting point for the discussion; second, we summarize macro-level research on restructuring and electric prices; third, we address data and analytical limitations; and fourth, we document state-specific outcomes that affirm the issues raised in the third sub-section.

Annual Average Retail Price of Electricity

Table 1 presents U.S. Energy information Agency (EIA) data on the annual average retail price of electricity for the Intermountain West states in 2017, by end-use sector (see Appendix B for the table of all 50 states).⁸⁵ Electricity prices are usually highest for residential and commercial consumers because it costs more to distribute electricity to them; industrial consumers use more electricity and

^v The complete set of arguments from Yes on Question 3 and No on Question 3 is delineated here in the order presented on each website. **Yes on Question 3:** “More jobs; Energy choice will lower electric bills for all Nevadans. (Competition is good. The more choices you have, the easier it is for you to go to a lower cost option when rates increase.); Energy choice will expand Nevada’s clean energy options; More choice: Right now, NV Energy is a monopoly and our only choice for electricity.” (For “Yes on Question 3,” see: Yes on 3: The Energy Choice Initiative. “Get the Facts.” Available: <https://yesquestion3.com/facts/>.) | **No on Question 3:** “Locks a risky experiment into Nevada’s Constitution; Leaves implementation to the legislature and courts; Could give California politicians & Federal Government more control over Nevada’s electricity system; Would cost Nevada consumers and taxpayers billions; Threatens Nevada’s progress toward a clean energy future.” (For “No on Question 3,” see: No on 3. “Get the Facts.” Available: <https://noon3.com/get-the-facts/>.)

can receive it at higher voltages, so supplying electricity to these customers is more efficient and less expensive (the price of electricity to industrial customers is generally close to the wholesale price of electricity).⁸⁶ The EIA data presented in Table 1 provides only a baseline of retail prices of electricity so the reader may have a sense of rate pricing around the country. Note that annual averages are useful in smoothing out seasonal variation but do not capture point-in-time snapshots.^w

Table 1. Annual Average Retail Price of Electricity (¢/kWh), Intermountain West States (2017)

Annual Average Retail Price of Electricity (¢/kWh), Intermountain West States (2017)				
	Residential	Commercial	Industrial	All Sectors
Arizona	12.50	10.58	6.45	10.71
California	18.24	15.89	12.87	16.14
Colorado	12.13	9.95	7.29	9.94
Nevada	12.00	7.98	6.13	8.76
New Mexico	12.92	10.27	6.01	9.64
Texas	11.18	8.31	5.49	8.55
Utah	11.04	8.74	6.12	8.66
United States	12.90	10.68	6.91	10.54

Temporal and spatial variation are endemic to the retail pricing of electricity, given the number and type of inputs that influence rates, rendering intrastate, cross-state, and historical comparisons unfounded. These can include, amongst others, fuel prices, weather, and regulatory costs, as we detail further in the sub-section on data and analytical limitations.

Here, we reference the following assertion from the official ECI (Yes on Question 3) comment to the Governor’s Committee on Energy Choice (CEC) on the PUCN report in April 2018:

...[A] discussion of national averages is not helpful. States have dramatically different electricity economies, a point acknowledged by the [PUCN] Report. It makes no sense to compare Nevada to eastern states (or California) that are in factually dissimilar circumstances. It is like saying that Nevada is sunnier than Oregon, or warmer than Washington - of course it is. The fact that Nevada has lower electricity prices than New York, California, Massachusetts and other high-

^w The official ECI reply comment presented to the CEC on the PUCN report is critical of annual price metrics, noting that EIA’s *Monthly Energy Review* with data from January of 2018 was available at the time of the PUCN’s writing (see: Tamara Beatty Peterson, Esq., and Jon Wellinghoff, Esq. “Motion for Leave to Submit Reply Comments of Nevadans for Affordable Clean Energy Choices (Before the Public Utilities Commission of Nevada: Docket No. 17-10001).” Presented as an Exhibit to the Governor’s Committee on Energy Choice, May 9, 2018. Available: http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/TaskForces/2017/Motion_re_Reply_Comments_FINAL.pdf). That more recent data is available is not an inaccurate statement, particularly as the PUCN relied on 2016 averages; in fact, the May 2018 EIA *Monthly Energy Review* includes data average retail prices of electricity for February of 2018. (See: U.S. Department of Energy, U.S. Energy Information Administration. “June 2018: Monthly Energy Review.” Available: <https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf>.) However, it is not clear that this data is available by state. Furthermore, were it available, we believe that monthly snapshots are problematic, as it would be no more fair to compare, say, Nevada to Massachusetts in February than would be the reverse in July.

cost states where utilities are saddled with difficult to maintain systems and costs of outdated or shut down nuclear plants - among a multiplicity of other factors - should come as no surprise to anyone...[.]⁸⁷

Restructuring and Electric Prices: Brief Summary of Research Findings

A. Evidence for Lower Rates

As noted previously, the evidence on the effect of restructuring on electric prices is mixed and inconclusive. The author of one discussion paper stated:

The evidence simply does not support critics' claims that there have been dramatic price increases in restructured states relative to states that have maintained more traditional forms of regulation...there is no clear pattern in the restructuring status of the states that have seen the greatest increases in retail prices since the mid-1990s. Among the 28 states in which some form of restructuring was implemented, 10 (plus the District of Columbia) experienced increases in average retail prices from 1995 to 2006 that outpaced the national average and 18 states had increases (or even decreases) below the national average. Among the non-restructured states, 11 had price increases above the national average and 11 had below average price increases.⁸⁸

The discussion paper cites several analyses that support the conclusion that restructuring has been beneficial to consumers, including the following: a 2006 report that used EIA state-level data from 1970-2003, which found that retail competition decreases price, with a price effect of about 5 to 10 percent; a 2007 report that used annual average rates, based on EIA data, for 1990-2004 and 1998-2004, which found that restructuring in the mid-Atlantic and New York "produced benefits in the range of \$.50 to \$1.80/MWh equivalent to a total of \$430 million to \$1.3 billion per year"; and others that showed price reductions, one of which asserted that consumer savings amounted to around \$34 billion from restructuring over a seven-year period.⁸⁹

A report available on the official ECI (Yes on Question 3) website, which uses EIA data, states that, "As a group, Customer Choice Jurisdictions outperformed Monopoly States on price, with average prices increasing less than inflation in competitive markets and far exceeding inflation under monopoly regulation."⁹⁰ Another report, which also relies on EIA data, finds that: (1) between 2008 and 2015, half of the restructured states enjoyed price decreases, while just three non-restructured states experienced the same; (2) Compound Average Growth Rate (CAGR) was higher in non-restructured states (3.07 percent) than in restructured states (2.49 percent); and (3) in Michigan, which has tweaked its legislation such that residential retail electric choice technically is allowed by law but currently does not exist in practice, had consumers been given access to the same market-based rates as Illinois, they would have paid \$11.3 billion less between 2009 and 2015.^{x, 91}

^x On the current status of residential retail electric choice in Michigan, see: Michigan Public Service Commission. "Electric Customer Choice Frequently Asked Questions for Customers." Available: https://www.michigan.gov/mpsc/0,4639,7-159-16377_17111-42899--,00.html.

In testimony before the CEC, John Hanger, former Secretary of Planning and Policy and Pennsylvania PUC Commissioner, asserted the following: (1) residential and commercial customers in Philadelphia and Pittsburgh pay 40 percent to 56 percent less (in real or inflation-adjusted dollars) than they did in 1996; (2) the average statewide electricity price is at the national average, not “well above it”; and (3) residential customers saved \$818 million in 2016 as a result of retail competition.^{y, 92}

B. Evidence for Higher Rates

On the other hand, another body of evidence suggests that restructuring has led to increased electric prices in those states that transitioned to a choice model. Many of these studies also use EIA data to argue that restructuring (or transition to “energy choice”) contributed to rate increases:

Of the 11 states and the District of Columbia (D.C.) that have effectively restructured their electricity markets and allow “free market” competition, electricity prices have gone up over four times faster, after restructuring than before restructuring, relative to U.S. electricity prices. Delaware, Maine, New York, Oregon, Rhode Island and the D.C. have extremely significant electricity price increases and are extremely less efficient, after their electric utilities restructure. Massachusetts and Texas have very significant electricity price increases and are very less efficient, after their electric utilities restructure. Connecticut, Maryland, New Hampshire, New Jersey have no significant relative price increases, pre-and-post restructuring; however, these four states retain substantial price suppression regulation, through re-regulation of their electricity marketplaces. No effectively restructured electric utility state is statistically more efficient.⁹³

A study on restructuring in the Texas market, using EIA data for 2002-2014, indicates that Texans in restructuring-exempt (or non-choice) areas have paid lower residential electric rates compared to their counterparts in restructured (or choice) areas.^{z, 94} Moreover, another report shows that “Texans

^y The basis for these findings appear to be a report titled, “A Case Study of Electric Competition Results in Pennsylvania: Real Benefits and Important Choices Ahead,” co-authored by Christina Simeone and John Hanger. The authors used EIA data, citing several datasets therein. However, it is not clear whether the findings regarding electricity prices rely entirely, somewhat, or not at all on this data. See: Christina Simeone and John Hanger. “A Case Study of Electric Competition Results in Pennsylvania: Real Benefits and Important Choices Ahead.” Kleinman Center for Energy Policy, University of Pennsylvania. October 28, 2016. Available: https://kleinmanenergy.upenn.edu/sites/default/files/proceedingsreports/A Case Study of Electric Competition Results in Pennsylvania_0_0.pdf.

^z Texas might have offered an interesting “natural experiment” to examine the effects of restructuring, as not all areas in the state are subject to restructuring. San Antonio and Austin, for example, receive electricity service from served by municipally-owned utilities or electric cooperatives, while other cities and towns are outside the boundaries of the grid service area. Ideally, this would allow for a quasi-experimental analysis, since an intrastate comparison might permit assessment of restructuring that is not compromised by variation across states. However, retail electric choice is available to 90 percent of the load in Texas, which would make the validity of the findings limited by the uneven distribution of retail electric choice. And, as we shall see, even intrastate comparisons are limited by the nature of the EIA data. On retail electric choice availability to 90 percent of the load in Texas, see: Philip R. O’Connor, Ph.D., and Erin M. O’Connell-Diaz. 2015. “Evolution Of The Revolution: The Sustained Success Of Retail Electricity Competition.” Available: https://yesquestion3.com/wp-content/uploads/2018/05/Massey_Evolution-of-Revolution.pdf.

living in deregulated [choice] areas would have saved nearly \$25 billion dollars in lower residential electricity bills from 2002 through 2014, had they paid the same average prices during that period as Texans living outside deregulation [non-choice]. This ‘lost savings’ amounts to more than \$5,100 for a typical household.”⁹⁵ The report goes on to find, though, that the difference between the two areas has been converging since 2011, with the percentage differential the smallest in 2014 since the inception of restructuring.⁹⁶

In sum, the macro-level research findings point in contradictory directions. On the one hand, there is evidence to support claims that restructuring (retail choice) has resulted in lower electricity prices. On the other, researchers have found that restructuring has contributed to increased electricity prices. With respect to these rate-specific findings, there is one commonality: reliance on EIA data. The next section addresses the problems with this data source for the purpose of evaluating the effect of retail electric choice on rate behavior, along with other analytical issues.

Data and Analytical Limitations

A. Electricity Rate Data Issues

As the previous sub-section noted, the vast majority of research studies use EIA data to reach their conclusions about the efficacy (or lack thereof) of retail electric choice. There are two primary reasons we can identify that may explain the tendency toward reliance on the EIA data: (1) EIA is an agency housed in the U.S. Department of Energy (DOE); it “collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.”⁹⁷ It is an “official” federal source that vets data in accordance with uniform guidelines and practices, reinforcing its validity. (2) The information is standardized and is provided for each state, suggesting that statewide comparisons are practicable.

Initially, the Guinn Center, too, intended to use EIA data to conduct an independent analysis of the effects of restructuring on electric pricing. The objective was to determine the extent to which our results conformed with the preexisting research: would they support one side or the other, or would our results be as mixed? However, in conversations with their experts, EIA stated explicitly that its data should not be used for these purposes, describing it as a “proxy” that “does not capture the statewide variation in price determinants” and that any such methodology would result in an ‘apples-to-oranges’ comparison, leading to biased results.”^{aa, 98}

EIA’s reasoning is sound, as we will detail below. But first, it is necessary to understand exactly what is available in its electricity prices data. EIA-861 contains information on “average price by state by

^{aa} The EIA website states, “Electricity prices can be difficult to determine, as they depend on the customer’s rate structure, which can differ greatly from company to company. EIA does not directly collect retail electricity rates or utility tariffs. However, using data collected on revenues and kilowatt hours sold to each customer group (residential, commercial, and industrial), EIA calculates average retail revenue per kilowatt hour as a proxy for retail electricity prices.” See: U.S. Department of Energy, U.S. Energy Information Administration. “Residential Electricity Prices Are Rising.” September 2, 2014. Available: <https://www.eia.gov/todayinenergy/detail.php?id=17791>.

provider” and is reported for each end-use sector (i.e., residential, commercial, industrial, transportation, other, and total) for 1990-2016.⁹⁹ With the shift to retail competition, EIA began to include line items for full-service providers (retail sales to customers who purchase energy and delivery from the same utility, in restructured and non-restructured states, with the exception of Texas, in which customers in restructured areas must purchase from a competitive supplier); restructured retail service providers (sales of energy and delivery, combined, to customers who use retail choice); energy-only providers (sales of energy to customers who use retail choice); and delivery-only service (sales of delivery to customers who use retail choice).¹⁰⁰

Setting the issue of annual averages aside, which has already been discussed, the dataset itself limits the capacity for analysis. While generation and delivery (i.e., the wires) are disaggregated for restructured providers, the same is not true for full-service providers. Even an intrastate comparison becomes impossible without equivalent measures for generation and wires service. However, were that data available, it still would be inherently problematic for two reasons: (1) it would only afford an appraisal of default service (i.e., Standard Offer Service, or SOS) relative to competitive service in a given state, but because each falls under different regulatory schemes with variation in built-in costs, we could not ascertain the “true” price of electricity for either; and (2) it would not permit cross-state comparisons, regardless, as the mismatched regulatory frameworks within any given state and across states, in combination with other pricing influences that differ by state, do imply an “apples-to-oranges” statistical endeavor.^{bb}

We present three sample bills from across the nation to illustrate the above. The first two are from Connecticut: Figure 4A displays a sample bill from the utility in which the customer has maintained default service with that entity but is poised to switch to a competitive supplier, and Figure 4B displays a sample bill for a Connecticut resident that receives its generation from a competitive supplier.¹⁰¹ Figure 5 is a sample bill from NV Energy.¹⁰²

As Figures 4A and 4B show, while there are commonalities across the two bills—both have generation services and transmission charges—different costs are built into the two bills. The customer with default service pays for “Decoupling Adjustment,” “Pension Tracker and Earnings Sharing,” and “CTCleanEnergyOptions,” while the customer of the competitive supplier does not; conversely, the former does not pay for the “Revenue Adjustment Mechanism Distribution” and the “Adjustment Charge,” while the latter does pay for these. These bills exemplify the differences in types of costs incurred by ratepayers in a single state, depending on whether he or she stayed with the full-service provider or switched to a retail supplier, thus demonstrating the problem with intrastate comparisons.

Figure 5, the sample bill from NV Energy, depicts the cross-state comparative predicament. Those receiving service from NV Energy in southern Nevada pay for a broad array of charges that those

^{bb} “Standard Offer Service (SOS) is electricity supply service sold by electric utility companies to a customer who does not choose an alternative electricity supplier.” (<https://www.psc.state.md.us/electricity/standard-offer-service/>)

living in Connecticut do not; these include all the line items below “Electric Consumption,” with the exception of the “Basic Service Charge.”¹⁰³

Figure 4A. Connecticut Standard Offer Service Sample Bill

Connecticut Standard Offer Service Sample Bill			
Your Account Information		Account Number:	789-7897897-7897
Customer Name Key: SMIT		Meter Number:	345345345
GEORGE B SMITH		Trans and Dist Rate:	R-Residential
38 PALM TREE AVE		Generation Rate:	Standard Service
MILFORD, CT 06460		Billing Period:	10/14/10 - 11/11/10
		Statement Date:	11/15/10
		Next Meter Reading (on or about):	12/14/10
<hr/>			
Previous Charges & Credits			
Amount of Previous Bill	10/15/10	\$	82.93
Payment Received, Thanks!	11/04/10	\$	82.93 <i>cr</i>
Balance Forward		\$	0.00
<hr/>			
New Charges & Credits			
POD 1231231231231 (CYCLE 07)			
Current Supplier: THE UNITED ILLUMINATING COMPANY			
New Supplier: Supplier ABC, LLC			
Generation Services Charge	341 kWh X \$.115680	\$	39.45
Total Generation Services Charges		\$	39.45
<hr/>			
Transmission per kWh	341 kWh X \$.017465	\$	5.96
Distribution Basic Service		\$	15.85
Distribution per kWh	341 kWh X \$.053234	\$	18.15
Combined Public Benefits Charge	341 kWh X \$.007375	\$	2.51
Competitive Transition Assessment per kWh	341 kWh X \$.015222	\$	5.19
Non-Bypassable FMCC per kWh	341 kWh X \$.001292	\$	0.44 <i>cr</i>
Decoupling Adjustment	341 kWh X \$.000291	\$	0.10
Pension Tracker and Earnings Sharing	341 kWh X \$.000665	\$	0.23 <i>cr</i>
Total Delivery Charges		\$	47.09
<hr/>			
CTCleanEnergyOptions (100%)	341 kWh X \$.013000	\$	4.43
Total New Charges		\$	90.97

Figure 4B. Connecticut Competitive Supplier Sample Bill

Connecticut Competitive Supplier Sample Bill			
Total Charges for Electricity			
Supplier (Any Energy Company)			
Generation Srvc Charge**	700 kWh X 0.09990		\$69.93
Subtotal Supply Services			\$69.93
Delivery			
Transmission Charge	700 kWh X 0.02922		\$20.45
Distribution Customer Service Charge			\$19.25
Distribution Charge per kWh	700 kWh X 0.03467		\$24.27
Revenue Adj Mechanism	700 kWh X 0.00079		\$0.55
CTA Charge per kWh	700 kWh X 0.00116		\$0.81
FMCC Delivery Charge	700 kWh X 0.00932		\$6.52
Comb Public Benefits Charge*	700 kWh X 0.01275		\$8.93
Distribution Adj Charge***	700 kWh X 0.00042		\$0.29
Subtotal Delivery Services			\$81.07
Total Cost of Electricity			\$151.00
<hr/>			
Total Current Charges			\$151.00

Figure 5. NV Energy Sample Bill

NV Energy Sample Bill								
ELECTRIC - RESIDENTIAL SERVICE								
Meter Number	Service Category	Service Period		Bill Days	Meter Readings		Motor Multiplier	Billing Usage
		From	To		Previous	Current		
ABC1234567	KWH	Nov 12	Dec 12	30	24039	25190	1	1,151
ELECTRIC CONSUMPTION 1					1,151.000	KWH	x .11555	133.00
DEFERRED ENERGY ADJUSTMENT 2					1,151.000	KWH	x .00000	0.00
TEMP. GREEN POWER FINANCING (TRED) 3					1,151.000	KWH	x .00083	.96
RENEWABLE ENERGY PROGRAM (REPR) 4					1,151.000	KWH	x .00132	1.52
ENERGY EFFICIENCY (EE) CHARGE 5					1,151.000	KWH	x .00343	3.95
ENERGY EFFICIENCY AMORTIZATION 6					1,151.000	KWH	x .00219 CR	2.52 CR
BASIC SERVICE CHARGE 7								10.00
LOCAL GOVERNMENT FEE 8							5%	7.35
UNIVERSAL ENERGY CHARGE 9					1,036.000	KWH	x .00039	.45
TOTAL ELECTRIC SERVICE AMOUNT								\$154.71

Thus, the EIA data is “picking up” a variety of costs and rate structures within states and across states that are unrelated to generation, transmission, and distribution.^{cc} To evaluate the effectiveness of restructuring through the use of EIA data, these costs would need to be eliminated from their dataset to access the “true” price. Otherwise, we would be examining the effect of restructuring on pricing that carries with it a variety of embedded social and regulatory costs.¹⁰⁴

^{cc} A study of restructuring in Ohio concurs, finding that EIA data does not reflect large costs incurred by end-use customers, which accounts for more than 50 percent of the total bill in Ohio and perhaps other states, as well. It states: “...total bill information is not commonly provided in electric utility analyses. The typical data source for analyses of this sort is EIA data... which provides at best only the marginal rate that customers pay for their electricity (i.e., cents/kWh). However, in states with active utility commissions, such as Ohio, costs are borne by households and businesses through a long litany of additional riders and surcharges that itemize additional energy and energy-related costs on utility bills....These include everything from traditional charges for transmission and distribution (T&D), as well as additional cost pass-thrus for costs such as participating in competitive auctions, service reliability, deferred assets, etc. For example, in the American Electric Power (AEP) service territory (Columbus and Canton, Ohio metro areas in this study) there are approximately 20 additional riders on residential electric bills that amount to more than 50 percent of the total bill. These are costs that households face and that are not included in any competing analyses from EIA data. Moreover, utilities can pursue strategies to shift rents from the energy generation component of the consumer bill to other portions of the bill such as T&D or riders.” See: Noah Dormady, Ph.D., Zhongnan Jiang, and Matthew Hoyt. “Do Markets Make Good Commissioners? A Quasi-Experimental Analysis of Retail Electric Restructuring in Ohio.” John Glenn College of Public Affairs, The Ohio State University. February 11, 2017. Pages 9-10. Available: <http://glenn.osu.edu/research/policy/policypapers-attributes/Do-Markets-Make-Good-Commissioners.pdf>.

EIA's technical notes for *Electric Power Monthly* summarize the types of costs that can be included in electricity bills, with regard to Form EIA-861:

The electric revenue used to calculate the average price of electricity to ultimate consumers is the operating revenue reported by the electric power industry participant. Operating revenue includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges. Electric power industry participant operating revenues also include State and Federal income taxes and other taxes paid by the utility.

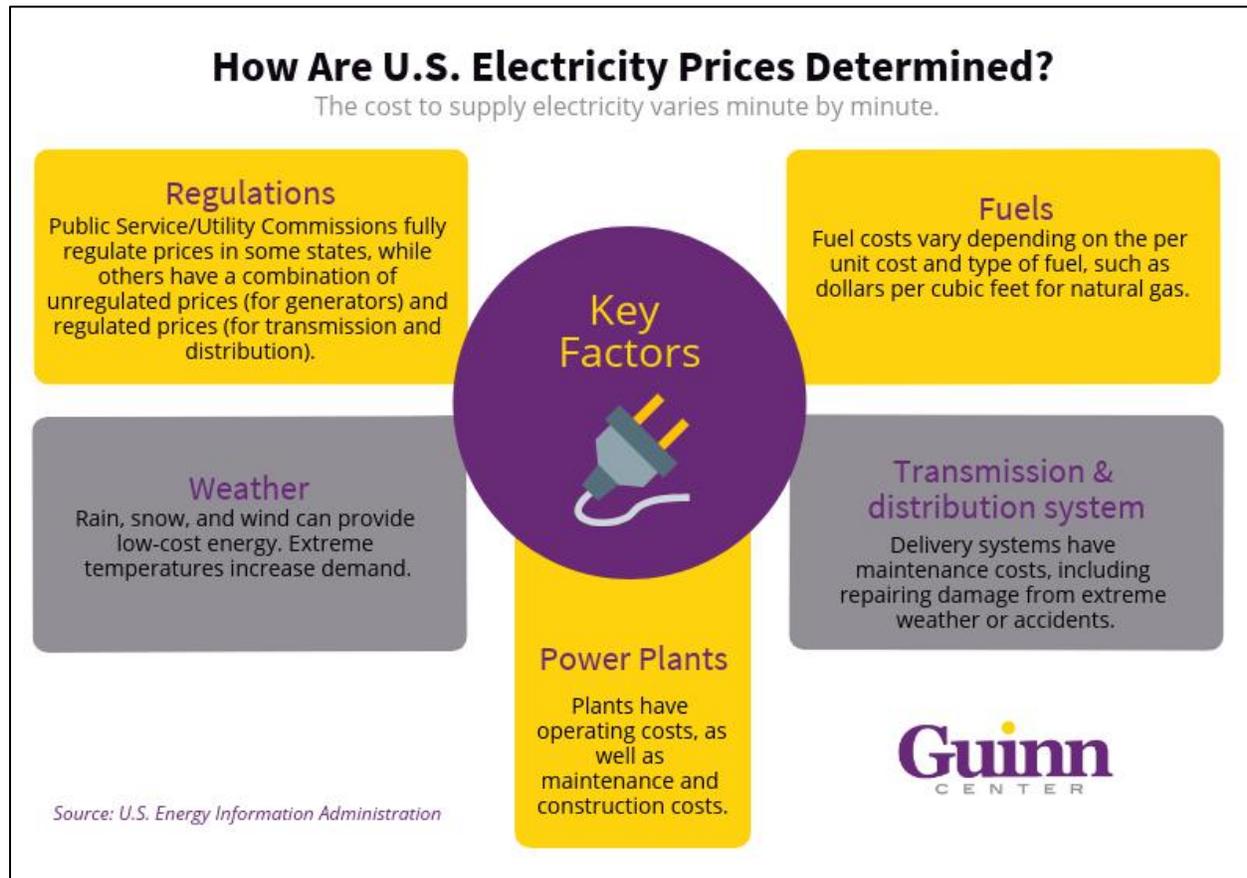
The average price of electricity to ultimate consumers reported in this publication by sector represents a weighted average of consumer revenue and sales, and does not equal the per kWh rate charged by the electric power industry participant to the individual consumers. Electric utilities typically employ a number of rate schedules within a single sector. These alternative rate schedules reflect the varying consumption levels and patterns of consumers and their associated impact on the costs to the electric power industry participant for providing electrical service.¹⁰⁵

The EIA technical notes, coupled with the Guinn Center's conversations with industry experts, reinforce the problematic nature of using the EIA data to make assertions about the effect of restructuring on electricity prices. Other issues further complicate use of the EIA data.

EIA explains that many factors influence electricity prices, as displayed in the infographic in Figure 6.¹⁰⁶ Those five key factors are: fuel costs; construction, maintenance, and operating costs of power plants; maintenance costs for the transmission and distribution system (i.e., the wires); weather conditions; and regulations (more broadly defined than the embedded social/regulatory costs discussed above to mean regulated prices under a vertically integrated utility and unregulated prices for generators/regulated prices for the wires in restructured states).¹⁰⁷ A FERC handbook specifies the impact of these factors on pricing in the context of supply and demand, stating that, "...key supply factors that affect prices include fuel prices, capital costs, transmission capacity and constraints and the operating characteristics of power plants. Sharp changes in demand, as well as extremely high levels of demand, affect prices as well, especially if less-efficient, more-expensive power plants must be turned on to serve load."¹⁰⁸

Moreover, as an economic consulting firm notes, wages and taxes, along with the regulatory climate, can have an impact on electric rates.¹⁰⁹ In particular, "regulatory lag" can distort pricing: when costs rise, a vertically integrated utility must file for rate increases, which can take some time. But in restructured states, costs reflect market prices more immediately; this can understate rates for vertically integrated utilities.¹¹⁰ What this suggests, perhaps, is an incongruity in the electric rate data if pricing in restructured states is reported as time(*t*), and pricing in traditionally regulated states is reported for time(*t-2*). This fundamental disparity in timing factors underscores yet another potential problem with use of the EIA data.

Figure 6. How Are U.S. Electricity Prices Determined?



Earlier, we cited a 2006 report that found that retail competition decreases price, with a price effect of about 5 to 10 percent. However, the author of that report recognized the bounds of price signal interpretation. He asserts, "...if the lower prices in retail competition states are due to competitive reforms they are a consequence of the negotiations over stranded cost recovery, regulated default service pricing, lower wholesale market and perhaps reforms in the regulation of distribution networks rather than retail competition per se."¹¹¹ In addition, he points to the near-constant changing of prices in the spot market, particularly the effect of hourly congestion problems, which is reflected in prices (e.g., as demand peaked during a hot summer day in 2005, there was import congestion into the Boston area, leading to a price that was 2.5 times that of Maine but lower than that of Connecticut, which typically confronts more import congestion than Boston).¹¹² To the extent that these sorts of factors inform pricing, it becomes ever more difficult to draw any conclusions about causal effects on rates. In the New England experience the author describes, all the states involved (Connecticut, Maine, and Massachusetts) have restructured markets, but the variation in prices is unrelated to restructuring.

Another researcher assessed twelve studies on electric market restructuring, some of which found positive effects on rates, while others found negative effects on rates. His approach was to evaluate the methodological robustness of these analyses, and he determined that all the conclusions were

in doubt because of common problems, such as “...the failure to be precise about the reforms being evaluated, the use of a post-reform comparison price that is itself distorted, and an inadequate specification of causation.”¹¹³

In sum, there are many factors that influence electric rates paid by consumers, and the EIA data, while excellent for the purposes intended—such as providing estimates of annual average retail prices of electricity, by year, state, and end-use sector—is not viable for examining the impact of restructuring on rate behavior. Electric rates and/or prices are not one-to-one corollaries of generation, transmission, and distribution costs but are indicators of the multiplicity of inputs that shape cost drivers. These can vary widely within states and across states, and because the EIA data is but a proxy for annual averages, an attempt to draw a conclusion regarding rate behavior in the context of restructuring versus the retention of a vertically integrated utility is likely to produce biased results.

B. Analytical Limitations

There are two additional points with regard to rates that we have yet to address. The first is the relationship between wholesale electric prices and rate behavior. The second is the effect of rate caps, rate freezes, and rate reductions on electric pricing. We will take each in turn, before proceeding to outcomes in states that have restructured their electricity markets. However, because the two often coincided, that sub-section will treat them in tandem, where applicable. The discussion here will help situate market mechanisms and regulatory choices in context and ascertain the extent to which their intersection has led occasionally to adverse outcomes.

i. Wholesale Electric Prices. All ratepayers—whether in markets with vertically integrated utilities or in retail electric choice markets—are vulnerable to changes in fuel costs and are exposed to market volatility. The process, and, accordingly, the pricing, differs with market structure, however. This sub-section suggests that there is heightened exposure under retail electric choice, as optimal market design implies a higher correlation between wholesale electric prices and retail rates. This can add to the consumer’s benefit when wholesale electric prices are low but can confer a disadvantage when wholesale electric prices are high.

The official ECI (Yes on Question 3) comment to the Governor’s Committee on Energy Choice (CEC) on the PUCN report in April 2018 disagrees with the idea that consumers are more exposed to market volatility under retail electric choice, asserting, “Nevadans are already exposed to ‘market volatility’ because NV Energy has persuaded the Commission [PUCN] to allow dollar-for-dollar recovery for fuel costs to force Nevada customers to protect the monopoly from market volatility. That means that rates already go up when natural gas is more expensive. Nevadans will be no less protected from market volatility than they are today.”¹¹⁴

ECI (Yes on 3) cites a fact sheet from NV Energy, titled, *Understanding Your Bill: Bill Statement Charge Descriptions—Residential*. The fact sheet states, “The BTER [Base Tariff Energy Rate] reimburses the utility for fuel and purchased power costs the company pays on behalf of its customers. Increases or decreases are passed on dollar-for-dollar with no profit to the company. Utilities cannot, under Nevada law, profit from fuel and purchased power costs.”¹¹⁵

As the fact sheet indicates, customers of vertically integrated utilities are not immune to pricing in the wholesale electric market.^{dd, 116} After all, as discussed previously, utilities enter into bilateral contracts in both traditional wholesale markets and organized wholesale markets, particularly through PPAs. Specifically, NV Energy, through its participation in the western EIM, has access to the real-time market, which means that spot purchases, when necessary, can be very expensive.^{ee} That said, in Nevada, under conditions of monopoly utility service, and pursuant to statute, the utility (NV Energy) cannot profit from fuel and purchased power costs (as noted above). Moreover, if the PUCN were to find that pass-through rates of wholesale costs were unduly burdensome, it could impose a regulatory remedy.¹¹⁷

However, in choice states, following restructuring, consumers are exposed more directly to wholesale electric costs, as the auction process becomes more deterministic in pricing. IPPs cannot remain in business if they cannot cover their costs, so when fuel costs rise, they submit higher bids into the market; the clearing price in an organized wholesale market reflects these costs.¹¹⁸ IPPs also can take a profit under retail electric choice, so regardless of whether costs are low or high, they can mark up prices in service of profit maximization.¹¹⁹

Under the typical restructuring model, the state utility regulatory body (e.g., Public Utilities Commission, Public Service Commission, etc.) does not retain its authority over pricing, and the Federal Energy Regulatory Commission (FERC) does not have authority over sales at retail, as discussed in Section II. Specifically, under retail electric choice, the PUCN would no longer be able to intervene to protect consumers against higher rates, as that likely would abrogate the intent of the initiative petition, which requires that the Nevada Legislature establish “an open, competitive retail electric energy market.”^{ff, 120}

Turning to the research, one school of thought has characterized a “successful” restructured market as one in which electric rates approximate wholesale electricity costs more closely. A study on restructuring in Texas states that, “...residential rates in competitive areas are highly reflective of wholesale rates, which suggests that electricity providers are minimizing costs in meeting market demands. By contrast, residential rates in non-competitive areas do not generally reflect wholesale rates. Furthermore, we find a shrinking gap between residential rates and wholesale rates in

^{dd} For example, in New England, in the first half of 2014, EIA found that residential customers of both full-service utilities and restructured suppliers experienced similar rate increases of about 11.8 percent, with the primary driver being the “sharp rise in wholesale power prices.” See: U.S. Department of Energy, U.S. Energy Information Administration. “Residential Electricity Prices Are Rising.” September 2, 2014. Available: <https://www.eia.gov/todayinenergy/detail.php?id=17791>.

^{ee} On real-time pricing, see: ISO New England. “FAQs: Day-Ahead Energy Market—Commitment, Scheduling, and Dispatch.” Available: <https://www.iso-ne.com/participate/support/faq/da-market-commitment>.

^{ff} Customers who retain default service may receive rates that are regulated by the PUCN, as was the case when states initially restructured (see, for example: Kevin E. McCarthy, Principal Analyst. “Electric Restructuring in Other States.” Connecticut Office of Legislative Research. OLR Research Report: 2002-R-0994. December 20, 2002. Available: <https://www.cga.ct.gov/2002/olrdata/et/rpt/2002-R-0994.htm>). But that decision will be determined ultimately by the Nevada Legislature.

competitive areas, which is consistent with improvements in firm and market efficiency. This also has not generally been the case in non-competitive areas.”^{99, 121}

While there is no consensus as to the effects of restructuring on rate behavior, most researchers agree that wholesale electric costs contribute substantially end-user prices. As one report observes, exogenous factors, including natural gas fluctuations and generation technology advances, have driven electricity rate changes more than the effects of restructuring itself. It asserts, “As natural gas prices nearly tripled during the first half of the 2000s, the impact on retail rates and the rents created for infra-marginal generation were far greater than they would have been under regulation. During 2006 and 2008 the U.S. natural gas price peaked above \$11/MMBTU. The higher gas prices drove up generation costs and power market prices.”¹²²

Another study reports the following: “In particular, retail price in states with retail markets saw a much steeper climb from 2003 to 2008, followed by a price decline in some retail states (especially Texas and New Jersey) for several years until recently, which coincides with the gas price movements in the past two decades.”¹²³ This study points to the inability to disentangle retail electric choice from other factors, including, amongst others, wholesale costs: “The real price impact of retail electricity choice is difficult to measure because of, among other things, rate variations with respect to wholesale price, the customer’s load profile, on- and off-peak conditions, marketing costs, and contract duration...Implementing retail electricity choice does impose some new costs. These include new billing procedures and metering that are compatible with the retail service offerings.”¹²⁴

Natural gas is the most salient fuel source in this discussion as many have noted, given that the “...pricing of electricity nationally has become closely aligned with the cost of natural gas, which is the principal source of fuel for peak generation.”¹²⁵ In addition, natural gas sets prices “during the most profitable hours in the energy market”; “...annual average electricity prices in PJM, ISO-NE, and NYISO clearly mirror the price of gas.”¹²⁶

Even a small share of exposure to natural gas can have an impact: “...restructuring of generation greatly increased the exposure of electricity rates to natural gas costs, even if a fairly small share of electricity was sourced from gas-fired plants.”¹²⁷ One analysis emphasizes the relationship between generation fuel mix and electricity rates, noting not just how closely these factors are intertwined but pointing to the complexity of the relationship:

Differences in generation fuel mix have a large impact on electricity rates in different states. Some states are more exposed to increases in natural gas and oil prices because of their greater reliance on such fuels to generate power. Not only were such states more likely to pursue restructuring in the first place, they have continued to be relatively exposed to recent sharp increases in fuel prices. In contrast, many “regulated” states have relatively large portions of their generation supply coming from coal, nuclear, and hydro; and electricity prices have consequently been somewhat shielded from fuel price increases (although coal and uranium prices have also risen significantly in recent years). Any comparison of state electricity rates that does not account for the relative impact of generation fuel mix will produce misleading results.

⁹⁹ Recall that Texas has both restructured and non-restructured areas.

Thus, comparing “restructured” Massachusetts, where 50% of electric supply is generated from natural gas and the average retail rate is about 17¢/ kWh, to “unrestructured” Idaho, where 80% of supply is from hydroelectric plants and the average retail rate is 6¢/kWh, says nothing about the relative benefits or deficiencies of the “regulated” or “unregulated” paradigms. At most, all this indicates is that fully depreciated hydroelectric dams provide cheap electricity. Electricity rates in Idaho and Massachusetts will differ dramatically over time, but the differences will be completely unrelated to restructuring.¹²⁸

Therefore, it is impossible to isolate the effects of restructuring on electricity rates. We have already documented such confounding factors as weather variations, timing, congestion issues, and more, but perhaps nothing is more intertwined with retail electric choice than wholesale costs, specifically, natural gas. The preceding discussion should not be misconstrued to suggest that electric prices in restructured states will increase necessarily because of natural gas’s pronounced contribution to costs. On the contrary, natural gas prices have been volatile, historically; when they are low, consumers in restructured states—by virtue of their increased exposure to the wholesale market—realize benefits from lower fuel costs.¹²⁹ But when they rise, consumers may pay higher electricity bills as a result of pass-through from IPPs to competitive suppliers.¹³⁰

Figure 7 displays the national annual average natural gas spot price in current dollars and inflation-adjusted dollars for 1997-2017.¹³¹

Figure 7. Annual Natural Gas Spot Price (Dollars per Million Btu)

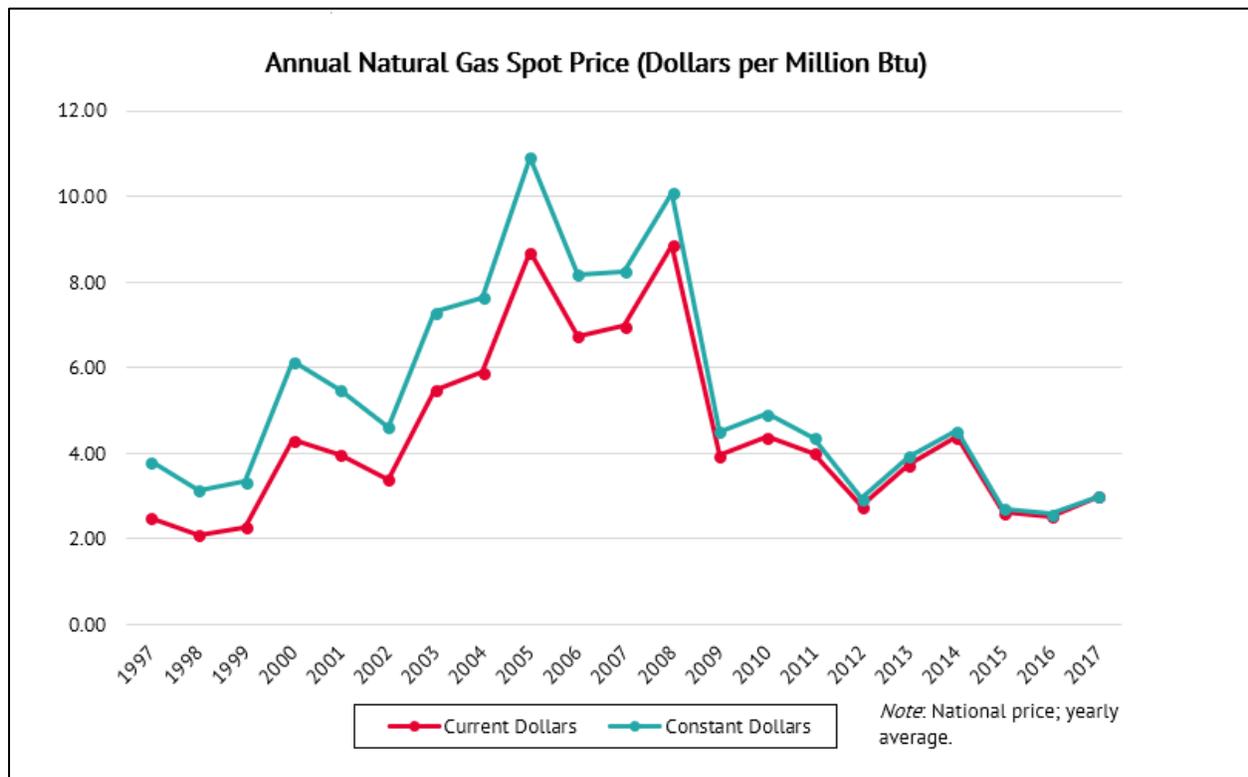


Figure 7 shows that natural gas prices tend to exhibit some fluctuations. In inflation-adjusted dollars, the annual average natural gas spot price is about the same as it was in 1997, which is quite low. In fact, EIA has forecasted that natural gas production will set a record in 2018.¹³² And “[w]hen natural gas is abundant and cheap, utility bills are lower in most areas, with the notable exception right now of the New England area, where politically-motivated pipeline constraints have led the absurd outcome of residents of the states north of New York paying much higher prices than the rest of the country, and having to actually import LNG [liquefied natural gas] from Russia in order to meet the region’s natural gas demand.”¹³³ The expectation is that natural gas prices will continue to remain low.¹³⁴

Given that natural gas prices exert such strong influence over end-user electricity rates, the pricing trend suggests that consumers could realize benefits from a restructured market, as wholesale prices and retail rates are more closely connected than they are under a vertically integrated utility. However, the data is not predictive, and we cannot anticipate exogenous shocks. As Figure 7 indicates, spikes in 2005 and 2008 reflect wholesale market volatility. For example, no one could have expected that Hurricanes Katrina and Rita would have disrupted offshore supply or caused such significant damage to major pipeline segments so as to cause “an extreme escalation of prices.”^{hh, 135} In the forthcoming “State-Specific Outcomes” sub-section, a good portion of the discussion will center on the effects of changes in wholesale natural gas prices on electricity rates in various states.

In 2015, the most recent year for which data is available, 48.1 percent of Nevada’s primary energy consumption came from natural gas.^{ii, 136} By way of contrast, in the inset quote above (page 37), the authors pointed to the difference between Massachusetts’ natural gas exposure and Idaho’s exposure, and, accordingly, the relative influences on electric rates. That report was published in 2008, so we pulled the rough consumption estimates for each of those states for that year. For Massachusetts, natural gas as a percentage of total consumption was 28.9 percent; for Idaho, it was 16.8 percent.¹³⁷ The 12.1 percentage-point difference in consumption may have helped translate into a price differential of 11¢/kWh (that is, setting aside other electricity rate influences). This lends support to the assertion that even incremental exposure to natural gas can be deterministic in rate setting.

^{hh} It is not clear what happened in 2008, as the industry was oversupplied, but natural gas prices may have been mapping to oil and global liquefied natural gas, which were relatively high and factored into price setting. See: Richard G. Smead, Director, Navigant Consulting, Inc. 2010. “Price Instability in the U.S. Natural Gas Industry: Historical Perspective and Overview.” Prepared for The Task Force on Natural Gas Market Stability. Available: http://bipartisanpolicy.org/wp-content/uploads/sites/default/files/Introduction_to_North_American_Natural_Gas_Markets_0.pdf.

ⁱⁱ Ideally, we would obtain data on Nevada’s actual exposure to natural gas in the electric generation fuel mix, but consumption estimates are but a rough approximation. (Generation data is available, but generation and consumption are not the same. Once electricity is generated onto the grid, its fuel type cannot be differentiated. Source: Guinn Center conversation with EIA.) EIA provides data on consumption, but it should be interpreted with caution, not only because of the differentiation problem but also due to the fact that it reflects consumption across all sectors and is not intended to represent the share of natural gas in the electric generation fuel mix.

ii. Rate Caps, Rate Freezes, and Rate Reductions. With the exception of Maine, all states that pursued restructuring (retail choice) implemented some form of rate caps, rate freezes, and/or rate reductions.^{jj, 138} They were designed to protect consumers through the transition process to a fully competitive market.¹³⁹ The general idea was that consumers might face unexpected rate increases in the initial phase of restructuring, so rate caps, freezes, and/or reductions could smooth the transition.¹⁴⁰ A separate consideration turns on stranded assets: if there are stranded costs by virtue of divestiture, and the Nevada Legislature decides that the utility must be compensated by passing on those costs to ratepayers, caps can ease that burden.¹⁴¹

Here is an example of a rate cap from Pennsylvania:

There are statutory caps on electric distribution utility rates: rates for standard offer service (i.e., service for customers who do not choose a generation supplier) and non-generation service are capped at January 1, 1997 levels until July 1, 2001; rates for generation, including transition charges, are capped at January 1, 1997 levels until January 1, 2006. In some distribution utility service areas, generation caps are in place until 2008-2011. Many distribution utilities have also extended distribution rate caps until 2003-2005. Pennsylvania did not require rate reductions, although several distribution utilities agreed to reduce rates in the first year of retail choice. These reductions were to be lowered and phased out over a two to three year period.¹⁴²

Another example is California, which, prior to repeal, instituted a 10 percent rate reduction so that its utilities could recover stranded costs.¹⁴³ Reducing rates allows utilities to recover stranded costs

^{jj} With the exception of two jurisdictions, rate caps, rate freezes, and rate reductions were established through enabling legislation. (An example is Pennsylvania; see: P.L.802, No.138, the “Electricity Generation Customer Choice and Competition Act of 1996,” available at: Pennsylvania General Assembly. 1996. “House Bill 1509: The Electricity Generation Customer Choice and Competition Act.” Available: <http://www.legis.state.pa.us/cfdocs/legis/li/uconsCheck.cfm?yr=1996&sessInd=0&act=138>.) The District of Columbia’s enabling legislation delegated authority to the District of Columbia Public Service Commission (“the Commission”) to set alternative forms of regulation. The legislation prescribes that the Commission “...may adopt an alternative form of regulation...if the Commission finds, after notice and a hearing, that the alternative form of regulation: (A) Protects consumers; (B) Ensures the quality, availability, and reliability of regulated electric services; and (C) Is in the interest of the public, including shareholders of the electric company. Alternative forms of regulation may include: (A) Price regulation, including price freezes or caps;...[.]” (*Source*: Council of the District of Columbia. 2000. “Retail Electric Competition and Consumer Protection Act of 1999.” Page 18. Available: <https://code.dccouncil.us/dc/council/laws/docs/13-107.pdf>.) “Order No. 11576, issued December 30, 1999... authorized a 7 percent reduction in PEPCO’s rates for residential customers and a 6.5 percent reduction in rates for commercial customers, to be implemented in three phases.” (*Source*: Public Service Commission of the District of Columbia. n.d. “Electric Restructuring – Formal Case No. 945 and Subsequent Cases.” Page 3 of 38. Available: <https://dcpsc.org/PSCDC/media/PDFFiles/Electric/ElectricRestructuring.pdf>.) The New York Public Service Commission (PSC) administered rate reductions independently of the New York State Legislature (see: Sheldon Silver, Michael J. Bragman, and Paul D. Tonko, Chair. 1999. “Shedding Light On The Governor’s Failed Electric Utility Restructuring: A Briefing Paper on Moving to Competition in the Electric Industry.” New York State Assembly. Available: <http://www.assembly.state.ny.us/Reports/Energy/199902/>). However, also note that New York restructured its electric power industry through a PSC opinion and order (see: Channele Carner. 2003. “Status of State Electric Industry Restructuring Activity – as of February 2003 –.” U.S. Department of Energy, U.S. Energy Information Administration. Available: <http://large.stanford.edu/publications/coal/references/docs/restructure.pdf>.)

by establishing a lower price for electricity while receiving compensation for its losses, often through a surcharge on its wires service; if rates were not capped, frozen, or reduced, stranded costs could impose an undue burden on the consumer, as these costs would be assessed on top of “normal” electricity rates.¹⁴⁴

While consumer groups largely favor rate caps, freezes, and/or reductions, critics find them problematic, contending that they do not permit consumers to realize actual market prices, or at least prices closer to the wholesale price of electricity.¹⁴⁵ As Ned Ross (Direct Energy), who leads the Retail Energy Supply Association (RESA) state and federal advocacy efforts as a 2018 Electric Caucus Chair for Nevada, explained to the PUCN, “Price caps do not achieve price stability in a competitive market. They can destabilize the market, as they did in California. So what we have to do is set the market up properly so that competition is invited, and that alone will be the...best preventative measure from having high prices.”¹⁴⁶

Furthermore, many states that established capped rates found that they discouraged market entry by competitive suppliers, as the caps were often below market rates, creating a disincentive to competition.¹⁴⁷ As one report notes, “...none of the retail electricity market designs yield instant price reductions for customers. States that held prices artificially low during the transition to a competitive market may have seen lower prices initially; however, the long-run effect of artificially depressed prices is a misallocation of resources and an inefficient electricity market. Consumers have no incentive to switch to an alternative electricity provider and providers have no incentive to enter the market to serve residential customers.”¹⁴⁸

In its restructuring enabling legislation (Senate Bill 7), Texas established a unique model to smooth transition, called the “Price to Beat.”¹⁴⁹ Several industry experts told the Guinn Center that if Question 3 were to pass, and some form of rate caps were deemed necessary, the Texas model would be the one to emulate.¹⁵⁰ “Texas required that electricity providers affiliated with the incumbent utility charge a ‘price to beat’ until the incumbent lost sufficient market share to alternative providers. This price was designed as a price floor and ceiling. In other words, it was designed to prevent the incumbent from offering artificially low rates to stifle competition and undercut new market players. It was also intended to provide a cap, or ceiling, so that customers that didn’t switch providers still received some benefit.”^{kk, 151}

For the purposes of this report, rate caps, freezes, and reductions are relevant for two reasons: (1) most of the macro-level research that showed a link between restructuring and decreased electric rates was published prior to the expiration of rate caps, and to the extent that prices were found to be lower in restructured areas, these results may be skewed by the depressive effects of rate caps, freezes, and reductions—they are inherently time bound; and (2) many of the state-specific outcomes that we will discuss in the next sub-section were driven by simultaneous expirations in rate caps, freezes, and reductions—when prices became aligned more closely with wholesale costs—and

^{kk} The incumbent utility can be understood as the preexisting vertically integrated utility with exclusive franchise over service in a designated territory.

volatility in those very same wholesale electric costs in electricity markets, which, depending on the timing, either exacerbated the problem or helped mitigate it.^{ll}

State-Specific Outcomes: Wholesale Electric Prices and Rate Caps/Freezes/Reductions

In this sub-section, we document the experiences of several states that restructured their electricity market (“choice states”), with particular regard to rate behavior, typically in the context of expiring rate caps and changes in wholesale electric costs.^{mmm} We also address macro-level losses in consumer savings.

A report prepared for the Maryland Public Service Commission stated the following:

After deregulation had been in place for three to five years, states’ rate freezes ended and, predictably, rates spiked dramatically to reflect current wholesale market prices....Some states laddered in rate increases, but residential customers still experienced rate hikes of over 50% after states lifted the freeze. Some states experienced rate increases up to 100%. Deregulation alone did not cause these rate increases, but it did exacerbate the uncertainty and instability that followed natural gas supply disruptions and electricity shortages in some transmission constrained areas. Multi-year price freezes coupled with market forces that drove prices up combined to produce significant rate shocks in many jurisdictions. Although all states have experienced increases in electric rates, the gap between average rates in restructured and regulated states has widened, with average rates in restructured states increasing more dramatically.¹⁵²

In Maryland, upon expiration of its rate freezes, residential rates for the 2005-2006 procurement period increased in the range of 35 percent to 72 percent, with additional factors such as heightened demand and rises in natural gas prices in the wake of Hurricanes Rita and Katrina.¹⁵³ In the previous year, the expectation that Maryland’s customers of Baltimore Gas & Electric would face a 72 percent rate increase was recorded in a docket before the Pennsylvania Public Utility Commission; these customers evidently had remained with the incumbent utility, which had to compete in the open market for power after divestiture.¹⁵⁴ (Maryland’s legislature ultimately deferred a substantial portion of the increase.)¹⁵⁵

Neighboring state Delaware experienced a similar shock in 2014, though it was on the competitive supply side. Given that that was considered a particularly cold winter, both customers with Delmarva, the incumbent utility, and those using a competitive supplier experienced increases in their

^{ll} “The time period examined, however, makes an enormous difference as rates in restructured states increased at a pace nearly 50% higher than those in non-restructured states between 1997 and 2007 but have actually declined slightly since 2007. Average rates in states that did not restructure have continued to increase since 2007, though at a slightly lower pace than between 1998-2007. Overall there is almost no difference in the change in average rates for the two groups over the full sample from 1998-2012.” (Source: Severin Borenstein and James Bushnell. 2015. “The U.S. Electricity Industry after 20 Years of Restructuring.” Energy Institute at Haas, University of California, Berkeley. Page 16. Available: <https://ei.haas.berkeley.edu/research/papers/WP252.pdf>.)

^{mmm} Some of these reports rely on EIA data, and in others, the data source is unclear. Given the limitations therein, the reader is advised to interpret the state-specific outcomes with caution.

electricity bills.^{nn, 156} However, customers who procured electricity through a retail supplier “...have seen their per-kilowatt-hour rate mirror spot electricity market rates, which have increased more than 400 percent in the past two months, according to information released by PJM Interconnection, the regional grid manager.”¹⁵⁷

In anticipation of expiring rate caps, the Pennsylvania Public Utility Commission issued a report showing that Allegheny Power’s residential customers could expect a 4 percent increase for residential customers and that PPL’s residential customers might experience as 30.4 percent increase once the caps were lifted.¹⁵⁸ That regulatory body also released a fact sheet that indicated that: (1) customers should expect to see an increase in their bills upon expiration of caps, as the market price for electricity had risen; and (2) elimination of the caps would mean that Pennsylvanians could choose a competitive supplier that may offer a better price for generation (at the time, the competitive supply rate was “as much as 4 cents per kWh cheaper than the default service price offered by the utility”).¹⁵⁹

New Jersey experienced rate turbulence with the expiration of rate caps at the end of its transition period in 2003.¹⁶⁰ Historically, the state’s electric prices had been some of the highest in the nation, so the purpose of its restructuring legislation was to lower costs.¹⁶¹ And, in the short term, New Jersey’s residents enjoyed lower rates for electricity.¹⁶² Once the transition period ended, rates began to increase again, from 9.3 cents/kWh in 2002 to 14.3 cents/kWh in 2011, which represents a 53.8 percent increase.¹⁶³ Rates increased by 19 percent in the immediate aftermath of the expired caps.¹⁶⁴ Given that New Jersey’s electricity prices are associated significantly with natural gas prices, however, recent pricing trends in the wholesale market (i.e., lower costs for natural gas) have provided some relief, though the state’s electricity prices have remained consistently above the national average price.¹⁶⁵

The New England states, when taken together, exhibited similar properties as other states that have restructured (i.e., adopted retail energy choice), though the states in question—Connecticut, Massachusetts, New Hampshire, and Rhode Island—tended to use rate reductions and freezes rather than caps.^{oo, 166} Through the transition period, the regional average electric rate for small consumers decreased or stayed flat. At the end of the transition period, rates have tended to climb, with the occasional dip.¹⁶⁷ This was attributed to several factors, including the underlying price of natural gas and regional supply constraints: “Natural gas prices gradually increased over much of that period, and as the proportion of gas-fired generation in New England grows relative to power derived from other fuel, the relationship between the underlying price of the natural gas commodity and the

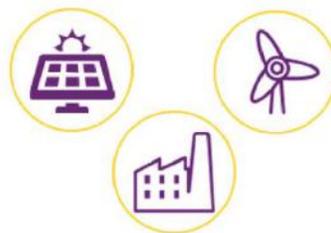
ⁿⁿ For example, one individual who switched from the Standard Offer Service provided by the incumbent utility, Delmarva Power, received a \$950 supply charge; this amount was three times that of the previous month, though the family had consumed less electricity. (Source: Aaron Nathans. “Electric Customers Feel Winter’s Costly Impact.” *News Journal*. March 3, 2014. Available: <https://www.delawareonline.com/story/money/2014/03/02/electric-customers-feel-winters-costly-impact/5955275/>.)

^{oo} Vermont did not restructure its electricity market, and Maine did not impose a rate cap, freeze, or reduction. (Source: Reishus Consulting, LLC. “Electric Restructuring in New England – A Look Back.” Prepared for New England States Committee on Electricity (NESCOE). December 21, 2015. Available: <http://nescoe.com/resource-center/restructuring-dec2015/>.)

resulting electricity supply price continues to strengthen....annual prices have been higher...in New England because of regional supply constraints that caused certain winter months to spike, pushing up the region’s rolling average price in the last few years.”¹⁶⁸

In the Midwest, all states that restructured encountered issues tied to wholesale electric prices, expiring rate caps, or both. Michigan’s retail electric structure has been described as “unique.”¹⁶⁹ In a state-commissioned survey of 26 questions regarding electric choice published in 2013, a joint response from Consumers Energy, DTE Energy, and MEGA (e.g., incumbent utilities) stated: “For most of the state, generation and distribution assets are owned by utilities and fully regulated by the MPSC [Michigan Public Service Commission], transmission assets are owned by stand-alone companies, and a limited portion of customers (10% of load) are able to obtain generation from alternative energy suppliers (AESs).”^{pp, 170}

However, no residential customers currently have access to retail choice, which is the result of a 2008 law that requires that “no more than 10 percent of an electric utility’s average weather-adjusted retail sales for the preceding calendar year may take service from an alternative electric supplier at any time.”¹⁷¹ The Michigan experience speaks to the vicious circle that can arise if the market is not restructured properly, as emblemized by rate caps, reductions, and management of stranded assets: in the short term, a rate reduction and price cap held prices low at the same time as energy costs were increasing.¹⁷² However, no electric choice structure developed, as retail suppliers could not compete with the regulated rates, which left ratepayers with no take-up option for choice.¹⁷³ The expiration of the rate caps resulted in increased electricity rates: residential customers of Edison [MEGA] were faced with a 12.5 percent increase in rates upon expiration of the cap, and residential customers of Consumers Energy, an incumbent utility, received a combined 9.8 increase in rates at the same time.¹⁷⁴ In addition, while both customers of the incumbent utilities and those who selected a competitive supplier initially were required to pay for stranded costs, later regulatory decisions incentivized switching by levying the costs only on those who remained with the utility.¹⁷⁵ Given that no retail electric market developed, consumers effectively subsidized restructuring that was nonexistent in practice.



^{pp} For the report on the 26 electric choice questions, see: Michigan Public Service Commission, Department of Licensing and Regulatory Affairs, and Michigan Energy Office. “Readying Michigan to Make Good Energy Decisions: Electric Choice.” November 20, 2013. Available: https://www.michigan.gov/documents/energy/electricc_report_440539_7.pdf.

A quasi-experimental analysis conducted on restructuring in Ohio found that residential customers did not experience rate decreases with the transition to a market-based model.^{qq, 176} The study found the following: “For most of Ohio’s residential retail load, prices have not declined since retail restructuring. For four of the seven metro areas in our study, retail restructuring resulted in higher month-to-month price trends than the trend that existed before restructuring. And while the other three territories of Cincinnati, Columbus and Dayton have seen month-to-month price trends decline or not change relative to pre-restructuring, households in those territories paid a higher real (inflation-adjusted) price, on average, in the period following restructuring than they did in the period preceding.”¹⁷⁷ Note that Ohio froze electric rates from 2001 through 2005.¹⁷⁸ And while the EIA data does not reflect fully all the contributing factors to retail electricity rates, it does provide a rough approximation of the trend once the freeze was lifted: all sectors experienced relatively flat electricity prices prior to restructuring and through the freeze, after which prices began to climb, perhaps most steeply for residential ratepayers.¹⁷⁹

The Illinois’ Citizens Utility Board expected the state’s consumers to see rate increases of 40 percent to 60 percent when its caps were eliminated.¹⁸⁰ The caps expired in 2007, leading to “rate shock” and soaring/surging prices, with customers experiencing double- and triple-digit increases in their electric bills in 2007.¹⁸¹ Residential customers of ComEd (a utility) witnessed a 26 to 56 percent increase in their bill between 2006 and 2007; large commercial and industrial customers saw their bills increase by 60 percent to 70 percent, though some large customers had increases of more than 100 percent.¹⁸² At Ameren, another utility, those increases were 49 percent to 125 percent for residential customers and 80 percent to 130 percent for large commercial and industrial customers.¹⁸³ The Illinois State Attorney General alleged that customers would pay an extra \$4.3 billion between 2007 and 2009 “because of manipulation of prices by wholesale suppliers (including affiliates of ComEd and Ameren) in the electricity auction used to set the utility rates under deregulation. The state’s complaint alleged that the deregulated generation affiliate of ComEd was charging the utility three times its actual cost to generate electricity to serve the utility’s customers.”¹⁸⁴ Eventually, the state brokered a deal to offer rate relief in the amount of \$1 billion to consumers, and rates decreased with surplus capacity in wholesale markets and low commodity prices.¹⁸⁵

^{qq} There is one potential limitation to this analysis, which is that the authors used a monthly publication of utility rates issued by the Public Utilities Commission of Ohio for the years 2004 through 2015, but this data captures the full bill with only Standard Offer Service and does not include bills for those who selected a retail supplier. While they acknowledge this potential problem, the authors assert that: (1) the generation portion is less than 50 percent of the total bill in Ohio, so consumers incur the same fees, regardless of generation supplier; and (2) competitive standards established in this time frame ensured that Standard Offer Service for generation better reflected market rates, which means that Standard Offer Service and retail supply service rates approximated one another closely. (*Source:* Noah Dormady, Ph.D., Zhongnan Jiang, and Matthew Hoyt. “Do Markets Make Good Commissioners? A Quasi-Experimental Analysis of Retail Electric Restructuring in Ohio.” John Glenn College of Public Affairs, The Ohio State University. February 11, 2017. Available: <http://glenn.osu.edu/research/policy/policypapers-attributes/Do-Markets-Make-Good-Commissioners.pdf>.)

Before moving westward with our examination of two additional states, Montana and Texas, it is important to note here that the problem is not necessarily with restructuring as a concept. The challenges, uncertainty, and volatility in rate behavior stem directly from market design. In some instances (e.g., Michigan), competition in electric energy suppliers did not thrive because there was no mechanism for retail suppliers to compete with the incumbent utility providing Standard Offer Service. Or, alternatively, as with Illinois, customers of the incumbent utility were penalized for not switching through an institutional scheme that helped facilitate market manipulation. In both cases, relational aspects became salient. Specifically, how the states implemented restructuring mattered for the variations in pricing offered by the incumbent utility versus retail suppliers. It is this relationship that can come to define the “success” or “failure” of restructuring. As we shall discuss shortly, Texas devised a solution to the problem, though that state has not been without its share of restructuring-related difficulties.

Moreover, while supporters of retail choice in Nevada and elsewhere emphasize the benefits it provides to consumers, our analysis indicates, somewhat ironically, that residential customers, in particular, have tended to remain with the incumbent utility. The reasons for the lack of residential customer switching are many:

- 1) With the exception of Texas, which has required customers in restructured areas to select a retail supplier upon expiration of the “Price to Beat” cap/floor, all states that have transitioned to a competitive retail market have permitted its ratepayers to remain with the incumbent utility; and
- 2) the above means that some consumers either are unaware that they can switch; did not switch because of familiarity with incumbent utility; did not switch because of better rates at the incumbent utility (i.e., in those states where competition has been impeded); have switched but ultimately decided to return to the incumbent utility; or could not switch due to a lack of creditworthiness, which translated into competitive suppliers being unwilling to “do business” with these individuals and the incumbent utility, in turn, charging higher prices to offset potential losses that may result from taking on non-creditworthy customers.^{rr, 186}

Figure 8A replicates a graph from a study on retail electric choice that depicts the percentage of eligible residential customers that have switched to a competitive supplier; as the authors note, it does not capture megawatt hour sales.¹⁸⁷ Excluding Texas, due to its mandate that ratepayers switch, approximately one-third of all eligible residential customers have switched to competitive suppliers.¹⁸⁸ “Overall, 16% of the total electrical energy sold in the U.S. in 2014 was sold by competitive retail energy suppliers.”¹⁸⁹

^{rr} “[Texas] requires retail choice program participation by all customers served by investor-owned utilities in the footprint of the Electric Reliability Council of Texas.” *Source*: Mathew J. Morey and Laurence D. Kirsch (Christensen Associates Energy Consulting LLC). 2016. “Retail Choice in Electricity: What Have We Learned in 20 Years?” Prepared for Electric Markets Research Foundation. Page 4. Available: [https://sites.hks.harvard.edu/hepg/Papers/2016/Retail Choice in Electricity for EMRF Final.pdf](https://sites.hks.harvard.edu/hepg/Papers/2016/Retail%20Choice%20in%20Electricity%20for%20EMRF%20Final.pdf).

Figure 8B presents a replication from the same study but for commercial and industrial (C&I) loads.¹⁹⁰ It is not directly comparable to Figure 8A, as that computed data on percentage of eligible customers, while Figure 8B computes the percent of loads. Regardless, each provides an approximation of the rates of competitive electric service take-up, by state. A comparison of Figure 8A and 8B indicates that C&I customers tend to adopt retail electric choice at higher rates than their residential counterparts. For example, in Illinois, where the gap is narrowest, the C&I switching rate is about 77 percent, while residential take-up is about 60 percent; the widest gap is in the District of Columbia, with a C&I switching rate of around 62 percent and residential take-up of approximately 14 percent. As the study notes, the benefits for C&I customers outweigh the costs, but the equation is reversed for residential customers.¹⁹¹ This report addresses more specific reasons for the discrepancy in Section IV, with respect to consumer impact.

Figure 8A. Residential Customers Taking Competitive Electric as Shares of Eligible Customers, 2014

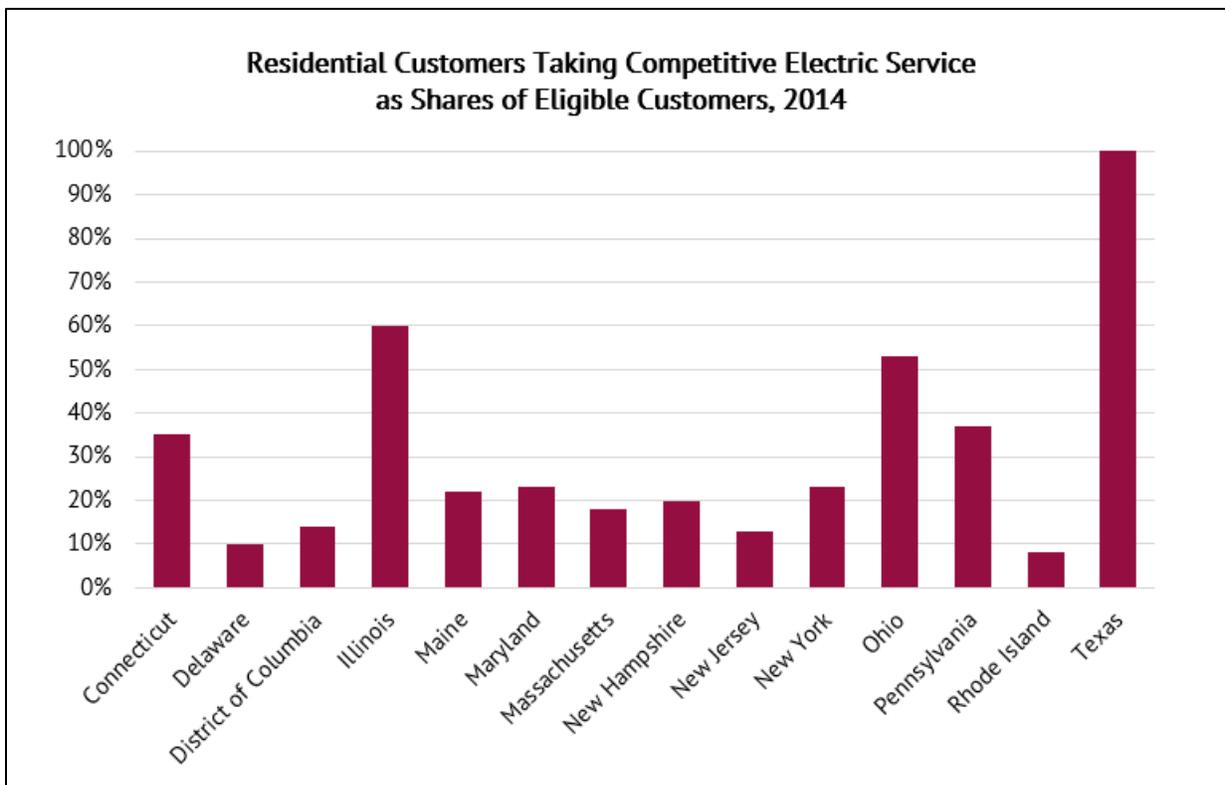
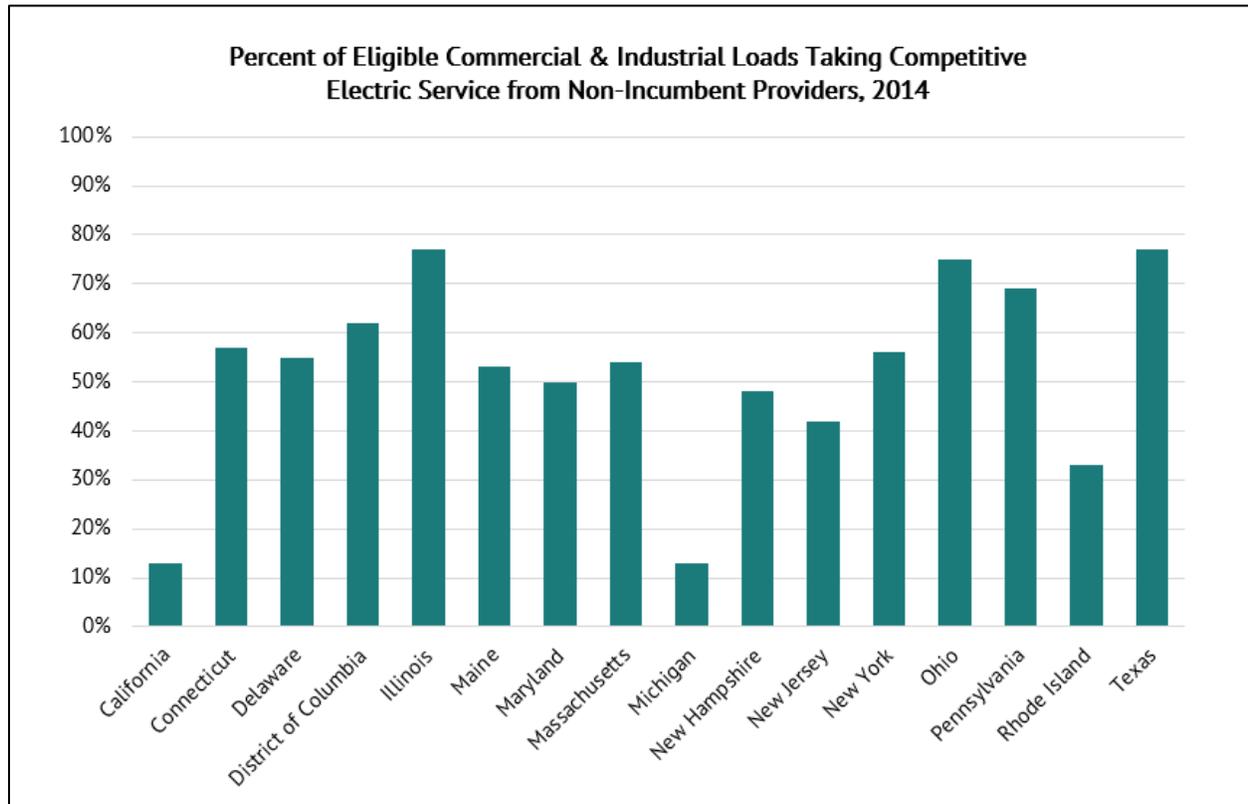


Figure 8B. Percent of Eligible Commercial & Industrial Loads Taking Competitive Electric Service from Non-Incumbent Providers, 2014



Returning to state-specific outcomes, Montana is the cautionary tale of restructuring. Assets were sold for \$2.7 billion, with large fees assessed by Goldman Sachs.¹⁹² The utility sold its generation assets to a company that eventually filed for bankruptcy protection, contributing to “skyrocketing electricity rates.”¹⁹³ The state had instituted rate caps for an initial two years and an additional two years for those who did not have access to retail choice at the end of the transition period.¹⁹⁴ The first rate caps expired in 2000, right as California began to experience its energy crisis, which caused wholesale prices to increase throughout many western states, including Montana.¹⁹⁵ The final set of rate caps expired in 2002, and rates increased.¹⁹⁶ At first, large customers bore the brunt of wholesale market exposure, particularly in 2001, but the combination of expiring caps and wholesale price increases resulted in “significant cost increases for...electricity” across all ratepayer types.¹⁹⁷ The state repealed retail electric choice in 2007 for all but those with loads of five or more megawatts.¹⁹⁸

Texas, unlike Montana, is considered by supporters of retail electric choice as the gold standard for restructuring. Its use of the “Price to Beat” model, which allowed retail suppliers to compete with incumbent utilities during the initial phase of the process, helped smooth the transition. And currently, as noted previously, Texans must choose a competitive supplier; there is no option for Standard Offer Service (SOS), which means that incumbent utilities and retail suppliers are not in a push-pull for consumers. In fact, residents in restructured areas do not have a default option unless their retail supplier cannot continue service, in which case the Public Utility Commission of Texas

supplies these customers with a temporary “safety net” through a Commission-designated provider.¹⁹⁹ With respect to the generation component of electricity delivery, retail suppliers compete on their own merits with a variety of product offerings and prices. Utilities continue to provide the wires service.

One report on restructuring in Texas found that, while residential customers in competitive areas paid higher average prices for electricity than those in non-competitive areas, for the period January 2002 through December 2016, residential prices declined in competitive areas and increased in non-competitive areas over the same time frame.²⁰⁰ However, a competing report observes that restructuring has led to higher prices and more volatility in competitive areas of the state, relative to non-competitive areas.²⁰¹ It states, “...prices in the deregulated areas steadily climbed as natural gas prices rose in the mid-2000s. From 2002 to 2006, the price to beat rose 88% and the competitive offers rose 62%. In contrast, rates in regulated areas of Texas rose only 24% during this period. For over a decade, deregulated areas of Texas have consistently paid more for electricity than regulated areas of the state. And prices are more volatile in deregulated areas.”²⁰² The report points to another troubling problem in Texas, which is the issue around stranded costs:

Estimates of stranded costs were calculated at various points during the transition to deregulation in order to provide for early mitigation and recovery, as applicable. Due to fluctuating market conditions over time and regulatory decisions, estimates of stranded costs ranged from negative \$2 billion (during periods of high natural gas prices making higher-cost plants more economical) to more than \$6.5 billion. By the time the issue was fully litigated, the total amount customers will pay amounted to more than **\$9.5 billion**. Even though customers are on the hook for this amount, private equity investors resold the assets at a significant profit under better market conditions. While the state’s policy was well-intended, it did not adequately anticipate the rapidly changing market conditions. This experience has been costly for businesses and residents of Texas, and underscores the complexities and trade-offs of deregulation.²⁰³

Recently, an article in the *Houston Chronicle* reported that, “Consumers...are in for a shock as retail prices have soared in anticipation of hot weather, potential power shortages and spikes in wholesale electricity prices.”²⁰⁴ “The increase in retail rates come as companies prepare for surging prices in the wholesale electricity markets where they buy their power. Forecasts of higher than normal temperatures and record power demand are coinciding with the shutdown of at least three coal-fired plants, leading to concerns that temporary shortages on the hottest summer days could send wholesale prices, which typically average less than \$50 per megawatt hour, spiking to \$3,000 per megawatt hour or higher.”²⁰⁵ Consumers who signed up with teaser rates, were on variable-rate contracts, and even one-year fixed rates are all vulnerable to price fluctuations (the latter increasing by 20 percent in the last year) ^{ss, 206} Thus, even Texas, which the ABACCUS report touted as “the

^{ss} Variable-rate plans fluctuate with the market, allowing some consumers to realize cost savings when the market price decreases but can increase under certain conditions, such as extreme heat or cold, leading to uncertainty. Fixed-rate plans do not change over the terms of the contract, which can ensure certainty but do not allow the consumer to take exploit advantageous conditions, such as when market prices decrease. See, for example: Eisenbach Consulting, LLC. “Variable vs. Fixed Rate Electricity Plans.” *Electric Choice*. April 14, 2015. Available: <https://www.electricchoice.com/blog/fixed-variable-electricity-plans/>.

competitive residential electricity market leader for the eighth consecutive year” in 2015, is not invulnerable to volatility in the market. One report cited previously contended that the market is most efficient when retail electric rates approximate wholesale electricity costs.²⁰⁷ That would suggest that the Texas market is working as designed, but both the upside and the downside for consumers is the exposure to market fluctuations in wholesale electric costs.

Lastly, we conclude this sub-section with a discussion of macro-level effects on consumers. Reports from official bodies in several states have found that retail electric choice has contributed to aggregate losses in consumer savings. The New York Public Service Commission conducted a 30-month study ending in June 2016 and found that consumers who switched to a competitive supplier, rather than remaining with the local utility, paid more than \$820 million more for electricity and gas than had they remained.^{tt} ²⁰⁸ The Office of Consumer Counsel in Connecticut found that that state’s consumers paid approximately \$58 million more by using retail suppliers in 2015 than had they retained default service options with the local utility.²⁰⁹ In Rhode Island, a report on the docket of its Public Utilities Commission indicated that, over the period 2013 to 2017, default service costs were \$56 million less for Rhode Islanders, versus those who chose competitive suppliers.²¹⁰ And a report commissioned by the Massachusetts Attorney General’s Office showed “that Massachusetts consumers in the competitive supply market paid \$176.8 million more than they would have paid if they had received electric supply from their electric company during the two-year period from July 2015 to June 2017.”²¹¹ Pursuant to that report, in March of 2018, Massachusetts Attorney General Maura Healey called for an end to residential retail electric choice in the state.²¹²

Note that these reports have been criticized by supporters of retail electric choice, particularly with respect to Standard Offer Service (SOS). For example, with respect to the Massachusetts case, Jon Wellinghoff, a former chair of the Federal Energy Regulatory Commission and a consultant to ECI (Yes on Question 3) said that “the Massachusetts experience will not apply in Nevada. The incumbent utility in Massachusetts was allowed to compete with REPs and that gave its ‘monopoly distribution service’ undue leverage....And Nevada’s as yet unwritten market rules will put stronger consumer protection laws in place and provide greater market transparency.”²¹³ Similarly, the Retail Energy Supply Association (RESA) has taken exception to the Massachusetts report:

RESA criticized the move saying that the **two-year timeframe considered in the report incorporates “two periods of steep basic service rate declines and ignores the period of sharp basic service rate increases prior to July of 2015,”** disregarding rational consumer behavior before that period. The association also said that the report does not consider the differences in types of product offerings from competitive suppliers or the reason why customers opted for a product. RESA presented an analysis on May 8 saying that suppliers could have saved residential customers nearly \$93 million in the first four months of 2018 if customers switched to the lowest available rate.²¹⁴

^{tt} New York offers retail electric and gas choice. Source: New York State. “NYS Power To Choose: About.” Available: <http://documents.dps.ny.gov/PTC/home/home>. | “Remaining with the local utility” refers generally to Standard Offer Service (SOS), discussed in Section IV.

Renewable Energy

Text Box 2. Renewable Energy Arguments (from Official Websites)²¹⁵

YES on 3: “Energy choice will expand Nevada’s clean energy options.”

NO on 3: “Threatens Nevada’s progress toward a clean energy future.”

Restructuring and Renewable Energy: Is There a Relationship?

As of 2016, Nevada’s utility-scale net electricity generation from geothermal energy ranked second in the nation, and its utility-scale net generation from solar energy ranked fourth in the nation.²¹⁶ However, approximately 88 percent of the fuels Nevada consumes come from out of state.²¹⁷

Question 3: The Energy Choice Initiative does not explicitly require that more renewables are integrated onto the grid.²¹⁸ But, would restructuring promote increased renewables or hinder their development? An exhibit which accompanied testimony before the Governor’s Committee on Energy Choice (CEC) indicated that, “Customer choice will not, and was not intended to, by itself guarantee more clean energy or the resulting economic benefits.”²¹⁹ A post written to inform companies about renewable energy procurement stated, “The value proposition associated with large-scale renewable energy projects – lower costs, reduced future price risk, lower GHG [greenhouse gases] and other strategic benefits – is available, no matter the regulatory regime for your organization’s U.S. footprint.”²²⁰

According to the industry experts with whom the Guinn Center spoke, neither a restructured model with retail electric choice nor the current vertically integrated utility structure provides unequivocally a more optimal pathway to delivering more renewable energy onto the grid.²²¹ In fact, these experts assert, there is no correlation between restructuring, or lack thereof, and increased renewables: the type of market model has no bearing on increased renewable energy.²²² If one of the primary objectives is to increase renewables consumption in Nevada, that is possible under both retail electric choice and a vertically integrated utility, though one expert stated that a competitive retail market would be more “nimble” in the context of rapidly advancing energy technologies.²²³ And neither the adoption of the former nor the retention of the latter would undermine that goal.²²⁴ However, recent data suggests that corporations in wholesale markets have been able to access renewables.²²⁵

There are several mechanisms that promote clean energy, including policy measures, such as increasing the RPS, and investments that would enhance the existing infrastructure. Neither of these is related, specifically, to restructuring.

Renewable Portfolio Standard (RPS)

Nevada has a Renewable Portfolio Standard (RPS) which “establishes the percentage of electricity sold by an electric utility to retail customers that must come from renewable sources.”²²⁶ Pursuant to *Nevada Revised Statutes* (NRS) 704.7821, the percentage of renewable energy must reach 25 percent

in 2025.^{uu, 227} According to Nevada’s *2017 Status of Energy Report*, the state RPS mandate was 20 percent 2017, and NV Energy “was on course to easily surpass that standard” for the year, with an actual RPS of 41 percent.²²⁸

In interviews with the Guinn Center, the vast majority of industry experts stated that the most significant factor in increasing renewables is the RPS.²²⁹ As the RPS, which mandates compliance, increases, the greater the percentage of renewables that must be sold to consumers; this would be true under retail electric choice or the vertically integrated utility.²³⁰ The RPS effectively compels an entity to invest in renewable development across the three major components of electricity delivery (e.g., generation, transmission, distribution) to meet the standard.

However, as another industry expert shared, given that the RPS is considered the most robust institutional tool to promote renewables, it is possible that a vertically integrated utility would serve that end more efficiently.²³¹ A single entity might have the financial resources to execute 30-year PPAs, a willingness and/or interest in investment, and the ability to exploit economies of scale.²³² And because there would be only one major utility and one regulatory body, renewable projects could be approved and fossil fuel generation could be retired in accordance with new installations cost-effectively and in a timely fashion.²³³ In other words, the RPS, as a regulatory matter, and a vertically integrated utility, by virtue of its structure, are consonant with one another.

Amanda Levin, a representative from the Natural Resources Defense Council (NRDC), a non-profit environmental advocacy group, presented evidence to the CEC showing that many states that have restructured did so in concert with increasing their RPS.²³⁴ She asserted, “In the last two years, there have been ten significant increases to Renewable Portfolio Standards, and seven of those are restructured states: New York, Michigan (which has limited access to retail choice), Maryland, Rhode Island, Illinois, Massachusetts, and Washington, D.C. The three states that are not restructured were California, Oregon, and Hawaii. So not only was restructuring interconnected with retail choice, but, in fact, these retail choice states have continued to increase their Renewable Portfolio Standards and expand upon them in the last two years, much more so than other states.”²³⁵ That said, one industry expert indicated that the relationship between restructuring and the RPS is not clear-cut: the increased RPS in retail electric choice states did not result from a policy choice regarding market design or for regulatory reasons but rather constituted a political bargain to garner support for restructuring from environmental advocacy groups.²³⁶

^{uu} On July 13, 2018, the Nevada Secretary of State announced that the Renewable Energy Promotion Initiative (Question 6) qualified for consideration by voters at the November 6, 2018, General Election. If a majority of voters approve Question 6, Nevada would be required to double its Renewable Portfolio Standard from 25 percent by 2025 to 50 percent by 2030. (Source: Associated Press. “Renewable Energy Ballot Measure Qualifies for Nevada Ballot.” *Reno Gazette Journal*. July 13, 2018. Available: <https://www.rgj.com/story/news/politics/2018/07/13/renewable-energy-ballot-measure-qualifies-nevada-ballot/783390002/>.)

The Auction Process, RPS, and Renewable Energy Credits

One argument for the possible relationship between retail electric choice and the promotion of renewables is that, as a theoretical matter, customers would not be locked in to local generation or whatever power source the utility selects; that is, customers could choose renewable options.²³⁷

But, here we refer to the previous discussion in Section II regarding the role of independent power producers (IPPs) in the wholesale electric market and competitive suppliers as brokers between that market in the retail electric market. Competitive suppliers do not produce energy themselves but merely purchase it from the IPPs. It is up to the IPPs to supply the actual energy. Renewable energy may not be available from the generation assets participating in the auction process, or the ISO operator may not select renewables in establishing the clearing price, where the “cost of the very last generating plant needed to supply power in a given hour sets the system cost”; once that is set, the system operator tells generators if they are not needed.²³⁸

The relevance for this discussion of retail electric choice is that if there is enforced compliance with an RPS, but there are insufficient generation assets to meet those requirements and/or the ISO does not select bids from renewable producers to satisfy the requirements in a choice context, then competitive suppliers must purchase Renewable Energy Credits (RECs). “RECs are the environmental value of renewable generation and can be bought and sold on a market. RECs do not need to be tied with consumption of the actual renewable generation” and “[m]ost restructured states used RECs...and Alternative Compliance Payments (ACP) to meet RPS requirements.”²³⁹ A report issued by the National Renewable Energy Laboratory (NREL) states that, “Unbundled RECs remain the largest source of green power sales.”²⁴⁰

The argument that retail electric choice will result in the integration of more renewables on the grid is flawed insofar that it does not account for the RPS and the auction process in organized wholesale markets:

- 1) The presence of competitive suppliers operating in a retail choice market cannot alone deliver more renewable energy onto the grid, as the burden falls more heavily to the IPPs and the ISO.
- 2) RECs are paper transactions only, so while a competitive supplier may promise a contract with 100 percent renewables, it does not follow that consumption of renewable generation will be actualized, as these suppliers cannot control transactions in the wholesale electric market, and they do not own generation assets themselves: a “100 Percent Renewable” contract means only that the supplier complies with that service offering by committing to

²⁴⁰ An explanation (i.e., RECs, simplified): “Joe’s Solar puts a 5 kilowatt system on your roof and sells you the electricity under a power purchase agreement. Because Joe owns the panels, he gets credit – in the form of RECs – for the 7000 kilowatt-hours (kWh) of renewable electricity it produces each year. Meanwhile, Bob’s all-fossil utility wants to ‘green up’ so it buys the RECs from Joe to match with its coal or gas-fired generation. Then Bob can claim that 7000 kWh of its power is renewable.” (*Source*: Severin Borenstein. “Double Counting Virtue.” *Energy Institute Blog*. Energy Institute at Haas, University of California, Berkeley. January 11, 2016. Available: <https://energyathaas.wordpress.com/2016/01/11/double-counting-virtue/>.)

the purchase of RECs.²⁴¹ From a technical standpoint, “The renewable energy attributes are separate from the physical electricity, which becomes indistinguishable and untraceable once it is placed on the grid. As a result, the use of specified renewable energy sources can only be determined contractually...[.]”²⁴²

- 3) Some industry experts argued that a relatively high RPS could act as a deterrent to market entry or lead to market exit by competitive suppliers if the costs of energy, coupled with the obligation to purchase RECs, is cost-prohibitive.²⁴³

Energy Infrastructure: Prospects and Challenges

If the onus for increased renewable energy development is placed on the IPPs in a restructured market, then Nevada could be confronted with a collective action problem. What kind of incentives would the market offer for the construction of clean energy generation assets? Why would any single producer absorb these concentrated costs while pursuing profit-maximizing ends? How would an increased RPS interact with those decisions? Could the Nevada Legislature mandate a specific amount of renewable energy generation from IPPs? These questions largely remain unanswered at the time of this writing, but Pennsylvania may provide some insight into the process.

In 2004, Pennsylvania Governor Edward Rendell signed the Alternative Energy Portfolio Standards Act into law.²⁴⁴ It mandated “that electric distribution companies [utilities] and electric generation suppliers [IPPs] include a specific percentage of electricity from alternative resources in the generation that they sell to Pennsylvania customers.”²⁴⁵ Specifically, the law requires that approved renewable or alternative sources provide 18 percent of electricity sold by 2021.²⁴⁶ The state had begun allowing full retail access for all customers as of January 1, 2000.²⁴⁷ This means that Pennsylvania established its RPS during the initial phase of restructuring.

Since that time, the state has witnessed growth in wind farms and solar facilities, and that generation largely has been self-financed:²⁴⁸

The 15,000 megawatts of new generation in Pennsylvania was built entirely with private investment of approximately \$15 billion. That large investment was made without any contribution from or risk to utility ratepayers. The companies and their shareholders building the new generation took all the risk of the investment. This shifting of risk from captured utility ratepayers to shareholders is an enormous benefit to utility customers.²⁴⁹

In Nevada, new renewable generation assets may come online irrespective of whether Question 3: The Energy Choice Initiative passes in November 2018 or not. Switch, a technology infrastructure corporation, which is headquartered in Las Vegas, announced the planned construction “of the single largest solar project portfolio in the United States.”²⁵⁰ It would do so in partnership with Capital Dynamics, a global asset manager, and the project would supply one gigawatt (gW) of solar generation via projects to be built in northern and southern Nevada.²⁵¹

NV Energy’s “2018 Joint IRP [integrated resource plan],” which has a 20-year planning horizon (i.e., 2019-2038), would add “1,001 megawatts of new, solar generating facilities....The plan contains [six]

projects located in Clark, Humboldt and Washoe counties.”^{ww, 252} As 1,000 megawatts (mW) is the equivalent of one gW, NV Energy intends to construct the equivalent amount of solar generation as Switch. Moreover, the 2018 Joint IRP “proposes approximately \$20 million of investment to bring the output of new solar PV [photovoltaic] facilities to customers. In addition, the plan proposes to expand grid improvement efforts by upgrading 230 kilovolt-transmission facilities at a cost of \$720 thousand.”²⁵³ However, were Question 3 to pass, NV Energy would not develop the expanded renewable energy projects but would only execute a limited, RPS-compliance plan only to meet Nevadans’ needs through 2023.²⁵⁴

The issue of generation assets, at least in the short term, appears to be settled: new renewable energies could be supplied regardless of the regulatory framework, reinforcing the assertion that restructuring is not associated, on its own, with increased renewables.

Organized Wholesale Markets/ISOs and the Resource Mix

However, restructuring would add one additional layer of uncertainty to the renewables question. As noted earlier, a precondition for the establishment of retail electric choice is participation in a preexisting organized wholesale market or the adoption of a new one. The vertically integrated utility, in which the supply chain is managed by a single entity (NV Energy) and regulated by a single body (the PUCN), provides certainty around generation assets, future plans, and the ability to meet demand with supply. These subjects are addressed in NV Energy’s 2018 Joint IRP.²⁵⁵ If Question 3 were to pass, the Nevada Legislature would need to decide whether to participate in an established ISO or form its own. Were Nevada to join an ISO, its generation assets would be commingled with those of other members through regionalization.²⁵⁶ The ISO selection decision, then, contributes to the uncertainty around renewable energy deployment, as ISOs’ fuel portfolios can vary widely.

Based on testimony before the CEC, it seems that the two most likely options for membership are the California Independent System Operator (CAISO) or the Southwest Power Pool (SPP).^{xx, 257} The Southwest Power Pool member states are: Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.²⁵⁸

To provide a comparison of resource mixes in the potential organized wholesale markets, the Guinn Center retrieved data from EIA on net generation in Nevada (as the current baseline), California, and the SPP states. Net generation is defined as: “The amount of gross generation less the electrical energy consumed at the generating station(s) for station service or auxiliaries.”²⁵⁹

While net generation is not equivalent to consumption, and it does not capture precisely how the mixing of fuels within organized wholesale markets would translate to the end-use customer, it is a rough approximation of the fuel portfolio prospects that lawmakers would need to consider, should

^{ww} NV Energy’s IRP is a triennial “plan to increase its supply of electricity or decrease its demand,” as required by Nevada Revised Statutes. § 704.741. See: Public Utilities Commission of Nevada. n.d. “Integrated Resource Plan Integrated Resource Plan (‘IRP’).” Slide 2 of 14. Available: http://www.sec.nv.gov/docs/puc_presentation_090707.pdf.

^{xx} Section IV discusses possibilities for organized market establishment and/or participation, and, where relevant, potential costs and time frames therein.

Question 3: The Energy Choice Initiative pass in November 2018. Figure 9 displays net generation in Nevada for 2017, with energy sources computed as a percentage of the total; Figure 10A provides a similar depiction for California (as a proxy) for CAISO; and Figure 10B represents an aggregation of energy sources by SPP member states and then calculated as a percentage of the total.²⁶⁰

As the pie charts show, there is considerable variation in fuel portfolios. Nevada generates a substantial amount of natural gas (70.2 percent) and a lesser, though not insignificant quantity of renewables (20.2 percent). The resource mix differs considerably across California and the SPP states: less than half of California’s net generation comes from natural gas (42.7 percent) and under one-third from renewable energy (27.1 percent); in the SPP states, coal dominates generation (39.6 percent), followed by natural gas (30.0 percent), and then renewable energy (16.6 percent).

The Nevada Independent conducted an interview with Michael Brune, the executive director of the Sierra Club, an environmental organization, and Brian Beffort, the Sierra Club’s Toiyabe Chapter director, and a question posed by the news website explicates the regionalization conundrum: “The argument that is made on the solar side is it will help balance the West’s resources and sort of distribute the energy out. But there’s also the argument that’s made that if you bring in states that have a more coal dominant portfolio, you’re diluting the [renewable portfolio standards] that you have in California or Nevada.”²⁶¹ Some reports have pointed to potential tensions between state-level mandates, such as variations in RPS and the authority of the ISO and/or FERC, observing that there is an underlying question of balance between state prerogatives and the imperatives of a centralized coordination regulatory apparatus that remains unresolved.²⁶²

Thus, the choice of organized wholesale market may shape the Silver State’s prospects for its renewable energy future under retail electric choice, particularly as legislators would have to evaluate the complementarities (or lack thereof) that a preexisting ISO might offer.

Figure 9. Net Generation: Nevada, 2017

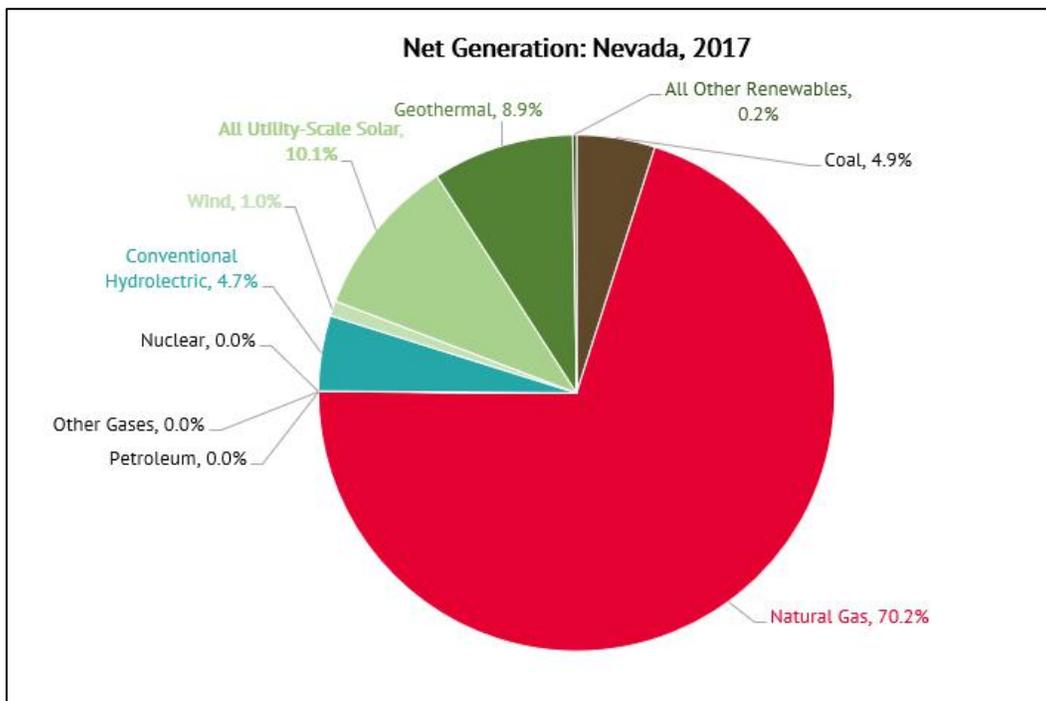


Figure 10A. Net Generation: California, 2017

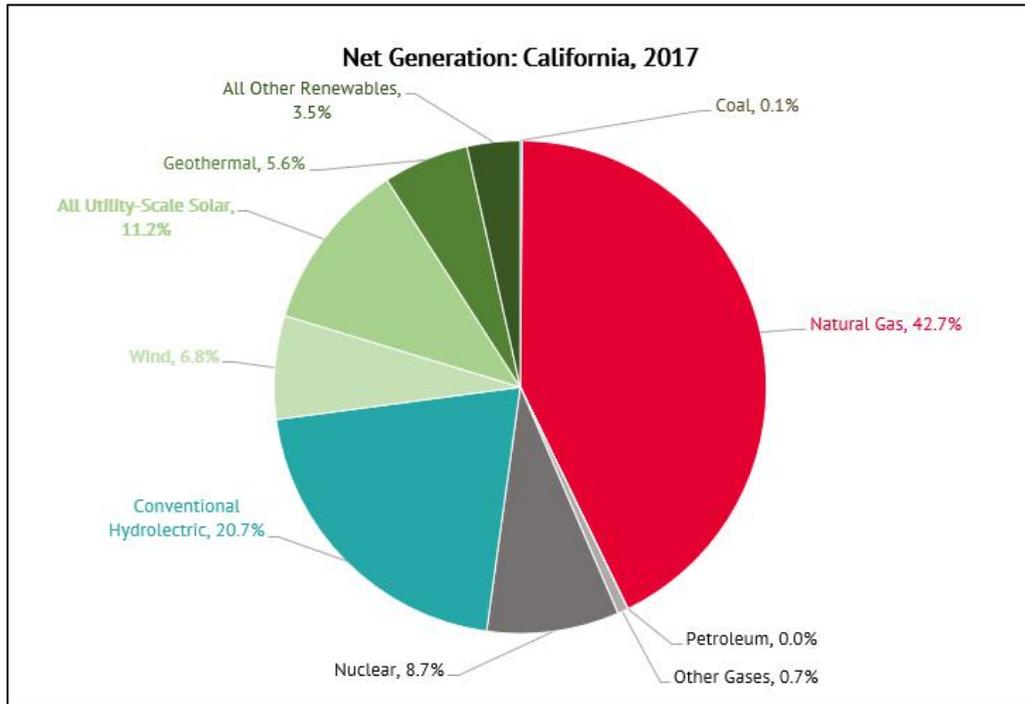
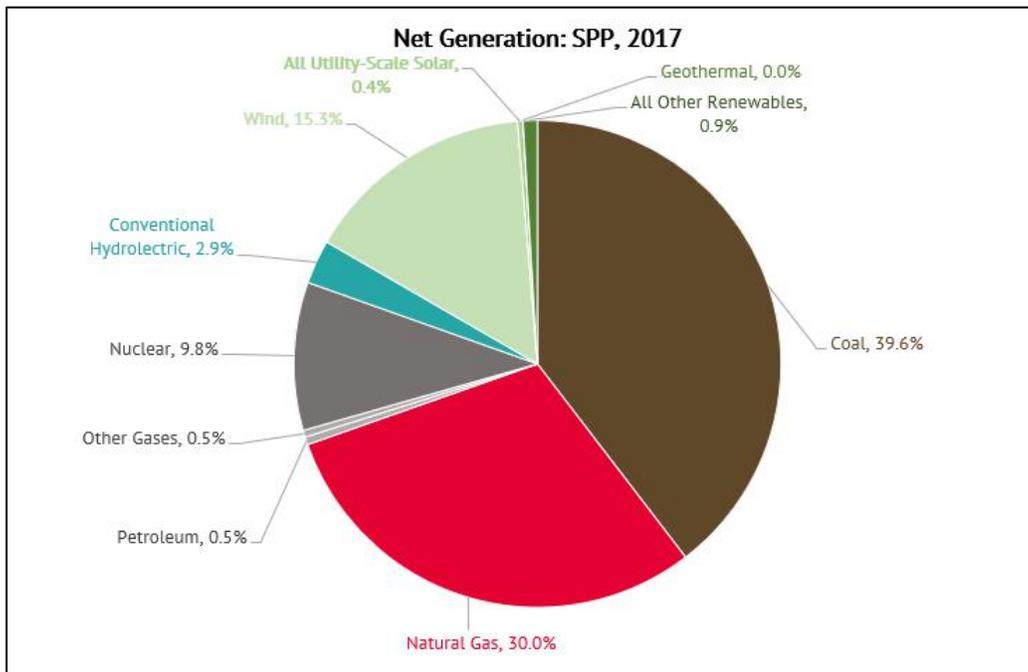


Figure 10B. Net Generation: SPP, 2017



IV. Additional Issues Related to Restructuring

This section addresses four additional issues associated with retail electric choice: organized wholesale markets (ISO creation or participation), divestiture/stranded assets, consumer impact, and implementation.

The organized wholesale markets sub-section (ISO creation or participation) discusses three options for Nevada, were Question 3: The Energy Choice Initiative to pass in November 2018 by a majority of registered Nevada voters. As testimony before the Governor's Committee on Energy Choice (CEC) suggests, the two most likely options for participation are the Southwest Power Pool (SPP) or the California Independent System Operator (CAISO). Alternatively, Nevada could establish its own independent system operator (ISO). Costs, time frames, and institutional dimensions vary with each option, and these are documented here, where available.

Divestiture and the related issue of stranded assets are addressed in the second sub-section. As we have noted previously and do so again here, the ballot initiative does not mandate divestiture, but many observers view this as a necessary outcome of restructuring. The incumbent utility's assets become "stranded" by virtue of divestiture and may be sold for a loss or a gain, which can translate into stranded costs or negative stranded costs (i.e., stranded benefits), respectively. Research reveals that retail electric choice states have encountered both stranded costs and stranded benefits, though many of these states were unable to forecast the amounts accurately in advance of the restructuring process. Current estimates for potential restructuring in Nevada range from \$6.7 billion in stranded costs to \$1.1 billion in stranded benefits. Any stranded costs likely would be borne by ratepayers in the form of a competitive transition charge (CTC), while stranded benefits could be passed on to ratepayers through rebates. We stress that these are estimates only that are subject to change through a valuation and asset purchase process.

In the consumer impact sub-section, we begin with a discussion of large commercial and industrial customers, as the distinction between these ratepayers and residential/small commercial customers illuminates the difficulties often faced by the latter in a restructured market. Residential and small commercial ratepayers typically are not knowledgeable about the intricacies of electricity procurement, and, as evidence from other states shows, this has contributed to market manipulation and customer exploitation. We close the sub-section with a description of Nevada's current institutional capacity for managing customer issues related to their electric bills.

The implementation sub-section examines experiences in other states with development of a competitive retail electric market. Here, we find that many states encountered implementation challenges, as enabling legislation and initial regulatory orders either contributed to adverse outcomes or could not anticipate unintended consequences, necessitating additional policy and/or regulatory interventions as corrective actions. The sub-section concludes with a discussion of the ballot initiative as a constitutional amendment, noting that if Question 3: The Energy Choice Initiative were to pass in November 2018, Nevada would be the only state to have used a constitutional remedy to restructure its electricity market. The implications of this procedural choice also are considered.

Organized Wholesale Markets (ISO Creation or Participation)

Testimony before the CEC suggests that Nevada currently has three options with regard to organized wholesale markets. In certain cases, preliminary estimates and time frames have been provided, but given that they are estimates only, there is no certainty as to the fiscal impact to Nevadans, who, based on the experiences of other states, are likely to bear the costs.²⁶³

The first option for the Silver State is creation of its own organized wholesale market as an ISO (e.g., NV-ISO). NV Energy projected an initial cost of about \$100 million in testimony before the Legislative Committee on Energy on April 18, 2018.²⁶⁴ Given that organized wholesale market participation is a prerequisite for the creation of a competitive retail choice market, it may be inferred that such a market would need to be established by July 1, 2023, pursuant to the ballot initiative.²⁶⁵

Second, Nevada could join the Southwest Power Pool (SPP). However, a potential problem with SPP is feasibility, as there is no direct transmission capacity between the SPP and the Nevada market, and it might take 10 years to build capacity.²⁶⁶ That said, "...there are transmission facilities that go from Nevada through other states so fiscally we are connected."²⁶⁷ An industry expert confirmed to the Guinn Center that "the 10-year infrastructure projection would be a good estimate if existing transmission could not be utilized and new transmission had to be constructed."²⁶⁸ At the August 8, 2017, meeting of the CEC, Carl Monroe, SPP's Executive Vice President and Chief Operating Officer, responded to Nevada Attorney General Adam Laxalt's question regarding costs as follows: "...you can actually prepare an RFI [Request for Information] to request costs from us...so you have the information you need to make a decision."²⁶⁹ At the time of this writing, it is the Guinn Center's understanding that no RFI has been submitted by the CEC to SPP.

A third option for Nevada is participation in the California Independent System Operator (CAISO). The State could be expected to spend about \$250,000 to study the benefits of regionalization; less than \$500,000 for incremental implementation costs to incorporate the NV Energy system (presumably, the wires); and \$21-\$27 million annually on a Grid Management Charge (GMC).²⁷⁰ The foregoing comes with the caveat that all amounts are estimates only and are subject to change.²⁷¹ In particular, the GMC estimate "...does not include GMC costs to serve non-NV Energy related customers because the load data for such customers is not readily available to the ISO."²⁷² While this may be interpreted as reference to customers outside NV Energy's service territory, another possibility is that it cannot account for load data under retail electric choice as that is yet unknown. If NV Energy were to join CAISO, the scope of activities could take 24-26 months, but other factors "outside of the ISO's control" could affect the timeline.²⁷³ It is not clear whether restructuring would change the timing projections. Lastly, it should be noted that the California State Legislature currently is considering a bill (Assembly Bill [AB] 813) that would transform the ISO into a regional organization and thus engender a corresponding change in its governance.²⁷⁴ As one industry expert shared with the Guinn Center, the outcome of the bill might determine whether Nevada *could* join CAISO.²⁷⁵ AB 813 currently is in committee before the California State Assembly.²⁷⁶

Divestiture and Stranded Assets

As noted in Section II, the ECI ballot initiative petition does not require NV Energy to divest itself of generation assets. If Question 3 were to pass, the Nevada Legislature would need to determine whether divestiture should be mandated. Some states required utilities to divest, while others merely encouraged it.²⁷⁷ Citing data from 2004, one study found that utilities in all restructured states had divested their generation assets, at least in part (at that time, only Delaware, the District of Columbia, Maine, Massachusetts, New Hampshire, and Rhode Island were 100 percent divested).²⁷⁸

With divestiture comes the uncertainty of the cost of stranded assets. Stranded costs may be defined as, "...the decline in the value of electricity generating assets due to restructuring of the industry."²⁷⁹ In other words, when a vertically integrated utility is required to divest, that is, sell its generation assets and PPAs, it may take a loss (stranded costs) or sell at a premium (negative stranded costs or stranded benefits). In mathematical terms, it may be expressed as: *Book Value* (accounting value/regulator value) – *Market Value* (economic value/competitive value) = *Stranded Cost*.²⁸⁰ This means that projections may be made as to the book value of the assets, but they may not be realized at the time of the sale. External factors, such as the demand for natural gas, will play a significant role at the time of divestiture, as will the buyers' offer price for the purchase of assets that are effectively discounted by virtue of the legal requirement to divest.²⁸¹

Incumbent utilities typically have been permitted to recover these stranded costs through a competitive transition charge (CTC), which is assessed until all costs have been paid. Most states levied the CTC on all ratepayers as a fee on top of the wires service, regardless of whether the customer had remained with the incumbent utility or switched to competitive supplier. As discussed in Section III, though, Michigan briefly experimented with an incentive that allowed ratepayers who switched to retail supplier to avoid the CTC.

Why are incumbent utilities permitted to recover stranded costs? The answer lies in what is called the "regulatory compact":

...utilities in all restructuring states persuaded regulators that the implicit agreement between the regulator and the [vertically-integrated monopoly utility] IOU (commonly referred to as a 'regulatory compact') required that the utility be made whole for any lost asset value from restructuring. Nearly all the generation assets with market value below the IOU's remaining book value had been built with the approval, and in some cases mandate, of regulatory commissions, so it was generally concluded that to force restructuring without compensation for stranded assets would violate the regulatory compact. Most state restructuring schemes included a plan for 100% recovery by utilities of any stranded investment and the others aimed at nearly 100% recovery.²⁸²

We detailed several states' experiences with divestiture in Section III in the context of rate caps, freezes, and reductions, but we will reiterate some of the impact here, as well as add some data points; note that some states had multiple vertically integrated utilities prior to restructuring.

Texas's initial estimates of stranded costs ranged from negative \$2 billion to more than \$6.5 billion; after litigation, the total amount of stranded costs was \$9.5 billion.²⁸³ Montana sold its generation assets for \$118 million over book value (i.e., a negative stranded cost), though it filed a request to

recover about \$23.8 million from a PPA that it could not divest, which FERC denied.²⁸⁴ In New England, Connecticut's stranded costs were settled at \$1.4 billion; Massachusetts had an approved stranded cost recovery of approximately \$1.6 billion; and New Hampshire's stranded costs were \$688.1 million. At the high end is Pennsylvania: across its seven utilities, final stranded cost allowances amounted to about \$11.9 billion.²⁸⁵

Estimates of stranded assets have been provided for Nevada, though they diverge significantly. The PUCN estimates stranded costs in the amount of \$4.1 billion, based on a 37 percent decline in the net book value of NV Energy's generating assets by 2023, and additional capital investments, if permitted, which could offset some of those losses. The PUCN's projections are lower than NV Energy's of \$6.7 billion.²⁸⁶ Stranded costs could include: (1) generation assets, such as power plants sold at below the remaining book value; (2) PPAs, fuel contracts, transmission contracts, and service contracts; (3) outstanding regulatory assets; (4) computer/data/electronic information and technology programs/systems; and (5) costs to retire debt and equity capital.²⁸⁷

On the other hand, an analysis presented to accompany Public Comment to the CEC on May 9, 2018, prepared by Mark Garrett, of Garrett Group, LLC, showed negative stranded costs (i.e., stranded benefits) of just over \$1.1 billion.^{yy, 288}

The range between a stranded cost of \$4.1 billion and a stranded benefit of \$1.1 billion is not insubstantial, and, while both are possible, as is something in between, neither represents the actual valuation or what a given buyer is willing to pay at the time of divestiture. And that cannot be quantified until the time of divestiture itself. These are merely estimates, and as one report asserts, "the values of electric generation assets change over time with market conditions."²⁸⁹ The Texas case where projections were made for both stranded benefits and stranded costs but for which stranded costs actually exceeded the initial estimate—though the assets were resold for a profit under more optimal market conditions—should provide a cautionary tale.²⁹⁰ Estimates, by definition, are uncertain, and the actual value is contingent on fluctuations in the market. Regardless, Nevada's ratepayers likely would have to pay any stranded costs, possibly through a CTC, and the time frame for recovery and the possibility of rate caps add to the uncertainty.

^{yy} The ECI asked Mark Garrett to conduct an independent analysis of the impacts of the ECI. *Source*: State of Nevada, Governor's Committee on Energy Choice. "MINUTES: Testimony Before the Governor's Committee on Energy Choice." May 9, 2018. Available: http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/TaskForces/2017/CEC_Minutes_for_9_May_18_DRAFT.pdf.

Consumer Impact

Irrespective of market structure, the procurement of electricity exerts differential impacts across ratepayer classes.²² Large commercial and industrial (C&I) customers tend to enjoy lower rates, relative to their residential and small commercial counterparts, under both a traditionally regulated utility structure and retail electric choice.²⁹¹ As Figure 8B (Section III) indicated, in restructured states, C&I take-up of the competitive supply option far outpaces that of residential consumers. The reasons for this variation offer insight into the issues some residential ratepayers in restructured states have experienced when switching to retail suppliers.



²² Some clarification on ratepayer class is required for the discussion here, as “commercial” can have different meanings. Residential and small commercial customers typically are grouped together, as these classes have similar load shapes. Load shapes “refer to the varying amounts of electricity required over time.” (See: U.S. Department of Energy, U.S. Energy Information Administration. “Electric Grid Operators Forecast Load Shapes to Plan Electricity Supply.” July 22, 2016. Available: <https://www.eia.gov/todayinenergy/detail.php?id=27192>; note that load shapes tend to be more variable for smaller customers.) An additional reason for this sort of classification turns on level of understanding and sophistication with regard to their energy needs, which tends to be lower for residential and small commercial ratepayers. (Source: Paul Chernick, John T. Colgan, Rick Gilliam, Douglas Jester, and Mark LeBel. “Charge Without a Cause? Assessing Electric Utility Demand Charges on Small Consumers.” Electricity Rate Design Review Paper No. 1. July 18, 2016. Available: https://www.seia.org/sites/default/files/Charge Without a Cause - Final - 7-18-16_0.pdf.) Large commercial and industrial customers have relatively flat load structures. (Source: U.S. Department of Energy, Federal Energy Regulatory Commission. 2015. “Energy Primer: A Handbook of Energy Market Basics.” Page 43. Available: <https://www.ferc.gov/market-oversight/guide/energy-primer.pdf>.) And these ratepayers tend to have greater expertise in electricity procurement. (Source: Paul Chernick, John T. Colgan, Rick Gilliam, Douglas Jester, and Mark LeBel. “Charge Without a Cause? Assessing Electric Utility Demand Charges on Small Consumers.” Electricity Rate Design Review Paper No. 1. July 18, 2016. Available: https://www.seia.org/sites/default/files/Charge Without a Cause - Final - 7-18-16_0.pdf.) The distinction is important, and, as such, we will treat residential and small commercial customers as one class, and large commercial and industrial ratepayers as another (we refer to the latter as C&I and/or “large customers”).

One study suggests that residential ratepayers may be disadvantaged in a restructured market *because* of C&I customers, which are “cherry picked” by retail suppliers:^{aaa}

Alternative retail energy suppliers target larger customers first because of the large size of their loads relative to the transaction costs of serving them. Likewise, large electricity customers will seek the lowest available electricity prices. The result of customers being able to shift between the market and utilities that price according to cost of service is rent-shifting: when large electricity customers leave for lower market prices, the utilities’ fixed costs of service are borne by their remaining customers; and when large electricity customers return to the utility when market prices are high, the remaining customers share with the big guys the relatively low utility costs. For customers able to shift between the market and utilities, this is a heads-win, tails-you-lose proposition, for which the remaining customers are the losers.²⁹²

This is not a consensus finding in the literature on retail electric choice, however. Most analyses attribute the higher switching rates among C&I customers to informational asymmetries and enhanced capacity. They do not construe restructuring as a zero-sum game but rather view C&I customers and residential customers as operating differently in the market. Even the authors of the abovementioned quote observe simply that large customers, by virtue of their size, enjoy certain benefits, such as the ability to dedicate staff time to investigation of supplier options and energy consumption decisions and to manage financial risks in ways that are inaccessible to residential ratepayers.²⁹³ For example, some large customers may have the ability to hire an energy procurement specialist.²⁹⁴

This post summarizes the costs and benefits across ratepayer classes:

To date, the biggest customers happen to be the biggest fans of retail choice. Within retail choice states, roughly half of commercial and industrial demand has switched to competitive

^{aaa} The question of “cherry picking” is a thorny one and the subject of some disagreement. For example, in Michigan’s survey regarding electric choice published in 2013, a joint response from Consumers Energy, DTE Energy, and MEGA (the utilities) stated: “...that AESs [alternative electric suppliers] have ‘cherry picked’ the markets and served only the large commercial and industrial customers with favorable load factors and more attractive credit profiles.” (*Source*: Michigan Public Service Commission, Department of Licensing and Regulatory Affairs, and Michigan Energy Office. “Reaching Michigan to Make Good Energy Decisions: Electric Choice.” November 20, 2013. Page 16. Available: https://www.michigan.gov/documents/energy/electric_report_440539_7.pdf.) On the other hand, the Retail Energy Supply Association (RESA), which advocates for vibrant and sustainable competitive retail energy markets as a better alternative for consumers than monopoly-protected utility regulation, dismisses the idea of “cherry picking.” In a white paper, it notes that, “The assertion is that large commercial and industrial customers will reap the bulk of the benefits and that competitive suppliers will ‘cherry pick.’ However, the data show that prices for residential customers in competitive retail markets have been on a favorable track alongside the benefits that have accrued to C&I customers. While percentage changes in price differ among the customer classes in both the monopoly and choice states, this is due in part to the greater volumes and more constant demand characteristics of larger customers.” (*Source*: Philip R. O’Connor, Ph.D. 2017. “Restructuring Recharged: The Superior Performance of Competitive Electricity Markets 2008-2016.” Retail Energy Supply Association. Page 17. Available: https://www.resausa.org/sites/default/files/RESA_Restructuring_Recharged_White_Paper_0.pdf.)

suppliers, with small companies less likely to do so. Consumers representing about one-tenth of residential demand have done the same.

This comes as little surprise, as the financial benefits of switching suppliers are proportional to a customer's size. In 2014, the average industrial customer's monthly electricity bill was more than \$7,000, compared with \$114 for a residential customer. If switching providers saves each customer 10 percent, then the industrial customer saves \$700 and the residential customer just \$14 per month. The former is enough to motivate sizable businesses to research and pursue alternative suppliers. But to save the equivalent of a pizza cost every month, the process for residential customers would have to be fairly hassle-free.

No surprise, some customers don't find it worth the hassle. Economists call the time and effort of switching providers "transaction costs." These include gathering information, evaluating providers and offers and making necessary arrangements with a new company (e.g., paperwork and communications).²⁹⁵

In other words, the transaction costs—the time and effort required to investigate retail electric choice options—may exceed the benefits that attend such relatively small cost savings for the average residential consumer.

The *Annual Baseline Assessment of Choice in Canada and the United States (ABACCUS)* report, which is published by Distributed Energy Financial Group (DEFG) LLC, a management consulting firm specializing in energy, points to an additional asset that C&I customers possess: knowledge. Large customers must know and understand energy, so they can evaluate options that align and/or reinforce their needs, such as the significance of electricity costs to their overall operating costs.²⁹⁶ The report states, "Large energy consumers are sophisticated and they fully able to manage and sign a contract that best suits their operations."²⁹⁷

Capacity, information, knowledge, and sophistication, which are instrumental to commercial and industrial (C&I) customers' ability to flourish in a restructured market, tend not to be hallmarks of residential and small commercial customers, at least with respect to energy decision making. Unless a given customer has resided in a retail choice state, that individual's typical encounter with electricity procurement is what the vertically integrated utility has provided to him. Learning curves can be steep, as some of the experiences from other states demonstrate. Additionally, the president of an electricity shopping website also has explained that there is a language disconnect: for example, the electricity industry uses terms like kilowatt-hours, while customers conceptualize their electricity as monthly bills or the estimated cost to set the thermostat at a particular level.²⁹⁸ Also, corporations have technology and access to information that has enabled them to shift loads, enter into demand response agreements, and take advantage of variable rates.

According to a website that helps customers sign up for electric service in restructured states, there are six common issues that figure in the most recorded complaints: (1) unknown fees; (2) poor customer service; (3) meter reading; (4) slamming and cramming ("Cramming is the illegal act of placing misleading charges on your bill that you did not agree to. Slamming is the process of

switching your energy service to another provider without your permission[.]”); (5) switch hold rules, or the inability to switch retail providers until a back bill is paid in full; and (6) fluctuating prices.^{bbb,299}

The last of these, fluctuating prices, is where informational disadvantages are greatest for residential customers. “As many consumers know, when you sign up for a new energy plan you will typically be given the option between fixed or variable rate energy plans. Many customers sign up for variable rate plans, either because they are able to lock in low prices, or because they do not come with as stringent of contracts. However, variable rate plans can change at any moment, in fact they can change any day. Just as gas prices and the stock market fluctuate, so does the energy market. Customers tend to complain when their energy prices go up drastically with the market, but this is a risk that customers take when they sign up for a variable rate plan. If you like to diligently plan how much of your budget will go to energy costs, then choosing a fixed rate plan is a better option. There isn’t as much risk involved, and you will always know how much per kWh you will be spending each month.”³⁰⁰

In fact, many residential customers, when first introduced to retail electric choice (or even later) are unfamiliar with variable-rate contracts versus fixed-rate contracts for electricity.³⁰¹ The Maryland Public Service Commission fielded 1,000 customer complaints regarding energy suppliers in 2013, which represented a 50 percent increase over the previous year.³⁰² Amongst others, the complaints involved price spikes (typically associated with variable-rate contracts), early termination fees that mounted into hundreds of dollars and for which customers were unaware, and slamming.³⁰³

This report presented evidence in Section III that showed that residential and commercial customers in Philadelphia and Pittsburgh were paying 40 percent to 56 percent less in 2016 than they did in 1996. But in 2014, at the residential customer level, anecdotes emerged about high electricity bills in Pennsylvania.^{ccc} That year, 53,559 Pennsylvania electricity consumers returned to the default service option provided by the utility, amidst “a flood of consumer complaints to the state attorney general and utility regulators.”³⁰⁴ In that same year, Pennsylvania Attorney General Kathleen G. Kane, along with the Bureau of Consumer Protection and the Office of Consumer Advocate “filed joint complaints with the Pennsylvania Public Utility Commission against [the] five electric suppliers after receiving thousands of complaints from state residents saying their monthly electricity bills rose by as much as 300 percent over the winter.”³⁰⁵ The Attorney General’s office “received 42,603 telephone calls and 7,551 consumer complaints about the electricity spikes.”³⁰⁶

Similarly, the New Jersey Attorney General, Division of Consumer Affairs, and Board of Public Utilities filed a lawsuit against three retail suppliers in 2014, citing these companies’ promised monthly savings that were fictional in practice; consumers experienced “skyrocketing” energy bills during a

^{bbb} The site is Texas-specific but is applicable to other states, as well.

^{ccc} For example, a couple in Pennsylvania received a \$634.12 bill, which was about five times higher than normal. “The bill was the result of a variable rate plan that spiked when severe cold weather caused a volatile swing in wholesale electric prices. For the next month, the Lehmans turned off lights and didn’t use the stove or the dryer.” (Source: Katelyn Ferral. “Variable-Rate Electricity Contracts in Pennsylvania Can Cost Customers Plenty.” *Pittsburgh Tribune-Review [TribLive]*. November 19, 2014. Available: <https://triblive.com/business/headlines/7069990-74/variable-customers-rate>.)

“long and cold winter.”³⁰⁷ The suit also alleged that the retail suppliers engaged in deceptive tactics, such as slamming, and “other unconscionable commercial practices.”³⁰⁸ Altogether, there were 1,463 consumer complaints about the companies.³⁰⁹

In comment before the New Jersey Board of Public Utilities, the AARP, a non-profit, nonpartisan organization which represents people aged 50 and over, cited a “misrepresentation of prices, the use of variable rates that are not predictable or even plainly stated, teaser rates, the renewal of fixed rate contracts into variable rate contracts without affirmative customer consent, and a host of telemarketing and door to door activities that confuse customers and take advantage of their lack of education and understanding of the terms being proposed to them in a hard sell marketing technique.”³¹⁰ The organization also observed that, rather than the 5 percent to 15 percent price reductions that people were promised, many customers saw electricity bill increases of 34 percent.³¹¹ Additionally, the AARP raised concerns about disclosure on variable rates, stating that language such as “based on wholesale market conditions” is not informative in helping customers predict their next bill.³¹²

As discussed in Section III, in 2007, Illinois enacted legislation that provided \$1 billion rate relief to offset losses resulting from market manipulation and excessive power prices by wholesale suppliers.³¹³ Challenges in the state have persisted since that time. The Illinois’ Citizens Utility Board, a non-profit, nonpartisan organization that represents the interests of that state’s residential utility customers, issued a report in 2014 that warned consumers about exorbitant rates, disappearing low introductory rates, extra fees, “punishing” exit fees, and high-pressure sales tactics.³¹⁴ Some customers were charged rates up to six times higher than they would have paid under the utility’s default service option.³¹⁵

Several states provide guidelines to consumers regarding the selection of retail suppliers. They propose questions that customers should ask before signing a contract, and there are striking similarities across states. As an example, Figure 11 presents a screenshot from the Maryland Attorney General’s website.³¹⁶

Texas’s “Power To Choose” website’s recommendations are similar but, amongst others, also suggest that the consumer ask whether transmission and distribution are included and what the consumer will “pay per kilowatt hour (kWh) of electricity based on 1,000 kWh of average monthly usage[.]”³¹⁷ Pennsylvania’s “PAPowerSwitch” website adds some additional questions, such as: whether the supplier is licensed by the Pennsylvania Public Utility Commission, how the price compares to the default service option provided by the incumbent utility, whether all taxes are included in the supplier’s price, and if there is a switching fee, and more.³¹⁸

The residential retail electric choice experience in other states has had its complications. Many consumers have lacked the expertise to make informed decisions about retail suppliers. That the states have provided official sources to help with the process speaks more to the obstacles that consumers have faced than to a facilitation of the process of retail supplier selection. In addition, a recurring theme is that consumers have not conceptualized well the distinction between variable-rate and fixed-rate contracts, and, relatedly, the impact of wholesale electric prices on the former.

During extreme and persistent adverse weather, such as long winters, many residential customers were adversely affected.

Figure 11. Maryland Attorney General: Choosing Your Residential Electricity Supplier

Maryland Attorney General: Choosing Your Residential Electricity Supplier

Advice for Evaluating Offers from Electricity Suppliers

Take your time to check out offers. You may receive offers from electricity suppliers through direct mail, telemarketing, advertising, and over the Internet. Read offers carefully and ask the supplier questions. You may have to commit to a fixed-term contract when you sign up with an electricity supplier. Therefore, be sure you like the terms of the offer. Questions to ask a supplier:

- Is the energy price fixed or can it fluctuate month to month? Does it vary by amount used or time of use?
- What is the length of the contract? Is there an early termination fee or other fee if you switch to another supplier before the contract period is over? How much notice is required to switch suppliers?
- Will the contract automatically renew at the end of the term? How much notice must you give if you don't wish to renew?
- How is the electricity generated - coal, gas, nuclear, hydro, etc.? What percentage of the fuel source is renewable, and what are the emissions levels?
- Is there a deposit or sign-on fee? A fee for late payments? Any other fees?
- Will you be billed by the supplier or by the electric company? Will you receive two separate bills or one combined bill?

However, we caution the reader not to interpret these experiences as predictive for Nevada should Question 3 pass. The intention simply is to report the consumer impact in other states so that Nevada's residents are aware of some potential pitfalls. If a majority of voters decide in favor of restructuring the electricity market, the Nevada Legislature and Governor will need to assess how robust our institutions for consumer protection are in their current form.

Currently, for example, the Public Utilities Commission of Nevada (PUCN) website states that customers who have a complaint about service provided by the regulated utility first should contact the utility's customer service representative for resolution, and barring a satisfactory response, should escalate the complaint to a supervisor from the utility.³¹⁹ Should the customer remain dissatisfied, he can contact the PUCN's Consumer Complaint Resolution Division.³²⁰ The Bureau of Consumer Protection (BCP), under the auspices of the Nevada Attorney General and Consumer Advocate, "advocates the consumer's voice in cases involving the rates and service of privately-owned utility (telephone, electric, and natural gas) companies before the PUCN...[.]"³²¹ The BCP does not represent individual consumers, however.³²² Nevada Consumer Affairs, which is a division of the Department of Business and Industry, does not take consumer complaints on matters related to the regulated utility.³²³

It is not clear how or if these procedures would change in a restructured market, but it appears that one dimension of implementation might entail the establishment of some sort of apparatus to manage potential consumer complaints regarding retail suppliers or the augmentation of authority by a preexisting institution, such as the PUCN, BCP, or Nevada Consumer Affairs.

Implementation

The electricity system is especially complex, and the regulation of it is complicated. States that have restructured have reworked their legislation and regulatory frameworks to provide robust markets for choice. The restructuring process can be lengthy, given all the moving parts. Many states have encountered implementation hurdles (e.g., market imperfections) that necessitated an expanded role for the government. For example, an exhibit presented to accompany testimony before the Governor’s Committee on Energy Choice (CEC) on August 23, 2017, stated that, “Restructuring takes time. For example, in Pennsylvania, this was a 16 year process. This may seem extreme but you have to not only have a structure in place but also deal with stranded costs in a transition to a competitive retail generation market[.]”³²⁴ And at the first meeting of the CEC, Josh Weber, serving as counsel to the Energy Choice Initiative/Nevadans for Affordable Clean Energy Choices (i.e., Yes on Question 3) indicated that “most states have been doing it [retail electric choice] for a few decades but are still evolving and getting it right.”³²⁵

We want to be clear, however, in asserting that the historical experiences of other states are meant for illustrative purposes only. We are not asserting that Nevada would confront these challenges, were Question 3 to pass. That said, it is important to document them so that residents are aware of what has occurred elsewhere and thus consider the implications for the Silver State.

A synthesis of case studies in four states in different regions—Illinois, Montana, New Jersey, and Texas—reveals that multiple pieces of legislation and/or regulatory orders were required to address the unintended consequences of restructuring. The report states, “New forms of market/government intervention to address market failures often have been necessary.”³²⁶ Illinois is emblematic in this regard: “First, the deregulation process was protracted and highly controversial, and included years of legislative debate, as well as a high-profile complaint and intervention by the state attorney general. Second, the turmoil associated with deregulation in Illinois—political, legislative, rate volatility, and other—reflected a lack of confidence in the ability of deregulation to ensure affordable, reliable power. This led Illinois policymakers to create new public entities and expanded roles for government in the purchase and sale of electricity in Illinois, essentially adding more regulation.”³²⁷ Illinois released four investigative studies, enacted two pieces of legislation, and put four regulatory orders in place by 2002.³²⁸ It also enacted legislation in 2007 that required the aforementioned \$1 billion in rate relief and created the Illinois Power Agency for the procurement of power for residential and small commercial customers of the incumbent utilities.³²⁹

One study from 2003, released during the initial phase of restructuring for most states, documents the implementation process in each to that point. Some examples: in Connecticut, the regulatory authority issued a report in 1995 that recommended restructuring, with a gradual move to retail competition; enabling legislation was enacted in 1998, and four additional regulatory orders

regarding divestiture, Standard Offer Service, and consumer regulation were put in place by 1999.³³⁰ Delaware required one piece of legislation and two regulatory orders through 1999.³³¹ The District of Columbia completed two investigative studies, passed one piece of legislation, and issued eight regulatory orders by 2001.³³² Likewise, Maine released one investigative study, enacted a single piece of legislation, and effectuated nine regulatory orders through 2002.³³³

On the other hand, New Jersey produced one investigative study, three pieces of legislation, and seven regulatory orders by 2000.³³⁴ New York had three investigative studies, three pieces of legislation, and six regulatory orders through 2001.³³⁵ Ohio conducted one investigative study, enacted one piece of enabling legislation, and issued twelve regulatory orders through 2002.³³⁶ Texas released six investigative studies, enacted four pieces of legislation, and implemented nineteen regulatory orders by 2002.³³⁷ As one report notes, though, the state did not anticipate certain issues in its enabling legislation; they only came into full view during the implementation phase and include information technology struggles, setup of the provider of last resort (i.e., the safety for those instances in which the retail supplier cannot continue service), costly market redesign (related to issues regarding market manipulation and a need to redesign the wholesale market), and stranded costs.³³⁸

Michigan perhaps best exemplifies the challenges surrounding implementation of retail electric choice, as its plans were considered carefully yet thwarted through the process. In 2000, two companion pieces of legislation—Public Act 141 and Public Act 142—were enacted to enable restructuring.³³⁹ Five regulatory orders had been issued through August 1999 to lay the groundwork for a retail electric choice market.³⁴⁰ By 2002, the Michigan Public Service Commission implemented 25 additional regulatory orders.³⁴¹ Michigan requires annual reports on the status of electric competition in the state. Its report for 2006 states that “the Commission issued 40 orders to further establish and implement the framework for Michigan’s electric customer choice programs and the provisions of 2000 PA 141.”³⁴² As detailed in the report, the 40 orders concerned implementation:

- “Two orders approving new AES [Alternative Electric Supplier] licenses;
- Two orders approving relinquishment of AES licenses;
- Five orders addressing stranded costs;
- Two orders adjusting securitization charges;
- One order closing a docket on implementation costs;
- Six orders addressing electric generation and transmission issues;
- Five orders relating to energy efficiency and renewable energy programs;
- Five orders investigating Code of Conduct and rule violations and adjustments;
- Two orders adopting a new power supply cost recovery method;
- Two orders distributing the Low-Income and Energy Efficiency Fund;
- Two orders piloting a PAYS® program;
- Four orders protecting customers from higher rates and service provider disputes;
- Two orders relating to choice tariff and amendments.”³⁴³

As noted in Section III, despite Michigan’s efforts at implementation and endeavors to optimize the market, decisions regarding rate caps, reductions, and management of stranded assets ultimately

impeded market development. No retail electric choice structure developed, and, as also discussed in Section III, the state passed the Customer Choice and Electricity Reliability Act of 2008, as part of Public Act 286.³⁴⁴ This law requires that “no more than 10 percent of an electric utility’s average weather-adjusted retail sales for the preceding calendar year may take service from an alternative electric supplier at any time.”³⁴⁵ Public Act 286 thus places a limit on electric choice.³⁴⁶ What this means in practice is that, currently, “no licensed alternative electric suppliers are marketing or enrolling residential customers.”³⁴⁷ Thus, the state has moved to a “hybrid model” via legislation, meaning that residential ratepayers have *de jure* access to choice but not *de facto* access.

Nevada experimented with restructuring in the late 1990s before repealing residential retail electric choice in 2001. Assembly Concurrent Resolution (ACR) 49 directed the PUCN “to study deregulation” in 1995.³⁴⁸ In July 1997, Assembly Bill (AB) 366 instructed the “PUCN to establish competitive market no later than December 31, 1999.”³⁴⁹ The PUCN opened Docket 97-8001 to study issues around retail competition in August 1997.³⁵⁰ Senate Bill (SB) 438, enacted in June 1999, delayed the market open date to March 2000.³⁵¹ On April 18, 2001, AB 369 “return[ed] utilities to regulation.”³⁵² In July of that year, “AB 661 was enacted, revising and repealing certain provisions of Nevada’s restructuring law. The law allows eligible large customers, those using 1MW and above, to choose an alternative supplier for power with permission from the State [PUCN].”^{ddd, 353} Even though Nevada did not implement restructuring in full, the prolonged nature of the process is evident.

Should Question 3: The Energy Choice Initiative pass in November 2018 by a majority of registered Nevada voters, the Nevada Legislature likely would have to redefine the scope of the PUCN’s authority, as current law pertains to monopoly utility service. Its purview could be expanded or proscribed, though the ballot initiative requires that “...all electricity customers are afforded meaningful choices among different providers, and that economic and regulatory burdens be minimized in order to promote competition and choices in the electric energy market.”³⁵⁴

What is certain is that PUCN cannot play a role in the wholesale organized market; prices are set through the auction process and coordinated by the independent system operator (ISO). Beyond that, the State likely would delineate the role of the utility regulator in statute. Our review of other states’ experiences shows that utility regulators in restructured markets have set default service rates; regulated wires charges; amended competitive transition charges (CTC); established/extended rate caps, rate freezes, and rate reductions; and more.

For example, the Electric Customer Choice and Competition Act of 1999, the enabling legislation for Maryland’s restructuring of its electric utility industry, delegated certain regulatory matters to the Maryland Public Service Commission (PSC). The PSC could change implementation schedules by order or settlement agreement with the incumbent utilities (at the time, Maryland had four large investor-owned utilities: Baltimore Gas and Electric Company, Delmarva Power and Light Company, Potomac Edison Company, and Potomac Electric Power Company).³⁵⁵ The legislation mandated rate reductions and rate caps, but the PSC “allocated the rate reduction among generation, transmission, and distribution components of residential electric rates, thus giving a portion of the rate reduction

^{ddd} This is commonly referred to as the “704B process.”

to customers who chose a different generation supplier and as well as those who remained with SOS {Standard Offer Service}.³⁵⁶ The PSC also approved alternative rate requirements for distribution service and SOS.³⁵⁷ Amongst other responsibilities with which it was entrusted, not all of which are enumerated here, the PSC also approved transition plans for the treatment of transition (i.e., stranded) costs or benefits.³⁵⁸

Insofar as the role of the PUCN under retail electric choice remains uncertain, so too does that of NV Energy. The ballot initiative does not specify that investor-owned utilities be restructured but rather permits “...every person, business, association of persons or businesses, state agency, political subdivision of the State of Nevada, or any other entity in Nevada...the right to choose the provider of its electric utility service.”³⁵⁹ This language affords the Nevada Legislature broad discretion over the limits of NV Energy’s operations, should it wish to remain in a restructured market in any capacity. And it raises questions regarding current law: What must be left intact? Which statutes would require revision? How would the established regulatory framework interact with the incumbent utility, when its operations are undetermined but likely to be circumscribed? These matters are interlocking, and decisions cast in any one regard could produce any number of variable outcomes. As examples, we discuss the Provider of Last Resort (POLR) and net metering.

There are two models for the POLR: Texas and all other restructured states. As previously mentioned, Texas established a “price to beat” that acted as a ceiling and a floor. For the first five years of transition, Texans in restructured areas were switched automatically to retailers affiliated with the traditional utilities, which charged the regulated “price to beat”; however, ratepayers could switch to competitive suppliers, which were permitted to provide lower rates.³⁶⁰ Today, all Texans in restructured areas must select a competitive supplier. As such, there is no Standard Offer Service (SOS) option, that is, service for customers who do not choose a generation supplier. (SOS also may be referred to as basic service in other restructured states, or, less frequently, default service, as this term typically is associated with the transitional model in Texas.) However, if a retail supplier cannot continue service, Texans receive temporary service from a Public Utility Commission of Texas-designated POLR.³⁶¹

In the remaining restructured states, competitive supply take-up is not mandatory. Customers can opt to switch to a retail electric supplier, or they may remain with the incumbent utility through its SOS.

The two models differ considerably, though both maintain some sort of role for the incumbent utility in electric supply provision. Texas’s utilities only procure electric supply as a temporary, emergency measure; incumbent utilities in other states compete with retail suppliers for customers. The *Annual Baseline Assessment of Choice in Canada and the United States* (ABACCUS) report views default service as incompatible with competition, contending that it should be transitional only—or, if not, that such service should be provided by competitive suppliers, rather than incumbent utilities—so that retail electric suppliers have “headroom” to compete.³⁶²

Thus, the Nevada Legislature would confront a variety of decisions, such as whether to use the Texas model or that established by other states, and it would need to determine the authority for that

choice. That is, would the State's enabling legislation prescribe a model, or would that determination be delegated to the PUCN? Complicating matters is that it remains unclear as to how much agency the incumbent utility would be afforded in the process. Paul Caudill, CEO of NV Energy has stated:

For the [Governor's] Committee [on Energy Choice], we've made this public already, in presentations actually to Assemblyman [Chris] Brooks and then also the Senate, that we're ready to fully divest all generation, all power purchase agreements, and, to get to your point about...what I'll call the Provider of Last Resort or Standard Offer Service or default service, we have no interest in performing that function, so our role right now is to kind of think about transitioning to a wires-only company, if that's what the State wants us to do...³⁶³

Regardless of the model that might be selected by the State, NV Energy thus has asserted that it does not wish to provide some sort of default service. The Nevada Legislature and/or the PUCN would need to identify an alternative supplier, be it for transitional or emergency service or as a more permanent option for ratepayers. We note the following: (1) it is not outside the realm of possibility that the State could make provision of default service, however defined, a condition of NV Energy's remaining in the market as the wires company; and (2) whichever entity provides default service technically plays a role in electricity supply, even in as a limited a case as Texas.

This brings us to our second example, net metering, which speaks to the questions of existing law, the obligations of the incumbent utility, and the PUCN's authority under retail electric choice. Net metering is a process in which a purchased or leased solar system (typically, rooftop solar) may produce excess energy, and in such cases, if what is produced exceeds more than what is used in a billing period, the excess energy is "pushed back onto the grid and used by other electricity customers"; in the next billing cycle in which consumption is greater than production, these customers receive a credit on their electricity bills.³⁶⁴ According to the Solar Energy Industries Association (SEIA), a national trade association of the U.S. solar energy industry, 425,022 homes in Nevada are powered by solar (27,308 installations; and 2,607.18 mW of installed solar).³⁶⁵

In the 79th (2017) Legislative Session, Assembly Bill (AB) 405 was enacted, which established a rate structure for net metering customers, effective June 15, 2017.³⁶⁶ The PUCN can approve draft orders on rates and rules for net metering customers.³⁶⁷ Several industry experts shared with the Guinn Center their concern that passage of Question 3: The Energy Choice Initiative, effectively would nullify the provisions of AB 405.³⁶⁸ One industry expert expressed the logic, as follows:

Net metering customers will not get the rate from NV Energy for excess energy. And NV Energy will not buy it back anymore, as it will no longer remain in the supply business. But who will? Legislators will need to figure it out. Will the State take on the financial burden of buying that energy? What about folks coming in to buy energy? Net metering customers' understanding right now is an expectation for the recovery of costs paid for 20 years at certain rates.³⁶⁹

It is not clear that approval of Question 3: The Energy Choice Initiative, in fact, would invalidate preexisting statutory authority, formally. But, to the extent that the ballot initiative requires competition and choices, it would seem to imply that NV Energy not remain an electric supplier—this is why divestiture has been presumed, as well. If NV does not supply generation, then, by definition, it is not a supplier than can provide retail rates. Therefore, there would be no entity in the

market with the ability to provide the net metering service. In the absence of further clarification, the right to energy choice seems incompatible with the rights guaranteed to net metering customers.

This raises the same questions as the POLR and is linked inextricably to the default service issue. To the former: (1) What could the State require, and to what extent would the PUCN be delegated authority to address these issues?; and (2) would NV Energy (or some other entity) be willing to accept the net metering provisions if it wants to provide wires service?

The discussion of default service suggests one caveat to the idea that the elimination of the monopoly service provider from the electricity supply market means that no entity would exist to ensure that the rights of net metering customers are upheld. While it may be true that NV Energy might not be that company, either the Nevada Legislature, through enabling legislation, or the PUCN, through regulatory order (if delegated that responsibility by the Nevada Legislature), could enforce net metering rules on some entity that wants to participate in the market or enter it anew.^{eee} This sort of designation may be true for the default service provider, as well, and since that entity would remain in the generation business, either as the POLR or via provision of an SOS option, one possibility might be to assign it net metering obligations, pursuant to AB 405. Ohio offers an example of a restructured state in which its law requires the wires companies to provide net metering to customers who generate several types of renewable energy; the Public Utilities Commission of Ohio issues related rulings and provides oversight.³⁷⁰

Thus, the implementation challenges raise another—and perhaps more pressing—issue: Question 3: The Energy Choice Initiative seeks to restructure Nevada’s electricity market through an amendment to the *Nevada Constitution*. In contrast, all other states, with the exception of New York, which restructured its electricity market through a regulatory order issued by its Public Service Commission, did so through legislation.³⁷¹

The ballot initiative before voters (Question 3) specifically would enshrine electric utility service provision as a right in the *Nevada Constitution*. It states that, “...every person, business, association of persons or businesses, state agency, political subdivision of the State of Nevada, or any other entity in Nevada has the right to choose the provider of its electric utility service, including, but not limited to, selecting providers from a competitive retail electric market, or by producing electricity for themselves or in association with others, and shall not be forced to purchase energy from one provider.”³⁷² There is precedent, however, for state constitutions to incorporate rights traditionally not deemed as such, including provisions for poverty, housing, shelter, and nutrition.³⁷³ In addition, “Many state constitutions also include declarations that set out as inalienable the right to seek and/or obtain safety and the right to pursue and/or obtain happiness.”³⁷⁴ Whether there is a right to electric utility service may be a matter for legal scholars to contemplate, admittedly.

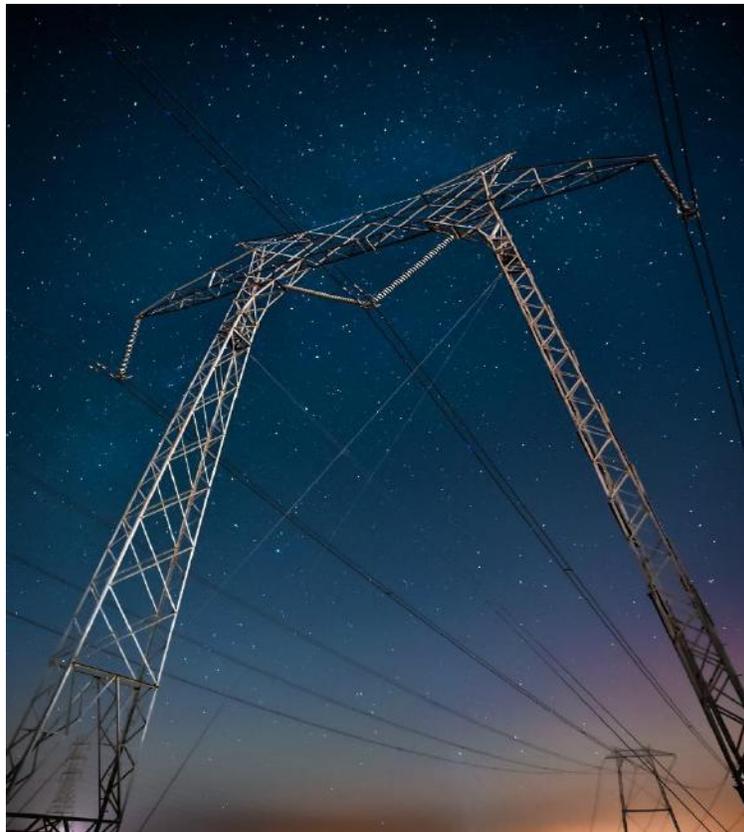
Currently, though, “the Nevada Legislature has passed laws which allow investor-owned utilities in Nevada to be monopolies.”³⁷⁵ This means that there is statutory authority granting the utility

^{eee} NV Energy might not be the entity in question, perhaps through the possible nullification of AB 405, or a potential decision not to remain the wires company and accept the conditions that may come with it (both of which are unknown at this time), amongst others.

exclusive franchise over a designated service territory.³⁷⁶ What this suggests is that, historically, electric utility service has been understood as a policy and/or regulatory matter in Nevada, not a constitutional one.³⁷⁷

However, using the *Nevada Constitution* as a regulatory tool forces the Nevada Legislature to proceed with restructuring, even if legislators find that their constituents would not benefit. As noted earlier, many states were unable to anticipate all the issues they eventually would confront until they began to implement the law or until well after. If legislators find that restructuring would be infeasible, the constitutional imperative would take precedence—that is, it would supersede the delegated authority with which legislators are entrusted—leaving the Nevada Legislature without recourse to take more time to vet the issue. Moreover, this is a five-year implementation process, and the Nevada Legislature would have to work on this over three legislative sessions.

And should Nevadans become less sanguine about the prospects of restructuring, they would have to repeat the process outlined in the Introduction of this report, as repeal of a constitutional amendment would require another constitutional amendment. Specifically, this would entail circulation of a petition to obtain the requisite number of signatures to appear on the ballot and then passage in two successive elections.^{fff}



^{fff} If Question 3 were to pass in November 2018, and in the intervening years, the people determined that they did not wish to see the electricity market restructured, after all, the earliest that a repeal measure could appear on the ballot is November 2020; it could not be repealed in full until November 2022. Thus, the uncertainty around market restructuring exposes Nevadans to risk that would be constitutionally enforced.

V. Conclusion

For years, most people understood electricity through their interactions with the utility, whether that meant reliability of service or billing questions. Restructuring has altered that relationship for residential customers in 15 states. They can select a competitive supplier—or, in the case of Texas, must select a competitive supplier—while the incumbent utility provides the wires (grid) service. Question 3: The Energy Choice Initiative (ECI) presents that decision to Nevadans through an initiative petition that will be placed on the ballot in November 2018. Should Nevada restructure its electricity market and permit retail choice access for residential customers?

Given the messaging on both sides of the debate, this report has endeavored to clarify the assertions promulgated by supporters and opponents. In compiling our report, the Guinn Center conducted an extensive review of federal energy data and more than two dozen interviews with energy industry experts (on both sides of the issue) around the country, and reviewed research documenting the experiences of other states that restructured their electricity markets (and adopted “energy choice”). Upon the completion of this review the report has reached certain findings.

This report has found that some people in restructured states have enjoyed the benefits of retail electric choice, while others have confronted unfavorable outcomes. The impact of restructuring turns largely on market design and policy decisions rendered before and during the implementation phase. But even those states that proceeded with caution and careful consideration were not invulnerable to unintended consequences.

This report also finds that research indicates that restructuring has no bearing on the increased integration of renewables onto the grid, nor does it hinder progress toward Nevada’s clean energy future. While the implementation of Question 3, if it passes, could require minimum standards for inclusion of renewables for eligible sellers in a wholesale electricity market, Question 3 does not by its plain language require integration of renewables into the grid.

Many Nevadans likely want to know what will happen with their electricity rates. This report finds that this question cannot be answered with any certainty, because there are too many variables that interact with one another even to produce a reasonable forecast or projection of what may happen to rates under restructuring in Nevada. We do know, however, that residential electricity rates in a restructured wholesale market will be more directly dependent upon the underlying prices of different forms of power generation, such as natural gas, solar and geothermal, than under the current monopolistic utility structure. Thus, for example, for states like Nevada that currently depend heavily on natural gas, their electricity rates in the wholesale market will vary more (up or down) with natural gas prices.

The opportunity to restructure its electricity market presents Nevadans with a different option and potential for its energy future, but the price of that decision is uncertainty. Given the evidence, we cannot argue conclusively that energy choice (Question 3) is either “good” or “bad” for Nevada. In other states that adopted energy choice and restructured their electricity markets, decision-makers subsequently had to intervene to stabilize markets and protect consumers, facilitate competition,

and establish new or revise existing regulatory frameworks. In other words, the experiences of other states suggest that restructuring is a complex and prolonged process that will take time, and only after retail electric choice is realized fully would Nevadans be able to determine if restructuring was the “right” path. Voters and decision-makers in the Silver State will have to identify and weigh their priorities in assessing issues of cost (and price variability), consumer choice (and protection), and sources of electricity generation.

Appendix A. The Market for Electricity: Explanations from Various Sources

Energy Manager Today (News and Best Practices for Commercial & Industrial Energy Managers)

"The auction process is designed to match electricity supply to demand at the lowest possible price point. The ISO, which oversees the process, predicts the hourly demand. Each generator offers a specific amount of generation capacity (supply) into the market at specific prices. In theory, the offer prices are based on the cost to operate the facility.

Once the offers are made, the ISO sorts them in ascending order to determine how much supply is available at different price points. It then selects the 'winning' bids – the lowest-priced combination of offers required to meet demand – which will be dispatched at the hour dictated by the auction. The clearing price is set based on the marginal (most expensive) unit of generation required to meet demand."³⁷⁸

PJM Learning Center (PJM is an ISO [RTO])

"The wholesale market begins with generators, which, after securing the necessary approval, connect to the grid and generate electricity. The electricity produced by generators is bought by an entity that will often, in turn, resell that power to meet end-user demand. These resale entities will generally buy electricity through markets or through contracts between individual buyers or sellers....

The price for wholesale electricity can be predetermined by a buyer and seller through a bilateral contract (a contract in which a mutual agreement has been made between the parties) or it can be set by organized wholesale markets. The clearing price for electricity in these wholesale markets is determined by an auction in which generation resources offer in a price at which they can supply a specific number of megawatt-hours of power....

If a resource submits a successful bid and will therefore be contributing its generation to meet demand, it is said to 'clear' the market. The cheapest resource will 'clear' the market first, followed by the next cheapest option and so forth until demand is met. When supply matches demand, the market is 'cleared,' and the price of the last resource to offer in (plus other market operation charges) becomes the wholesale price of power.

After electricity is bought by resell or 'supply' entities in the wholesale market, it can be sold to end-users in the retail market....

Many consumers have options for purchasing electricity. They can choose from their local utility or a number of competitive retailers to find the service that best fits their needs. These resellers (retail electricity providers) purchase electricity through wholesale electricity markets before they resell it to consumers...."³⁷⁹

Bates White (Economic Consulting Firm)

ISOs "...determine which sources of electricity will be used to meet demand, selecting or 'dispatching' the cheapest sources available at any time. Low-cost 'baseload' plants are dispatched first, followed by higher-cost resources, according to need, and independent of whether the resources are used to serve local or more distant needs. This is called 'economic dispatch.'

When the system uses economic dispatch, the cost of the very last generating plant needed to supply power in a given hour sets the system cost.

Where there is vigorous wholesale market competition, such as in PJM, centralized dispatch is no longer determined by a system operator using estimated incremental costs for each generating plant. Instead, PJM uses a bid-based system, in which individual generators submit their own price bids every day to the system operator to meet the expected customer

demand for the following day. Once the system operator has all of the bids, he selects those generators whose bids are lowest and tells generators who are not selected that they will not be needed.

Bid-based energy markets begin with generators submitting their bids to the system operator in the day-ahead (DA) market. As its name implies, the day-ahead market takes place the day before the actual operating day. The DA market is a financial market, rather than a physical one. Essentially, the DA market is like a commodities futures market that allows buyers and sellers to hedge their transactions. Selling generation in the DA market, like selling orange juice futures, doesn't mean the seller is committed to physically delivering their product. Instead, generators whose bids in the DA market are accepted are bound into a financial obligation. A generator that cannot physically provide the power bid the previous day must obtain that power in the real-time (RT) market, which is a 'physical' spot market. It is in the real-time market that generators provide the electricity needed to keep the lights on.

In practice, bids will in fact tend to approximate actual marginal costs—a generation owner stands to lose money by bidding above marginal cost and not being selected, or by bidding below marginal cost, being selected, and then being unable to recoup the costs to produce electricity....Since the market-clearing price will always be positive, owners of baseload plants know they will still be paid for their generation, even though in many offpeak hours when electric demand is low, the market prices will be below their plants' average costs."³⁸⁰

Further Explication on Bates White and Economic Dispatch (William W. Hogan, Raymond Plank Professor of Global Energy Policy, John F. Kennedy School of Government, Harvard University)

"The Bates-White statement is correct, but only if you are careful about the precise definition of every word and include demand side bidding.

...the basics, for the canonical convex case:

...you see the standard supply and demand construction, ignoring the effects of different locations in a grid. The...supply curve would be the generator offers. At every moment the intersection of supply and demand defines the standard market clearing price charged to all loads and paid to all generators. Economic dispatch takes the cheapest generators first.

Note that at the highest period the intersection of supply and demand is above the variable cost of the most expensive generator producing at that time. This is the effect of scarcity prices to account for the limits on the capacity of lower cost generation.

...[where] the model is closer to the real situation with a transmission system...the supply offers and demand bids in effect present supply and demand curves at different locations. The theory of locational pricing extends the ideas...by incorporating transmission constraints and the equilibrium conditions across the whole grid. Now there are different market-clearing prices at each location. Again, generation is paid and load is charged according to their respective locational prices. The basic intuition...extends to this equilibrium solution[.]

Note that at the locational market clearing prices, only those generators actually producing get paid the locational energy prices, and no generator whose variable cost is greater than the respective locational price is producing energy.

With economic dispatch, the locational marginal prices are the only prices that support the solution in the sense that nobody has an incentive to deviate from the economic dispatch. This is also the only pricing mechanism that allows for open access and non-discrimination. This is a critical feature that is often overlooked or wished away.

In these standard examples and interpretations, there are no commitment costs or other non-convexities. This gets into extended locational marginal prices, which is a more advanced topic."³⁸¹

Appendix B. Annual Average Retail Price of Electricity (¢/kWh), 2017³⁸²

	Residential	Commercial	Industrial	All Sectors
Alabama	12.61	11.62	6.23	9.89
Alaska	21.57	19.46	16.59	19.52
Arizona	12.50	10.58	6.45	10.71
Arkansas	10.22	8.44	5.93	8.18
California	18.24	15.89	12.87	16.14
Colorado	12.13	9.95	7.29	9.94
Connecticut	20.31	16.10	13.31	17.62
Delaware	13.44	9.95	7.70	10.99
District of Columbia	12.93	11.68	8.25	11.81
Florida	11.85	9.61	7.90	10.65
Georgia	11.80	9.98	5.82	9.75
Hawaii	29.50	26.82	22.92	26.07
Idaho	10.11	8.02	6.69	8.30
Illinois	12.70	8.87	6.37	9.33
Indiana	11.95	10.30	7.39	9.61
Iowa	12.60	9.62	6.31	8.92
Kansas	13.27	10.49	7.49	10.58
Kentucky	10.64	9.70	5.58	8.44
Louisiana	9.51	8.91	5.42	7.75
Maine	15.96	12.14	9.09	12.94
Maryland	13.99	10.76	8.32	12.00
Massachusetts	18.92	14.88	13.48	16.14
Michigan	15.47	11.02	7.32	11.39
Minnesota	13.19	10.58	7.73	10.53
Mississippi	11.19	10.30	6.12	9.19
Missouri	11.27	9.32	7.06	9.83
Montana	11.11	10.20	5.15	9.02
Nebraska	10.98	8.98	7.66	9.16
Nevada	12.00	7.98	6.13	8.76
New Hampshire	19.22	14.75	12.33	16.16
New Jersey	15.69	12.31	10.16	13.38
New Mexico	12.92	10.27	6.01	9.64
New York	18.04	14.76	5.94	14.78
North Carolina	11.12	8.56	6.11	9.15
North Dakota	10.40	9.18	8.62	9.26
Ohio	12.37	9.97	6.69	9.71
Oklahoma	10.48	7.97	5.27	8.12
Oregon	10.71	8.88	6.19	8.98
Pennsylvania	14.33	8.99	6.75	10.16
Rhode Island	18.30	15.24	14.58	16.44
South Carolina	12.78	10.49	6.09	9.83
South Dakota	11.68	9.58	7.80	9.98
Tennessee	10.65	10.50	6.03	9.54
Texas	11.18	8.31	5.49	8.55
Utah	11.04	8.74	6.12	8.66
Vermont	17.65	14.61	10.08	14.57
Virginia	11.67	8.07	6.67	9.28
Washington	9.60	8.51	4.66	7.94
West Virginia	11.62	9.57	6.64	9.00
Wisconsin	14.68	11.08	7.79	11.05
Wyoming	11.41	9.75	6.91	8.29
United States	12.90	10.68	6.91	10.54

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