SERVING CUSTOMERS BEST

THE BENEFITS OF COMPETITIVE ELECTRIC VEHICLE CHARGING STATIONS

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SUMMARY AND CONCLUSIONS

Electric vehicle (EV) sales are projected to grow exponentially in the coming years, and the network of public charging stations to serve them must expand accordingly. State policy makers will play a vital role in the design and structure of this new and growing public charging station industry.

At this early stage in the development of a public EV charging network, critical public policy decisions are being made that will affect consumers' ability to access the charging and ancillary services they desire at reasonable prices.

State policy makers will decide who is allowed to own charging stations and on what terms. Policy makers will decide the extent to which electric utilities can extend their monopoly franchise protections into the public charging business, potentially gaining a competitive advantage in this burgeoning competitive space.

In this paper we evaluate whether and to what extent electric utilities should participate in this new sector. We evaluate utility ownership to determine whether they can use their position as the grid owner to their advantage in the sector. We provide a historical and economic background on utility monopolies, describe the ownership options from which states may choose going forward, analyze and compare those options, and conclude which option is best for both EV owners and electricity consumers.

Based on this analysis, we conclude allowing monopoly utilities to own public EV charging stations will provide less efficient, lower-quality service and choice to EV owners, resulting in

unfair cost shifting to other electricity consumers. Utility ownership of EV charging stations is generally not in the public interest.

We recommend regulators and legislators enable a competitive and nondiscriminatory environment for public charging stations. We identify only very limited circumstances where utilities should be permitted to own charging stations. Additionally, we recommend pricing and other terms that regulators should consider to maximize benefits for EV owners and electricity consumers.

We also recommend several policies aimed at speeding the deployment of EV charging networks. These policies are premised on the assumption that independent, nonutility entities will continue to be allowed to provide charging services. These policy recommendations include incentivizing utility behaviors in some areas and clarifying long-term market conditions. Finally, a summary of our recommendations is included:

1. **Regulated Rate Policies –** Regulators need to consider the impact of regulated rates and rate design on EV charging stations and station owners.
2. **Utility Ownership –** Regulators should ban or disfavor utility ownership of charging stations.
3. **Distribution Planning –** Regulators should support an increased focus on planning using state-of-the-art tools and should allow for proactive, rather than reactive, development of the distribution systems.
4. **Interconnection Policies –** Regulators should support the development of dedicated interconnection personnel, work with utilities to standardize and streamline timelines and processes, allow more flexible policies with respect to inventory and supply chain issues, and ensure that nonutility owners of charging stations receive fair and equal service from the utility when developing charging stations.
5. **Private Sector Access –** Regulators should work with utilities to develop, train, and certify third parties to work with private investors to build out the distribution network, where feasible.
6. **Cost Allocation –** Regulators should create cost-allocation policies fair to all parties to recover the costs of developing the infrastructure required for robust EV charging.
7. **Meeting Public Need at the Lowest Cost –** If a public need arises, regulators should look for solutions other than a utility to meet the need.
8. **Divestiture of utility-owned charging stations –** Regulators should have utilities sell any utility-owned EV charging stations to nonutility entities.

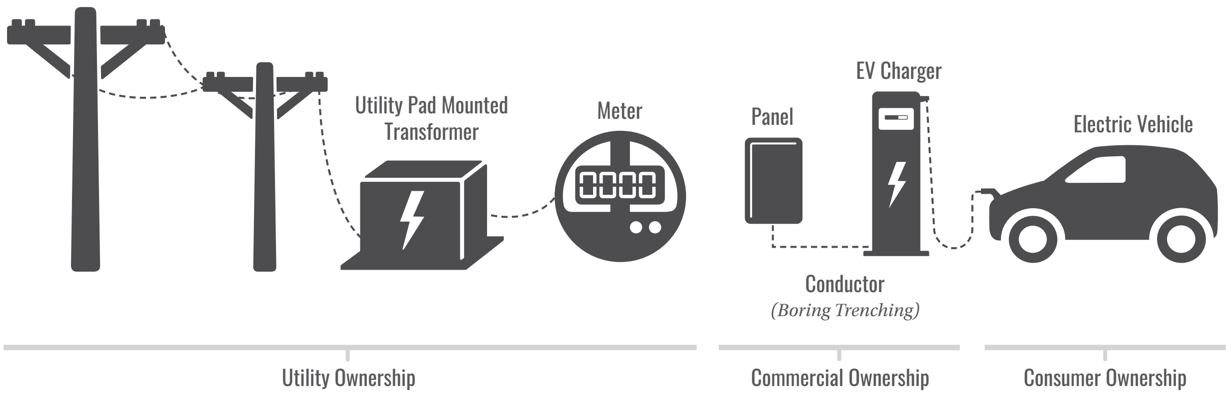
Regulators should proclaim EV charging to be a competitive service and then focus on policies to support the development of the charging network. Competition in charging will lead to the best results for the build-out of EV charging, for consumer pricing of electricity, and for service of EV drivers. The time to make these policy choices is now, before charging becomes monopolized. If regulators and legislators do not act quickly, we will create an economically inefficient and artificially low equilibrium point for investment in EV charging which will result in more expensive, less convenient charging services and stunt the overall adoption of EVs.

II INTRODUCTION AND CONTEXT

A. What is a public charging station?

For this paper, we define "public EV charging station" as one that is accessible to the general public for charging. We do not include individual customer-owned chargers for private use (homes, school district bus fleets, commercial fleet chargers, etc.). In theory, public charging stations could be owned by government or private entities. Private entities can include regulated investor-owned utilities or a wide variety of other entities—retail stores, grocery stores, convenience stores, malls, hotels, truck stops, gas stations, and any other type of commercial business. All that is needed to deploy an EV charging station is a parking spot, a terminal, and a metered connection to the distribution network.

FIGURE 1. *EV Charging Infrastructure Components and Ideal Ownership Model*



Source: Figure adapted from MJ Bradley & Associates and Georgetown Climate Center, https://www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf

Level 3 Direct Current Fast Charging (DCFC) chargers are the type most often used for public or commercial charging and are the main focus of the paper. A Level 1 charger uses household current and takes 40-50 hours to charge a typical EV. Level 2 chargers also employ alternating current but operate at 240 volts (for residential chargers) or 208 volts (for commercial chargers) and can take 4-10 hours to fully charge an electric vehicle. Level 3 fast-charging facilities utilize high-voltage direct current to fully charge an electric vehicle in 20 minutes to 1 hour.[1] We anticipate Level 3 DC fast chargers will constitute the majority of public charging station networks.[2] Commercial enterprises catering to customers away from home and away from their private Level 2 home charger offer fast-charging service as either their primary business (as fueling is today for many outlets), or as an ancillary business for others (i.e., restaurants, shopping centers, convenience stores, hotels, etc.) and those offerings should grow in the future. Level 4 chargers are available, but today the cost of a Level 4 charger and associated system upgrades make it impractical for mass rollout for public charging. Regardless, the principles discussed in this paper apply to any charging types. The table below summarizes the critical attributes of the different types of chargers.

TABLE 1. *Summary of EV Charging Station Types*

CHARGER LEVEL	CURRENT TYPE	VOLTAGE (V)	POWER (KW)	AVG. CHARGING TIME/250 MILES
1	AC	120	2.4	43 Hours
2	AC	240	3-20	11 Hours
3	DC	~500	50-350	60 Minutes
4	DC	800-1,000	>1,000	20 Minutes

1 U.S. Department of Transportation, "Electric Vehicle Charging Speeds," February 2022, https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds.

2 Recent commercial EV chargers are for plans to DC fast charger networks. See announcements from Hertz and bp, Pilot Company, General Motors, and EVgo, TravelCenters of America and Electrify America, Mercedes-Benz, ChargePoint, and MN8 Energy, ChargePoint, Volvo Cars, and Starbucks, Forum Mobility, and Ford.

B. Public utility roles

The appropriate role of monopoly utilities in a market economy is the subject of extensive historical and economic analysis. It is rare for governments in a market economy to grant a single entity the privilege of a monopoly to operate in a market without any competition. Virtually all sectors of the economy—agriculture, real estate, banking, recreation, tourism, etc.—operate in competitive markets without monopoly protection. Arguably a major reason for the relatively strong historical growth of the U.S. economy is tied to the ability of consumers to choose from competing suppliers in an open market, leading to lower costs and greater innovation.

The public policy decision to provide market exclusivity to a single entity, or allow a monopoly entity to expand its exclusivity to adjacent sectors where it will inherently have advantages over competitors, should be undertaken *only when the structural conditions exist where it would benefit consumers*. As with most important policy decisions, there are politics and special interests involved. In deciding this important public policy outcome, the utilities who stand to gain from extending their monopolies are vested in that policy outcome and participate in the political process.

C. The public policy question

Exponential growth in EV market penetration requires state policy makers to determine for public charging stations whether there should be a market competition framework, a monopoly utility construct, or a hybrid where utilities are allowed to compete for public charging stations. If third-party companies compete against utilities with privileged access to the electricity distribution network and other advantages, such as socialized cost recovery, the playing field may not be level and competitive service providers will be less likely to invest and innovate—harming consumers in the long run.

This analysis is intended to help policy makers determine the best policy course for consumers.

EV OUTLOOK

Electric vehicles represent only a small fraction of the 285 million vehicles in the U.S. today. This is quickly changing. Currently, there are 1.7 million electric vehicles in the U.S.,[3] which represents a fourfold increase from 2018.[4] In 2021, electric vehicles accounted for less than 5% of sales.[5] But, in the first quarter of 2022, new EV registrations rose 6% while overall new-car registrations dropped 18%.[6] Estimates from BloombergNEF and Atlas Policy indicate the share of U.S. electric vehicle sales will rise quickly, becoming approximately 40% of all new passenger vehicle sales by 2030.[7] The passage of the 2022 Inflation Reduction Act (IRA), which includes incentives for EV purchases, logically only increases these estimates. BloombergNEF modeling released after the IRA's passage estimates sales of new electric vehicles will increase from 43% to 52% of all new passenger vehicles by 2030.[8]

While the exact need is unknown, we do know that significant investments are required to build an electric vehicle charging network that keeps pace with rapid growth in electric vehicle sales. In 2022, there were roughly 120,000 public electric vehicle charging ports in the U.S.[9] According to the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), public charging port installations have grown at an average annual rate of about 20% for 2020

3 Experian, "New Electric Vehicle Registrations Grew More Than 250% Over the Last Five Years, According to New Experian Data," September 2022, https://www.businesswire.com/news/home/20220922005189/en/.

4 *Id.*

5 Ira Boudway, "More Than Half of US Car Sales Will Be Electric by 2030," Bloomberg, September 2022, https://www.bloomberg.com/news/articles/2022-09-20/more-than-half-of-us-car-sales-will-be-electric-by-2030.

6 Experian, 2022.

7 Lucy McKenzie & Nick Nigro, "U.S. Passenger Vehicle Electrification Infrastructure Assessment," Atlas Public Policy, April 2021, at 6, https://atlaspolicy.com/wp-content/uploads/2021/04/2021-04-21_US_Electrification_Infrastructure_Assessment.pdf.

8 Boudway, 2022.

9 A. Brown, J. Cappellucci, et al, "Electric Vehicle Charging Infrastructure Trends from the Alternative Fueling Station Locator: First Quarter 2022," National Renewable Energy Laboratory, September 2022, at 1, https://www.nrel.gov/docs/fy22osti/82987.pdf.

and 2021.[10] The Biden Administration has stated a goal of installing 500,000 electric vehicle charging ports by 2030.[11] Atlas Public Policy similarly estimates that 495,000 electric vehicle charging ports are needed by 2030 to accommodate a scenario of 100% electric passenger new vehicle sales by 2035.[12]

Based on the number of chargers needed by 2030 in these two scenarios, the U.S. is roughly 18% toward meeting expected demand. NREL estimates the U.S. must triple the annual average rate of deployment from the 2020-2022 average,[13] and Atlas Policy projects meeting electric vehicle charging infrastructure targets will require a total of $39 billion in investment between 2021 and 2030.[14] Other projections of public charging need set these goals much higher. The global consultancy McKinsey estimates a scenario consistent with federal targets, in which half of vehicles in the U.S. are zero-emission vehicles by 2030, "would require 1.2 million public EV chargers and 28 million private EV chargers".[15] The International Council on Clean Transportation projects a larger number, noting that to support the projected vehicle count "public and workplace charging will need to grow from approximately 216,000 chargers in 2020 to 2.4 million by 2030, including 1.3 million workplace, 900,000 public Level 2, and 180,000 direct current fast chargers."[16]

10 *Id.* at 7.

11 *Id.* At 1.

12 Lucy McKenzie & Nick Nigro, "U.S. Passenger Vehicle Electrification Infrastructure Assessment," Atlas Public Policy, April 2021, at 6, https://atlaspolicy.com/wp-content/uploads/2021/04/2021-04-21_US_Electrification_Infrastructure_Assessment.pdf.

13 Brown at 7.

14 Nigro at 8.

15 Philipp Kampshoff, Adi Kumar, Shannon Peloquin, and Shivika Sahdev, "Building the electric-vehicle charging infrastructure America needs," April 2022, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs.

16 Bauer, Gordon, Chih-Wei Hsu, Mike Nicholas, and Nic Lutsey, Charging Up America: Assessing the Growing Need for US Charging Infrastructure Through 2030, International Council on Clean Transportation, July 2021, p. i. Found at: https://theicct.org/sites/default/files/publications/charging-up-america-jul2021.pdf.

IV PUBLIC POLICY REEVALUATION REQUIRED

Accommodating this rapid market penetration by electric vehicles requires policy makers to reevaluate long-standing policies regarding electric utilities. Nonutility entities already sell and are expected to continue selling EV charging services to retail customers throughout the U.S. To accommodate necessary charging infrastructure investment, policy makers must reconsider a wide array of traditional electric industry policies and traditions. For example, if a service station sells electricity at retail rates to charge a vehicle, must that service provider become a utility? Most states have passed laws or regulations clarifying that the sale of electricity by a charging station does not make the seller a public utility even though it is providing retail electricity service. But what if the rate to charge is based on time and not kWh? Will there be regulations on rates, terms, and conditions of service, or on the ownership structures allowed? What if the charging station owner simply passes through the costs? How does an entity looking to invest in a regional or national EV-charging service network navigate the plethora of differing state-by-state regulatory regimes?[17]

Developing EV charging networks will require significant upgrades in electricity distribution networks. This raises important questions relating to EV charger interconnections. How does a utility meet increasing demand for local interconnections and system upgrades? How are requests prioritized? What if both independent and utility-affiliated stations wish to be connected in the same given area—will they be treated fairly? How will the costs associated with charging infrastructure development be allocated? Is it project-specific or put into distribution rates? How are capital investments captured? Is there a difference between "last mile" costs and costs for substation improvements needed for increased loads? How should these costs be incorporated in distribution rates? Demand charges? Special EV charges? Fully socialized rates?

Based on our review, no state or other jurisdiction has comprehensively addressed the issues arising from EV charging and infrastructure needs. In this paper, we make policy recommendations for meeting the challenges of rapid EV charging demand growth, supported by the reasoned conclusions and analysis in this paper.

17 R. Gramlich and F. Lacey, "Who's the Buyer? Retail Electric Market Structure Reforms in Support of Resource Adequacy and Clean Energy Deployment," Prepared for the Wind and Solar Alliance by Grid Strategies, March 2020, at 4, https://gridprogress.files.wordpress.com/2020/03/whos-the-buyer.pdf.

V HISTORY OF UTILITY MONOPOLY PROTECTION

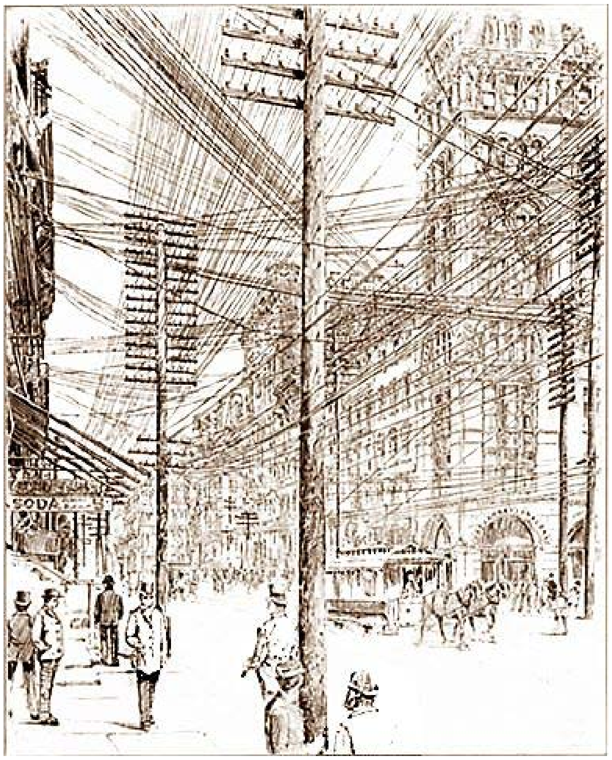
In 1882, Thomas Edison pioneered one of the first commercial installations of indoor electric lighting in the lower Manhattan financial district. It was a paradigm-shifting innovation that inalterably changed the way people lived their daily lives. But Edison soon was in competition with another important innovation, George Westinghouse's transformer, which led to development of the electric industry as we know it today. In competition with Edison, Westinghouse and Nikola Tesla installed dynamos harnessing the immense power of Niagara Falls and built long-distance transmission lines using transformers that delivered alternating current electricity to distant customers.[18] They demonstrated that electricity could be generated on a far larger scale than Edison's Direct Current system, and that AC electricity could be economically transmitted over long distances.[19]

Long-distance electricity transmission allowed electricity production and distribution at an increasingly grander scale. Larger and more-efficient power

18 Forrest McDonald, *Insull*, University of Chicago Press, 1962, p. 37, "In 1886 George Westinghouse and William Stanley perfected a device – the transformer – that made it possible to transmit electricity by means of alternating current cheaply for scores, even hundreds, of miles. This opened a new world to the central stations, for it vastly increased their potential service areas and thus made possible the centralization of production in large, economical steam and hydroelectric generating units."

19 Craig Roach, *Simply Electrifying*, BenBella Books, Dallas, 2017, p. 99, "With the engineering and financial success at Niagara Falls and the Chicago World's Fair, Tesla and Westinghouse had decisively won the Battle of the Currents with their alternating-current system."

FIGURE 2. *Image of overhead power lines in NYC, 1890*



stations generated electricity at increasingly lower cost due to economies of scale. Linking those power plants together in a larger transmission grid provided further economies of scale. Very quickly, electricity shifted from a privilege of the wealthy to a product for the masses.

Key to this outcome was Samuel Insull. After helping Edison establish the company that became General Electric, Insull relocated to Chicago and pioneered structural, financial, and regulatory innovations that rapidly established the electric industry structure as we know it today. Foremost among these was the development and widespread deployment of the regulated monopoly utility business model. Since bigger was better in generation, transmission and distribution of electricity, Insull showed it made economic and logistical sense for one large monopoly company to own the entire system and provide affordable electricity with universal service to all homes and businesses at government-regulated rates.

Insull became an early advocate of regulated monopoly utility service in response to "ruinous competition." It was inefficient for competing electricity providers to each have their own network of generators and wires. Obscuring the urban landscape together with telephone wires, throngs of redundant electrical wires were inefficient. With multiple suppliers competing for customers on price, and each building and maintaining their own generator and distribution network, it was difficult if not impossible to profit. Thus, he argued, competition frustrated the development of electricity production and distribution at scale.[20]

20 McDonald, pp. 57-58. "Insull knew little about how to manage a central station company, but he was sure of one thing: that the only sensible way to sell electric lighting was to have no competition." "So Insull set out to fashion a monopoly of service in Chicago."

The regulated monopoly business model solved these problems. In what is known as the regulatory compact, state and local officials agreed to provide protected monopoly service territories to utility companies, which in turn consented to government oversight and price regulation intended to prevent price gouging and foster universal service. In this construct, retail electricity customers are captive to the utility and have no other option than to take service from the utility at regulated rates.[21]

By the early 20th Century, the standard utility regulatory model ultimately adopted by states (not only throughout the U.S. but in most countries around the world) provided a monopoly utility franchise for a designated geographic area. Legal scholar and administrative law judge Scott Hempling describes it this way: “This franchise is a legal infrastructure designed to align the company’s interest with the public interest. This legal framework has seven components: (1) exclusive retail franchise; (2) obligation to serve; (3) consent to regulation; (4) quality of service; (5) power of eminent domain; (6) limit on liability; and (7) just and reasonable rates. This is the general framework governing all regulated monopolies in the U.S.”[22] The model is often applied in natural gas distribution, local telecommunications, water and sewage service, and certain transportation sectors such as moving and ferries.[23]

The regulated utility model was highly successful, allowing ever greater economies of scale and increasingly more affordable electricity for mass distribution and consumption.

A. Scope of the regulated monopoly

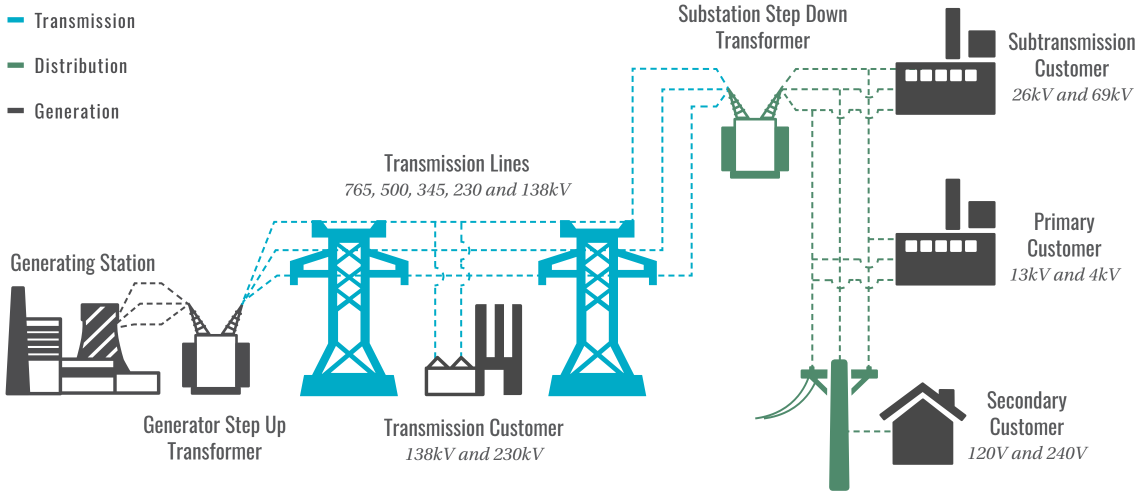
Originally, the regulated utility model included the electricity value chain from the generator to the meter. Resources upstream of the generating facility were not subject to utility price regulation. Mining, mining practices, labor laws, drilling for gas and interstate gas transmission were not considered natural monopolies and therefore not the purview of the regulated utility. Many fuel resources must be transported across multiple states to reach the regulated utility’s property. Similarly, on the other end of the electricity value chain, the monopoly utility typically does not own, operate, manage or control any resources on the customer’s side of the meter, such as appliances.

21 Samuel Insull, “Standardization, Cost System of Rates, and Public Control,” in Central-Station Electric Service, Chicago, Privately Printed, 1915, p. 45, “While it is not supposed to be popular to speak of exclusive franchises, it should be recognized that the best service at the lowest price can only be obtained…by exclusive control of a given territory being placed in the hands of one undertaking. …In order to protect the public, exclusive franchises should be coupled with the conditions of public control, requiring all charges for services fixed by public bodies to be based on cost plus a reasonable profit.”

22 Hempling, Scott, “Regulating Public Utility Performance the Law of Market Structure, Pricing and Jurisdiction,” American Bar Association (2013), 11.

23 For example, see, North Carolina Utilities Commission, “Industries Regulated by the Commission,” last accessed March 2023, https://www.ncuc.gov/Industries/industries.html.

FIGURE 3. *Traditional electric utility: generation, transmission, distribution*[24]



As the electric industry has evolved, the scope of resources with natural monopoly protections has grown smaller. At the front end of the electricity supply chain, it has long been demonstrated that generation supply no longer provides the economies of scale justifying monopoly rights. Congress effectively recognized this in passing the 1978 Public Utility Regulatory Policies Act (PURPA) and later in the 1992 Energy Policy Act (EPAct). PURPA and the 1992 EPAct provided for nonutility generation resources to operate within the monopoly franchise of utilities. Leaving the transmission and distribution businesses within the domain of regulated monopoly, these laws enabled the evolution of electric generation competition and the development of robust regional wholesale power markets. [25]

B. Downstream Innovation

While monopoly protection facilitated rapid growth of the electric industry, it in turn stimulated other platforms for innovation and competition on the customer side of the meter. Vast electric streetcar systems promoted personal mobility and economic growth, which together with motorized vehicles made horses a thing of the past in rapidly modernizing metropolitan areas. Electric appliances alleviated the drudgery of everyday life. Vacuum cleaners, washing machines, electric irons, refrigerators, radios, and phonographs—together with electric lighting—transformed society. And these early 20th century innovations made possible by the electric industry in turn provided other new platforms for competition, innovation and economic growth. Manufacturers competed to provide better appliances at better prices to customers. The utilities promoted these innovations as a means of ensuring and expanding electricity demand.

These downstream businesses were competitive, without any participation from utilities. Utilities have generally been denied the right to monopolize or gain competitive advantage from what

24 https://www.nps.gov/subjects/renewableenergy/transmission.htm

25 Charles Bayless, Public Utilities Fortnightly, December 1, 1994, "This steady march of optimally sized units to larger capacity peaked in the early 1980s with 1,000+ MW units. But in mid-1980, a startling thing happened. The size of the cheapest plant dropped dramatically. Today the cheapest unit is a gas turbine in the 50- to 150 MW range...the important point is that the optimum size has shifted from 500+ MW (10-year lead time) to smaller units (1-year lead time)."

are structurally competitive businesses on the customer side of the meter, even when those businesses are enabled by the utility's business.

C. Competitive Forces in the Electric Industry

Industries like electricity and telecommunications have evolved due to technological innovation. Technological innovation can drive structural competitiveness of subsectors of the electric industry. Economists, Congress, and regulators long ago recognized that generation markets no longer retain the characteristics of a natural monopoly.

In 1983, MIT economists Paul Joskow and Richard Schmalensee produced a highly influential analysis showing that the generation sector of the electric industry was no longer exhibiting declining average costs, indicating that the generation aspect of electricity service was no longer a natural monopoly.[26]

In 1996, FERC addressed this in its landmark Order No. 888 promoting competition in generation markets. "Scale economies encouraged power generation by large vertically integrated utility companies that also transmitted and distributed power. Beginning in the 1970s, however, additional economies of scale in generation were no longer being achieved,"[27] the commission observed. The electric industry faced a situation where the price of each incremental unit of electric power exceeded average cost. "Bigger was no longer better" in generation, FERC's order noted.[28]

26 Paul L. Joskow & Richard Schmalensee, 1988. "Markets for Power: An Analysis of Electrical Utility Deregulation," MIT Press Books, The MIT Press, edition 1, volume 1, number 0262600188.

27 *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Pub. Utils.*; Recovery of Stranded Costs by Publ. Utils. & Transmitting Utils., Order No. 888, 61 FR 21540 (May 10, 1996), at 18.

28 *Id.*, at 18.

Advances in technologies allowed scale economies to be exploited by smaller-size generation units, thereby allowing new generation to be brought online at costs below those of the large plants of the 1970s and earlier.

In developing the federal rules undergirding the shift from monopoly generation resources to competitive wholesale power markets, federal antitrust regulators strongly recommended separating ownership of monopoly transmission and distribution systems from generation supply to assure fair competition.[29] Separating monopoly business from the adjacent competitive sectors would make for more fair competition to the benefit of consumers, the Department of Justice and Federal Trade Commission argued.

Since 1996, robustly competitive power markets with scores of nonutility generation suppliers have developed across approximately one-third of the U.S. While Congress enabled FERC to promote competition in generation markets, each individual state determines the degree to which generation ownership is left with the monopoly utility.

Regulated monopolies played a key role in the initial growth and success of the electric industry, but today policy makers confront important policy decisions regarding the boundary between the exclusive monopoly and the competitive market. To accommodate robust growth in electric vehicles, regulators must make crucial policy decisions on the downstream side of the monopoly utility related to EV charging infrastructure and networks. These decisions will determine the speed of deployment of EV charging, the costs of EV charging, the competitiveness of EV charging, and the products and services offered to end-use consumers of EV charging.

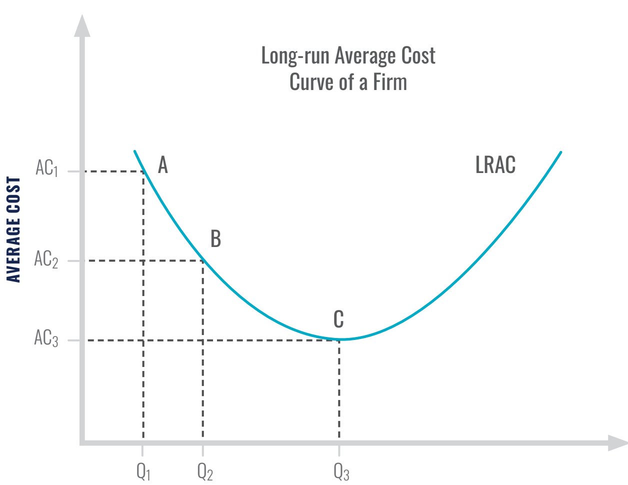
29 August 7, 1995, Comment of the Staff of the Bureau of Economics of the Federal Trade Commission, Federal Energy Regulatory Commission Docket Nos. RM95-8-000 & RM94-7-001 "Competitive opportunities in the generation of electric power have burgeoned in the last decade, stimulated by changes in relative costs of different types of generating plants and by changes in laws and regulations. But economic benefits for consumers of greater competition may be thwarted by features of the industry's traditional vertically integrated structure and regulation." Adopting functional rather than operational unbundling, "would leave in place the incentive and the opportunity for some utilities to exercise market power in the regulated system. Preventing them from doing so by enforcing regulations to control their behavior may prove difficult. The problem would be most effectively prevented by completely separating ownership and control of generation from transmission."

VI NATURAL MONOPOLY

The justification for monopoly protections is based on there being a "natural monopoly." Basic conditions must hold for a market to be considered competitive: (1) the market is comprised of many buyers and sellers where all are price takers and lack the market power to influence prices; (2) the firms in the market produce the same product; (3) there is transparent information about prices and products; (4) transaction costs are low; (5) buyers and sellers can freely enter and exit the market.[30] When these conditions are present, conventional economic wisdom and experience shows consumers are best served by allowing competition among providers, with no privileges granted to any entity.[31]

In contrast, a natural monopoly is where the natural state would have one dominant supplier. In that case, granting market exclusivity can make economic sense and work in the interest of consumers as long as public utility regulation is put in place. In electricity, transmission and distribution largely still exhibit economies of scale, where a bigger network leads to a lower cost per unit of service.

FIGURE 4. *Natural Monopolies and Declining Long-Run Average Cost*



The standard economic theory of economies of scale is illustrated using the Long-Run Average Cost Curve of a firm. The curve plots the average cost for each additional unit of output by a firm. Costs per additional unit are high at low levels of output on the left side of the chart. The left side of the chart (from A to C) is where economies of scale exist. In that range, a natural monopoly exists and "entire demand within a relevant market can be satisfied at lowest cost by one firm rather than by two or more."[33]

30 Jeffrey M. Perloff, Microeconomics Theory and Applications with Calculus, Fourth Edition, Chapter 8 Competitive Firms and Markets, 271-273.
31 *Id.*, Chapter 8 Competitive Firms and Markets and Chapter 11 Monopoly and Monopsony.
32 For image source see https://energyeducation.ca/encyclopedia/Economies_of_scale#:~:text=The%20Long%20Run%20Average%20Cost,rises%20proportionately%20less%20to%20output, R.S. Pindyck and D.L. Rubinfeld. *Microeconomics*. New Jersey: Pearson, 2013, pp. 255-256.
33 R.A. Posner, *Natural Monopoly and Its Regulation*, 50th anniversary edition, Cato Institute, 1968, p. 1.

Monopolies need not be inherently harmful. It is cheaper and more efficient for consumers, with a declining average cost range, to have an industry structure where there is a larger upfront investment and one large firm providing the service. When this occurs, conventional economic wisdom suggests there should be granted exclusivity subject to the regulatory compact of public utility price and service regulation by economic regulators.[34]

A. Regulating Monopolies

Allowing utilities to have monopoly protection or to participate in sectors connected to their protected market domain are policy choices to be made over the course of an industry's evolution. Policy makers should carefully consider the pros and cons of these decisions in terms of what provides the best prices and services for consumers over time. If a sector is not a natural monopoly, it should be treated competitively as in most other industries, without a grant of market exclusivity. When other market failures exist, the extension of the monopoly can be allowed under standard public utility regulation.

Public utility regulation is intended to prevent monopolistic pricing and set rates at levels only high enough to attract investment and grant the utility a reasonable rate of return. Standard regulation also should include rules such as preventing the utility from taking advantage of its monopoly position in one sector to gain advantage in a connected competitive market. Various rules and regulations prevent utilities from favoring affiliates over third parties that may need to use the utility's network. Monopoly utility regulation requires constant vigilance by policy makers due to the financial incentives for the company to leverage its monopoly for advantage in the market. The National Association of Regulatory Utility Commissioners (NARUC) observed that "utilities have a natural business incentive to shift costs from non-regulated competitive operations to regulated monopoly operations since [cost] recovery is more certain with captive ratepayers."[35] Unless regulators restrict utilities to their natural monopoly sector, competition can suffer in these adjacent markets.

B. "Quarantine the Monopoly"

Another public policy decision is whether to contain the utility's participation to the sector for which the natural monopoly exists or to allow it to participate in upstream or downstream sectors. There is a long antitrust and utility regulatory tradition of limiting the scope of monopolies. One clear articulation of this principle is called the Bell Doctrine (or "Baxter's Law"), which arose in 1982 when antitrust lawsuits against AT&T were settled on the condition that AT&T exit the unregulated, competitive downstream equipment market.[36] The Justice Department's Assistant Attorney General in charge of antitrust, William Baxter, argued that regulated vertically integrated monopolists' presence in an unregulated downstream market can be anticompetitive, and thus his recommendation was to "quarantine the monopoly" by requiring AT&T to separate its ownership and control of regulated monopoly businesses from

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34 Scott Hempling, Regulating Public Utility Performance, ABA 2013, pg. 2.

35 *Id.* p. 3.

36 Kiesling, Lynne. "Incumbent vertical market power, experimentation, and institutional design in the deregulating electricity industry." The Independent Review 19.2 (2014): 239-264.

its competitive unregulated endeavors.[37] A significant body of academic literature supports that economic theory and historical examples converge on the same conclusion: a regulated, vertically integrated monopoly is incentivized to skew competition by "sabotaging" rivals of its downstream affiliates.[38] Sabotage, in this context, is described as "the intentional degradation of the quality of inputs sold by the dominant firm to unaffiliated downstream retailers (the upstream dominant firm artificially increases the unit costs of unintegrated downstream rivals by degrading input quality or imposing other cost-increasing, non-price terms of sale)."[39] The goal of sabotage is to increase the profits of the monopolist's downstream subsidiary.[40]

Sabotage can take other forms as well. Referring to the electric industry specifically, Sibley and Weisman count "refusing to deal" and "poor quality interconnection" as potential forms of sabotage.[41] Sappington and Mandy expand on this list, adding (1) unnecessarily delaying approval and implementation of nonutility projects/deployment of new products (intentionally delaying the process to get generation facilities interconnected, for example); and (2) withholding valuable information to the unaffiliated downstream rivals.[42] Sabotage occurs because the monopoly is profit-constrained in its upstream market while profits are unrestrained in the unregulated sector.[43] Sand adds, "the increased costs for the rivals could be due to legal expenses incurred when attempting to obtain access on equal terms"— transaction costs occur when an unaffiliated downstream firm must ensure they receive fair treatment to enter the market.[44]

To counter the incentive to sabotage, regulators have either enforced structural separation, as was done by antitrust regulators with AT&T, or enforced rules that require regulated utilities to deal with everyone—affiliates and competitors alike—on comparable terms. The former approach is called "structural," while the latter is "behavioral," or rules-based regulation. Behavioral regulation tends to be less effective than structural separation or preventing the utility from participating in adjacent sectors.[45] If a monopoly utility has affiliates in the competitive sector, it will have an incentive to advantage its affiliates relative to competitors and regulatory rules are difficult to fashion that overcome all the subtle ways a utility might disadvantage its competitors.

Behavioral regulations can address access pricing (the price the monopoly charges competitors for market entry—in this case, connection to the electricity grid), but it can be difficult to

37 Baxter, William F. "Conditions Creating Antitrust Concern with Vertical Integration by Regulated Industries—'For Whom the Bell Doctrine Tolls'." *Antitrust Law Journal* 52, no. 2 (1983): 243–47. http://www.jstor.org/stable/40842824.

38 Beard, T. Randolph, David L. Kaserman, and John W. Mayo. "Regulation, vertical integration and sabotage." The Journal of Industrial Economics 49.3 (2001): 319-333; Economides, Nicholas. "The incentive for non-price discrimination by an input monopolist." International Journal of Industrial Organization 16.3 (1998): 271-284; Economides, Nicholas. "The incentive for non-price discrimination by an input monopolist." International Journal of Industrial Organization 16.3 (1998): 271-284; Kiesling, 2014.

39 Beard, Kaserman, and Mayo, 2001.

40 Bustos, Alvaro E., and Alexander Galetovic. "Vertical integration and sabotage with a regulated bottleneck monopoly." The BE Journal of Economic Analysis & Policy 9.1 (2009).

41 Sibley, David S., and Dennis L. Weisman. "Raising rivals' costs: The entry of an upstream monopolist into downstream markets." Information economics and policy 10.4 (1998): 451-470.

42 Mandy, David M., and David EM Sappington. "Incentives for sabotage in vertically related industries." Journal of regulatory economics 31.3 (2007): 235-260.

43 Beard, Kaserman, and Mayo, 2001; Sappington and Mandy, 2007.

44 Sand, Jan Y. "Regulation with non-price discrimination." International Journal of Industrial Organization 22.8-9 (2004): 1289-1307.

45 Reiffen, David, Laurence Schumann, and Michael R. Ward. "Discriminatory dealing with downstream competitors: Evidence from the cellular industry." The Journal of Industrial Economics 48.3 (2000): 253-286; Kiesling, 2014; August 7, 1995, Comment of the Staff of the Bureau of Economics of the Federal Trade Commission, Federal Energy Regulatory Commission Docket Nos. RM95-8-000 & RM94-7-001.

regulate the *quality* of those inputs or the timeliness in which they are deployed.[46] Even if there are regulations to address quality of input and timeliness of deployment, there is broad scope for the monopolist to legally evade these provisions, and oversight of these requirements will be imperfect.[47] Bustos and Galetovic find that vertically integrating unaffiliated, unregulated downstream firms with an upstream monopolist's subsidiary does not increase consumer welfare in the long run—the only exception being if the subsidiary is much more efficient than the rivals.[48] Further, sabotage-related activities only serve to raise costs and harm consumers, whereas independent competition not only lowers costs but increases innovation.[49] Another consequence from sabotage and inefficient vertical integration for developing industries is the blunting of innovation in products and services.[50]

Given the incentive of utility monopolies to extend their business into adjacent sectors and the consumer harm when that happens, policy makers should be vigilant to protect against this "mission creep" by putting boundaries on monopoly utility activities.

C. Justifying ownership of EV charging stations by utilities

Any sector of the economy can be evaluated to identify a natural monopoly. If economies of scale exist, it would warrant a monopoly franchise and exclusive ownership by one firm. In this section we assess public EV charging stations and their cost structure.

1. Evaluation of Scale Economies in Public Charging Stations

To determine if economies of scale exist in the public EV charging market, our analysis examined whether declining average costs exist in the market. The size of the market is important to establish in such analyses; it should not be the entire country but rather the geographic area in which individual public EV stations compete for customers. For example, for gasoline stations, there are many small fueling stations—not one large, individual station in a given geographic area (such as a ten-mile radius). Similarly, public EV charging stations in most areas will likely be characterized by many small, independent stations.[51] With hundreds of EV charging stations needed in a given geographic area, the efficient scale of electric vehicle charging stations means numerous firms will enter and exit the market, satisfying the conditions needed for a competitive market.[52]

Such market analyses also require a careful definition of the product. A "standard" public EV charging service includes multiple DC fast-charging terminals that provide a roughly 30-minute customer experience, including security measures, and access to restrooms and food.[53] It is clear companies are planning to operate their public EV charging stations independently

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46 Reiffen, Schumann, and Ward, 2000.

47 *Id.*

48 Bustos and Galetovic, 2009.

49 *Id.*

50 Kiesling, 2014.

51 Melaina M., Bremson J., & Solo K., "Consumer Convenience and the Availability of Retail Stations as a Market Barrier for Alternative Fuel Vehicles," National Renewable Energy Laboratory, November 2012, at 1, https://www.nrel.gov/docs/fy13osti/56898.pdf.

52 Alternative Fuels Data Center, "Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, Accessed February 2023, https://afdc.energy.gov/evi-pro-lite#:~:text=EVI%2DPro%20Lite%20is%20a,Tool%20(EVI%2DPro).

53 *See* announcements from Mercedes-Benz , Volvo, Starbucks, and ChargePoint, and Shell.

from each other and potentially even in close proximity. Anecdotally, we found in urban centers there are already examples of multiple public DC fast charging stations in the immediate area.[54]

Economic theory also dictates that, in industries with high fixed costs, economies of scale are more likely. While there are some fixed costs associated with each charging station that do not vary with the number of chargers installed such as rent, insurance, materials, and labor, they are not a large part of the costs.[55]

2. Methodology for cost calculations

The table below from RMI provides a range-of-cost example for DC fast-charging infrastructure.[56] A typical electric vehicle charging station has multiple charging ports. Mercedes-Benz, Electrify America, and Tesla are or will be the three largest DC fast charging networks in the United States. They typically have six, four, and eight fast-charging ports per station respectively, with only about ten public EV charging stations across the three companies having fewer than four DC fast-charging ports.[57]

TABLE 2. *Cost Ranges for Charging Infrastructure Components*[58]

COST ELEMENT	LOWEST COST	HIGHEST COST
DCFC (50kW)	$20,000	$35,800
DCFC (150 kW)	$75,600	$100,000
DCFC (350 kW)	$128,000	$150,000
Transformer (150-300 kVA)	$35,000	$53,000
Transformer (500-7,500 kVA)	$44,000	$69,600
Transformer (1,000+ kVA)	$66,000	$173,000
Data contracts	$84/year/charger	$240/year/charger
Network contracts	$200/year/charger	$250/year/charger
Credit card reader	$325	$1,000
Cable cost	$1,000	$3,500

54 *See* DC Fast Charging Station Locations in Seattle, WA (98101, 98122) and San Francisco, CA (94102, 94103) in the Alternative Fuels Data Center, "Alternative Fueling Station Locator," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, Accessed February 2023, https://afdc.energy.gov/stations/#/find/nearest?fuel=ELEC&ev_levels=dc_fast.

55 Chris Nelder and Emily Rogers, Reducing EV Charging Infrastructure Costs, RMI, 2019 https://rmi.org/wp-content/uploads/2020/01/RMI-EV-Charging-Infrastructure-Costs.pdf. ("RMI Report")

56 *Id.* at 21.

57 DOE Alternative Fuels data and Mercedes-Benz Announcement.

58 Adapted from RMI report at 21.

Using the average number of ports per station, charging terminal prices from ChargePoint,[59] transformer unit costs from Pacific Gas and Electric Company[60] and Southern California Edison,[61] and other charging infrastructure components from RMI,[62] we calculated the total cost for an electric vehicle charging station. For the calculation we used some simplifications. ChargePoint sells a dual port EV charging station, the ChargePoint Express 250 CPE250, which retails for $52,000.[63] We used PGE's April 2021 unit cost guide and SCE's March 2022 unit cost guide to correctly size a transformer based on the number of ports per average EV charging station.[64] Finally, we used the high end of the cost estimates for data contracts, network contracts, credit card reader costs, and cable costs from RMI.[65]

Land acquisition costs were not included in our calculations because the contract terms are non-public and highly variable. Charging equipment is also often located on land with minimal economic value because it is unusable for other purposes, such as the grass perimeter around a parking lot. Parking spots in commercial locations may be leased to the charging company at zero cost or other favorable terms because the commercial business wants the consumer traffic.

Interconnection costs and distribution system upgrades also were not included in our calculations because they are still a part of the utility's natural monopoly and can have significant economies of scale. These costs are highly fixed and do not scale linearly with the size of the installation. Because there are economies of scale in interconnections, the state regulator should review those costs. We address those costs and their allocation further in this paper.

With these assumptions, we calculated the total cost of an EV charging station to be in the range of $150,000 for four charging ports[66] on the low end and $275,000 for eight charging ports[67] on the high end. In our calculations the charging terminals make up approximately two-thirds of the cost for the charging infrastructure components. Using these numbers, we calculated the total average infrastructure costs per charging port across the range of average charging ports for the three largest DCFC networks. We find an approximate average price per DCFC port of $37,365 for four charging ports, $35,652 for six ports, and $34,391 for eight DCFC ports.

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59 *See* Smart Charge America, "ChargePoint Express 250 CPE250," last accessed March 2023, https://smartchargeamerica.com/electric-car-chargers/commercial/?filter_charging-level=level-3&filter_ports=double-port.

60 *See* PG&E, "Unit Cost Data Guide," April 2021, https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/interconnection-renewables/Unit-Cost-Guide.pdf.

61 *See* SCE, "Unit Cost Guide," March 2022, https://www.sce.com/sites/default/files/custom-files/Web%20files/Attachment_A-Unit_Cost_Guide.pdf.

62 RMI report at 21.

63 *See* https://smartchargeamerica.com/electric-car-chargers/commercial/chargepoint-express-250/.

64 See https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/interconnection-renewables/Unit-Cost-Guide.pdf; https://www.sce.com/sites/default/files/custom-files/Web%20files/Attachment_A-Unit_Cost_Guide.pdf.

65 RMI report at 21.

66 Includes two ChargePoint Express 250 CPE250 fast chargers with a $39,000 150kVA transformer from PG&E; *See* PG&E Unit Cost Guide.

67 Includes four ChargePoint Express 250 CPE250 fast chargers with a $58,710 750 kVA transformer from SCE; *See* SCE Unit Cost Guide.

TABLE 3. *Calculations for average cost per EV charging port by company*

COMPANY	ELECTRIFY AMERICA	MERCEDES-BENZ	TESLA
Average Number of Chargers	4	6	8
DCFC	$52,000	$52,000	$52,000
Transformer	$39,000	$50,470	$58,710
Data Contracts (per charger/per year)	$240	$240	$240
Network Contracts (per charger/per year)	$250	$250	$250
Credit Card Reader	$1,000	$1,000	$1,000
Cable Cost	$3,500	$3,500	$3,500
Total	**$149,460**	**$213,910**	**$275,130**
Cost per port	**$37,365**	**$35,652**	**$34,391**

The results of our calculations demonstrate that adding additional individual charging ports produces a fairly linear cost per port. Individual firms might achieve some economies of scale by purchasing in bulk or achieving learning curves in soft costs.[68] However, it is clear there are not large reductions in cost for each additional electric vehicle charging port added to a station. Instead, our calculations show a relatively linear cost per additional port. The result from our analysis locates the market for electric vehicle charging stations on the flat cost part of a long run average cost curve, where there are no economies of scale. A relatively linear and not decreasing average cost profile is consistent with "constant returns to scale" one sees in structurally competitive markets, and not a natural monopoly with large economies of scale. At no point does the marginal charger installation result in lower costs to charge an incremental vehicle. In contrast, as incremental electric load is put on a utility's distribution system, distribution costs remain constant and the average cost for delivery of each kilowatt-hour of electricity decreases.

When there are constant returns to scale, it is most efficient to have a competitive market with many distributed firms producing the output. In this case, it would be most efficient to have many electric vehicle charging terminals and stations owned and operated by many independent firms. We therefore conclude that public charging stations are a structurally competitive sector, not a natural monopoly.

We now turn to a description and assessment of each ownership option and explore the question of whether monopoly-owned EV charging stations can co-exist fairly in a structurally competitive sector.

68 RMI report at 23.

VII ELECTRIC VEHICLE CHARGING STATION OWNERSHIP OPTIONS

In this section we identify and evaluate three broad ownership models for public EV charging stations that could potentially be implemented separately, as well as a fourth option, which could be a hybrid of all or some of the three models. First, we examine the private utility ownership model where public EV charging stations would be exclusively owned by the host utility. Second, we consider the independent (nonutility) private ownership of charging stations. Independent station ownership would be similar to the traditional service station model and to almost all other retail businesses across the U.S. economy. Third, there could be a public (government) ownership model where local, state, and or federal governments would own the public charging stations. Finally, there is a hybrid model where two or all three of the ownership models are incorporated. In this section we describe and evaluate each ownership type.

A. Utility ownership

We evaluate utility ownership of EV charging stations as we would evaluate utility ownership of any other asset. The resources and expenses associated with operations and maintenance of the resources would be built into utility rates. Rates would be socialized across all customers

and would change periodically, and the utility would not be relieved of its universal service obligations.

Today, seven states still regulate EV charging as the exclusive domain of the electric company.[69] Others, while not providing exclusivity to the utilities, are allowing utility ownership of EV-charging stations. Utility companies have already embarked on a path of EV charging ownership and are receiving funding for the initiatives through pilot program funding, special tariffs, or other ratepayer-funded mechanisms. The Department of Energy reports alternative fuels vehicle incentives in every state.[70] Some utilities provide investment incentives for private ownership of EV charging stations; they provide alternative rate structures and, in some instances, they own both the charging stations and infrastructure to support them.

The following sections describe three regions where regulators have allowed utilities to own and operate public EV charging stations. One example is from Maryland, where electricity markets have been restructured to allow retail choice. Another example is from California, which is a complex electricity market that allows some retail choice, but most customers lack that right. The third is from Louisiana where the fully vertically integrated investor-owned utility is regulated by the city council.

1. Maryland has Allowed Limited Utility Ownership of EV Charging Stations

The Maryland Public Service Commission (MDPSC) in January 2019 ordered the state's utilities to invest in EV charging infrastructure. These investments include discounts, rebates, tariff incentives, and utility ownership of public charging stations. In its order, the MDPSC stated, "In due consideration of the State's policies toward EV adoption and clean air, as well as the Commission's own priorities for grid reliability, efficiency and optimization, the Commission finds that it is in the public interest to allow utilities to own and operate a limited number of public charging stations to jumpstart the deployment of a public EV charging network, reduce EV owner range anxiety in the near term, and lay the foundation for a competitive market to develop in this space."[71] In aggregate, the MDPSC allowed the utilities to install nearly 1,000 public EV Chargers on government properties, stating, "The Utilities are directed to locate public EV charging equipment only at property leased, owned, or occupied by a unit of State, county, or municipal government for public use and, to that end, the Utilities shall work with state, municipal and local government entities to determine the siting locations for these public EV chargers."[72]

The MDPSC also allowed $17.8 million in EV-charging incentives to residential customers. These incentives include discounted smart chargers, rebates and tariff incentives, and EV-only time-of-use rates and submetering. The MDPSC has not allowed utility ownership of residential EV charging, ordering, "All charging equipment in this [Residential] category and in the Non-

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69 David Ferris, "Will electric vehicles kill the gas station?," E&E News, October 2022, https://www.eenews.net/articles/will-electric-vehicles-kill-the-gas-station/.

70 Alternative Fuels Data Center, "State Laws and Incentives," U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, Accessed February 2023, https://afdc.energy.gov/laws/state.

71 Maryland Public Service Commission, Order 88997, In the Matter of the Petition of the Electric Vehicle Work Group for Implementation of a Statewide Electric Vehicle Portfolio, Case No. 9478, January 14, 2019, p. 65.

72 *See*, MDPSC Order No. 88997, p. 66.

Residential category will be customer-owned."[73] Maryland seeks to extract some value from the residential subsidies by compelling recipients of the incentives to share their metering data with the utility. MDPSC ordered, "The Utilities shall require any residential customer who elects to participate in the rebate program to share EV charging timing, frequency, and other usage data with their Utility, as a condition of receiving the rebate."[74]

The Maryland utilities, in program reports in the MDPSC's EV docket, proposed for Commission approval specific modifications and enhancements to their EV-charging programs based on approximately two years of experience. Among the 34 different utility proposals were requests for more funding to support further utility investments in public level 2 chargers. Specifically, BGE requested an additional $3.7 million to own and operate 100 level 2 chargers at multi-unit dwellings (MUD) locations. They argued their initial program to subsidize EV charging at MUD locations was over-subscribed. They also asked the MDPSC for additional funds for discounts on other EV services across multiple rate classes. The other Maryland utilities did not seek funding for incremental EV charging stations but did seek other program enhancements that would be borne by ratepayers.

The MDPSC adopted several of the 34 recommendations made by the utilities but denied BGE's request for incremental level 2 charger funding. They did, however, allow BGE to expand its charging network by allowing excess approved funds from earlier approvals to be used to for incremental charging resources, reasoning:

> "Because the true benefits of allowing utilities to own and operate multifamily chargers are not yet understood, the Commission cannot justify additional ratepayer spend for additional multifamily chargers. Nevertheless, there is value in affording BGE flexibility to collect more data. To minimize cost impacts on BGE ratepayers, the Commission will adopt Staff's recommendation to allow BGE 60 additional L2 chargers at no additional increase in budget, and further directs BGE to install a minimum of 20 percent of these chargers at multifamily locations comprising at least 30 percent [low- and moderate-income] residents."[75]

2. California Has Allowed Limited Utility Ownership of EV Charging Stations

Southern California Edison petitioned the California Public Utility Commission (CPUC) for approval of its Charge Ready 2 Infrastructure and Market Education Programs for funding to own and operate more than 4,000 charging ports[76]. SCE had a focused market. It wanted to own and operate charging facilities at multi-unit dwelling locations, government facilities, and universities. Stakeholders generally argued against the size and scope of the SCE program. The CPUC acknowledged the comments and significantly downsized the program, limiting SCE's ownership to no more than 2,500 units and limited the host site to multi-unit dwellings in

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73 *See*, MDPSC Order No. 88997, p. 45.

74 *See*, MDPSC Order No. 88997, p. 55.

75 *See*, Maryland Public Service Commission Order No. 90036, Order Approving, in Part, Modifications to the Statewide Electric Vehicle Charging Pilot Program, In the Matter of the Petition of the Electric Vehicle Work Group for Implementation of a Statewide Electric Vehicle Portfolio, Case No. 9478, p. 34, January 11, 2022.

76 *See*, CPUC, "APPLICATION OF SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E) FOR APPROVAL OF ITS CHARGE READY 2 INFRASTRUCTURE AND MARKET EDUCATION PROGRAMS," Application 18-06-015, June 2018, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M217/K456/217456372.PDF.

disadvantaged communities.[77]

3. New Orleans City Council Has Allowed Utility Ownership

Entergy New Orleans (ENO), regulated by the New Orleans City Council, petitioned the Council for authority to spend up to $500,000 on "public EV charging infrastructure that would provide free EV charging services at roughly 30-50 locations" in the city.[78] Despite stakeholder opposition, the City Council allowed ENO "to invest of up to $500,000 in public EV charging infrastructure that would provide free EV charging services at roughly 30-50 locations and shall consider stakeholder input as to the siting of such locations." The siting decision was moved to a different docket.[79] Although an ultimate decision on locations remains undecided, Entergy and the city have already deployed a small network of EV charging stations with additional charging stations planned.[80]

With passage of the federal Infrastructure Investment and Jobs Act (IIJA) in 2021[81], ENO has requested incremental funding from the City Council, expecting it will be partially funded by the federal government. ENO has requested an additional $3 million to fund the construction and ownership of five DCFC charging stations across the City of New Orleans, including one located in a parking lot of a big box retail store. ENO is not proposing free charging at these DCFC stations; rather, they have proposed a $0.35 per kWh charge, which ENO states "is not a cost-based rate and is not calculated to recover the costs of the DCFC stations. Rather, ENO is proposing that the [DCFC Rate] Schedule have an initial rate intended to encourage use of public DCFC stations and adoption of EVs and that ENO have the ability to periodically adjust the rate with due notice to the Council."[82]

The City Council, recognizing that EV ownership should not be reserved for public utilities, decreed that "the construction, location and operation of electric vehicle charging stations on both private and public property should be encouraged." It also acknowledged current laws might hinder the way private chargers are regulated under traditional public utility regulation. In doing so, it affirmed that "a person or entity that purchases electricity from Entergy New Orleans or another utility regulated by the New Orleans City Council and furnishes such electricity exclusively to charge vehicles, to or for the public, for compensation, never was, and is not now, a utility or public utility…and is not subject to the Council's utility regulatory authority."[83] This type of edict from a regulator is important to facilitate competitive charging.

While the City Council is allowing and even encouraging private ownership of charging stations, at the same time it is allowing ENO to provide free charging at 30-50 locations approved by the

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77 *See*, CPUC, "DECISION AUTHORIZING SOUTHERN CALIFORNIA EDISON COMPANY'S CHARGE READY 2 INFRASTRUCTURE AND MARKET EDUCATION PROGRAMS," Application 18-06-015, September 2020, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K230/346230115.PDF.

78 *See*, Resolution No. R-19-457, Resolution and Order in the Revised Application of Entergy New Orleans, LLC for a Change in Electric and Gas Rates Pursuant to Council Resolutions R-15-194 and R-17-504 and for Related Relief Resolution and Order, Docket No. UD-18-07, November 7, 2019, p. 172.

79 *Id.* p. 189.

80 *See*, Entergy, "City, Entergy New Orleans Complete First Installation of Public Electric Vehicle Chargers," August 2022, https://www.entergynewsroom.com/news/city-entergy-new-orleans-complete-first-installation-public-electric-vehicle-chargers/.

81 Infrastructure Investment and Jobs Act, Pub. L. 117-58 (Nov. 15, 2021).

82 Request of Entergy New Orleans, LLC for Approval of Public Direct Current Fast Charging Station Project to Expand Access to Electric Vehicle Charging Infrastructure and Request to Modify its Electric Rate Schedules,

83 See, Resolution R-18-100 at 3-4. See, e.g., Sections 146-275 and 146-276 of the City of New Orleans' Code of Ordinances, which require entities who would install physical assets, like EV charging stations, over or under the streets of New Orleans to obtain a "special franchise" from the City.

City Council in 2019. With its proposed DCFC stations, ENO's proposed plan is to charge a rate that is not cost-based and will not recover costs.

In each of these proceedings allowing utility ownership of public charging, arguments were made that supported utility ownership of EV charging to solve some societal problems such as providing access to EV charging in underserved markets. Today, underserved markets have not been defined. Underserved could include sparsely populated, remote and/or low-income areas. At this point, however, it is unclear that such areas will not be served by private owners. The market is too immature to show a societal need exists for utility-owned EV chargers in underserved areas. Policy decisions to allow utility ownership in these areas are premature.

B. Municipal government utility ownership

In the context of public EV charging stations, the municipal utility model is similar to the investor-owned utility framework. The municipal utility benefits from the same cost-recovery model but lacks the profit incentive and access-to-capital options that investor-owned utilities enjoy. Extensive capital outlays are often funded with municipal debt secured by ratepayers. In this business model, management decisions, such as locating a charging station or developing an entire network, can sometimes be political in nature rather than profit oriented. A municipality may have the best access to land on which to develop a charging network, but the typical municipal location is not suited for consumers seeking charging services while shopping or dining at a restaurant. In this model, municipal ratepayers can potentially be burdened with uneconomic decisions that make no sense for EV owners.

C. Electric cooperative utility ownership

The cooperative utility ownership model suffers from similar constraints. In the cooperative business model, like the municipal model, profits don't drive business decisions. Because co-ops are customer-owned, the customers would just be paying themselves any profits earned. In theory, business decisions are made that best serve themselves. Cooperatives generally have access to subsidized capital through federal government programs. Cooperative utilities have a track record in making innovative investments that will ultimately lower costs for their members. These include investments in efficiency, demand response and microgrids. It is not yet clear if cooperatives will lead the EV charging buildout.

Unlike other innovations where co-ops have led the deployment, EV charging networks will increase the costs to the co-op and, especially early on, most members will not own EVs. In addition to the cost issues of subsidization and price impact, load management will also be challenging for co-ops. According to a recent report from the National Rural Electric Cooperative Association, "The load associated with EVs can be beneficial to co-ops since it is highly flexible; it can be shifted away from peak hours or other periods when grid supply is low and/or expensive to periods of excess or low-cost electricity." It further states, "However, EVs have the potential to negatively impact co-ops if they are not prepared to accept and manage the charging load. Unmitigated charging load may increase peak demand, electricity costs, and exceed the limits of co-op infrastructure."[84]

Drivers are not accustomed to scheduling or managing their stops for re-fueling an automobile.[85] Today, when a gas tank runs low, the driver pulls over and fills up. In the market for publicly available EV charging, that consumer behavior is not likely to change. It will be very difficult to educate consumers to recharge only at certain times, especially when those times change. In the early adoption days of EV charging, a charger might be used only a couple of times a day, and perhaps by non-members who are just driving through the co-op service territory. This can create spikes in demand that will be difficult for the co-op to manage or prevent and result in increased costs for the co-op's members. There are financial risks for cooperative utilities and their member-owners in building out an EV charging network. These risks might suppress their desire to lead on developing EV charging locations.

84 *See*, Erin Kelly, "NRECA Report: What Co-ops Can Do to Benefit From Electric Vehicle Rise," Cooperative.com, August 2021, https://www.cooperative.com/news/pages/nreca-report-what-co-ops-can-do-to-benefit-from-electric-vehicle-rise.aspx.

85 Joann Muller, "Electric car road trips are perfectly doable — if you plan ahead," Axios, February 2023, https://www.axios.com/2023/02/14/electric-car-ev-road-trip.

VIII MARKET CHALLENGES WITH UTILITY OWNERSHIP

The utility ownership models create several problems. First and foremost, utility ownership of EV charging infrastructure will harm competition and inhibit product and service innovation. Second, utilities generally lack the significant labor resources necessary to oversee the purchase, installation, and maintenance on a long-term basis of the vast number of chargers required to support a comprehensive national EV-charging infrastructure network. It would be economically inefficient for utilities to develop a labor force of that magnitude. Third, utility ownership of chargers will create needless regulatory and legal burdens of granting access to private property, developing easements for access to private properties, and ensuring adequate compensation to private property owners for such access. Finally, it leads to cost shifts and subsidies paid by non-EV owning customers. Each of these problems ultimately harms consumers through increased costs, deployment delays and innovation shortfalls. Electric utility participation in EV charging markets will frustrate the rapid development of robust charging networks at least cost to consumers.

A. Unfair Competition

Many pleadings before utility regulatory commissions across the country argue that utility ownership of EV charging will harm competition, slow the implementation of EV charger development, or is otherwise not sound public policy. It is not just private enterprise arguing against utility ownership of EV Charging. In Maryland, the Office of Peoples Counsel (MDOPC), the consumer advocate in utility proceedings, argued, “private competitive charging companies have built and are building charging stations across the state and the country. Charging stations are not ‘natural’ monopolies; thus, the rationale that economies of scale make it more efficient for utilities to build, own, and operate EV charging stations is lacking.”[86] MDOPC added, “Utility participation in competitive markets risks undermining the competition, especially in emerging markets for EVs. Most significantly, incumbent utilities compete with a largely guaranteed source of funding and profit—recovery from customers in rates. And ratepayer funding is not the only potential entry barrier. Among other potential barriers, utilities benefit from widespread brand name recognition unavailable to competitors, and they can also benefit from ratepayer-funded marketing campaigns.”[87] Utilities could also “sabotage” competition as discussed above, by giving themselves preferential access to the interconnection process, reallocating costs in rate proceedings or through other difficult to discern behaviors, such as implementing demand charges in tariffs applicable to certain businesses that operate EV chargers.

86 Comments of the Office of People’s Counsel, In the Matter of the Petition of the Electric Vehicle Work Group for Implementation of a Statewide Electric Vehicle Portfolio, Maryland PSC Case No. 9478, October 6, 2021, p. 3.
87 *Id.* p. 4.

Under a utility ownership model, cost shifts and subsidies are inevitable. When a utility spends money or invests in infrastructure, it is the collective captive ratepayers' money. Unlike traditional distribution investments, until all vehicles driven are electric, only some consumers will benefit from utility investments in EV charging facilities. Thus, any utility cost-recovery model will necessarily include recovery from consumers who receive no benefit from the investments. The only potential work-around to this would be if all costs for each individual utility-owned charging station were recovered from the customers who used the charging station. In a rate-regulated model, the rate-setting would become more complex with stakeholders arguing that distribution upgrades were or were not needed absent the charging investments. This could result in utility-owned facilities charging different rates in different regions of the utility service territory, contrary to basic utility ratemaking principles. The impracticality and/or illegality of differentiated utility rates for charging results in subsidies that unfairly benefit utility-owned charging networks in competition with privately owned charging stations. The subsidies might be such that an independent charging station owner might shy away from investing in certain areas because of subsidized charging available nearby. Ultimately, this harms consumers, depriving them of competitive options (if seeking a charge) and compelling the payment of a subsidy (from customers who do not own EVs).

B. Labor constraints on the utility ownership model

The overall utility workforce has declined almost 4% since 2010.[88] The Center for Energy Workforce Development projects utilities will need to hire more than 150,000 employees over the next five years.[89] This employment shortfall already constrains societal electrification trends, including the efficient deployment of EV charging stations. For example, there are stories of EV charging network upgrades taking multiple years. Based on surveys of EV charging developers, the Interstate Renewable Energy Council (IREC) finds the current timeline to develop a DC fast charger "range[s] from six months to more than two years."[90] According to IREC's survey of EV charger developers, "the main factors that contribute to longer timelines include interconnection process delays, difficulties obtaining easements, and slow permitting processes."[91] IREC identified "lack of utility staff and resources dedicated to EV infrastructure projects" as a primary cause of the delays and cites five other research reports reaching this same conclusion.[92]

McKinsey estimates a scenario consistent with federal targets (in which half of vehicles in the U.S. are zero-emission vehicles by 2030) "would require 1.2 million public EV chargers and 28 million private EV chargers".[93] The International Council on Clean Transportation projects a slightly larger number, noting that to support the projected vehicle count "public and workplace charging will need to grow from approximately 216,000 chargers in 2020 to 2.4 million by

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88 *See*, https://datausa.io/profile/naics/utilities#about summarizing US Bureau of Labor Statistics data.

89 *See*, CEWD, "Gaps in the Energy Workforce 2021 Pipeline Survey Results," 2021, https://cewd.org/wp-content/uploads/2022/02/Gaps-In-Energy-Careers-Report-2022_Final-pages.pdf.

90 Interstate Renewable Energy Council, Paving the Way: Emerging Best Practices for Electric Vehicle Charger Interconnection, June 2022, p. 10. ("IREC Study"), https://irecusa.org/wp-content/uploads/2022/06/EV-Paper-3-Charger-Interconnection_compressed.pdf.

91 IREC Study, p. 10.

92 IREC Study, p. 11.

93 Philipp Kampshoff, Adi Kumar, Shannon Peloquin, and Shivika Sahdev, "Building the electric-vehicle charging infrastructure America needs," April 2022, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs.

2030, including 1.3 million workplace, 900,000 public Level 2, and 180,000 direct current fast chargers."[94] With utilities short-staffed, policies should encourage private ownership of EV chargers, and utilities should be incentivized to develop staff trained in improving the interconnection process for private EV-charging investments. Without such policies, utilities might be incentivized to interconnect or otherwise service their own charging stations before others.

Utility ownership of EV charging stations will exacerbate the utility labor problem. The employment analysis presented above does not include any hiring specifically for the installation or maintenance of charging stations. According to JD Power, maintenance of charging stations is becoming an important issue. They report that the "number of failed charging attempts climbed steadily from 15 percent in the first quarter of 2021 to 20 percent in the first quarter of 2022 and rose to more than 21 percent by the third quarter [of 2022]."[95] This maintenance burden should not be borne by utilities or their rate payers. Doing so would result in significant cross subsidies from utility customers without EVs and would unfairly benefit a utility competing in the market for EV charging.

While the exact number of utility employees needed for maintenance is not known, the burden will be quite significant. In BGE's mid-course program enhancement request referenced above, BGE sought $1 million in incremental funding for maintenance of its network of 500 publicly available EV charging stations. BGE's maintenance burden at the time was approximately 20 tickets per month per 100 chargers[96].

C. Legal and regulatory constraints on the utility ownership model

Legal issues significantly complicate the utility ownership model of EV charging networks. For example, it is easy to envision why EV chargers will be needed throughout our interstate highway network, similar to the fueling network that exists today. Addressing range anxiety issues will facilitate EV market penetration.

Real estate issues complicate utility ownership of EV charging stations, especially in high-traffic areas that are already populated with fueling stations. The federal infrastructure bill complicates the real estate issue for utility ownership even more. The IIJA provides incentives for EV charger development, however, the incentives are limited to chargers located in "Alternative Fuels Corridors," which are basically the interstate highways. To receive the incentives, the EV charging stations need to include banks of four chargers, located within 50 miles of each other and no more than one mile off the interstate.[97]

The intricacies of cost and real estate procurement in this scenario would warrant a paper of

94 Bauer, Gordon, Chih-Wei Hsu, Mike Nicholas, and Nic Lutsey, Charging Up America: Assessing the Growing Need for US Charging Infrastructure Through 2030, International Council on Clean Transportation, July 2021, p. i., https://theicct.org/sites/default/files/publications/charging-up-america-jul2021.pdf.

95 Automotive News, JD Power: EV Charger Reliability Worsens, quoting J.D. Power's Electric Vehicle Experience Public Charging Study, Feb 8, 2023, https://www.autonews.com/mobility-report-newsletter/jd-power-ev-charger-reliability-worsens.

96 *See*, Maryland Public Service Commission Order No. 90036, p 45.

97 Gillian Flaccus and Matthew Brown, "Money approved for states to build car-charging network," AP News, September 2022, https://apnews.com/article/biden-technology-north-america-puerto-rico-climate-and-environment-40ae125f2f2dcf2dd8ae269e320b945a; U.S. Department of Transportation Federal Highway Administration, "MEMORANDUM: The National Electric Vehicle Infrastructure (NEVI) Formula Program Guidance," February 10, 2022, https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf.

its own. With few exceptions, while driving on the interstate highways, a driver typically finds a network of fueling and food options at exit interchanges. Frequently these services are found under one roof and oftentimes there are multiple businesses competing for a driver's patronage. A utility with a monopoly on EV charging would need to either secure property near the interstate highway interchanges or enter into land-rights agreements with existing property owners nearby. In many cases, the existing property owners will be productively utilizing that real estate. Land acquisition solutions could become problematic from both a cost and legal perspective.

It is not just the cost that could cause problems. If the utility's plan was to only secure land rights for charging stations from existing property owners (presumably those already with fueling capabilities or other travel conveniences), the land rights could be complicated by access rights (legal contracting), host site business limitations (can't occupy parking spots during lunch and dinner hour for charging), electrical operating limits (significant upgrades needed for multiple chargers), maintenance requirements and service-level guarantees to ensure the chargers are functional (no more than one hour of outage per charger per month) so that the brand value of the host site is not diminished. The Interstate Renewable Energy Council study described the difficulties in obtaining easements as the second cause of utility delay in developing EV chargers. "The resulting 'soft costs' are hard to quantify but can significantly impact charger deployment," IREC confirmed.[98]

Each of these complications adds to the cost and time to deployment of a utility-owned EV charger. And while the businesses hosting a utility-owned charger might be similar, they have different business models, different costs of real estate, different geographic footprints, different electrical needs and capabilities, and other differences ultimately preventing a standard agreement with any set of property owners. These complications could lead to the utility picking winners and losers in the business world and lead to incremental costs that utility customers, even those without vehicles, would be compelled to pay.[99] Under a utility ownership model, ratepayers would be responsible for paying for the resolution of all of these very complex acquisition issues.

D. Consumer risk under the utility ownership model

In many instances where utilities were permitted to develop and own EV charging stations, the relevant state regulators have allowed the ownership on public land (government buildings, universities, and the like), or in disadvantaged areas and/or multiunit dwellings. In those instances, the state might have an incentive and a justifiable argument to allow utility ownership (paid for by ratepayers) of EV charging. For example, governments do not have expertise in charging. It is easier for the government entity to have the infrastructure managed by another firm. Similarly, the private property owner of a multifamily dwelling might receive a private benefit from utility ownership and operation of the charger, which they might not otherwise see in a competitive environment. For example, it might help the landlord attract tenants or allow

98 IREC Study, p. 4.

99 The US Census Bureau estimates that approximately 8% of US households do not possess a vehicle. (*See*, https://www.fool.com/the-ascent/research/car-ownership-statistics/#:~:text=Only%208.5%25%20of%20households%20in,number%20of%20vehicles%20per%20household.)

it to earn additional profits from the charging infrastructure. But in neither instance is there a compelling need for utility ownership of EV charging infrastructure.

In making these charger investments, utilities will spend millions of dollars in ratepayer money to build charging networks, placing much risk on ratepayers. First, there is location risk. EV charging might be fundamentally different from the existing liquid fuels business. For example, a significant amount of EV charging will be done at home and most of the demand for public charging will be from customers traveling long distances or those unable to charge at home. It is also true that fully charging an EV takes significantly more time than fueling a vehicle with gasoline. If these scenarios hold over time, it is not clear that placing a public charger on state government property will provide any meaningful value to the mass of consumers. For example, why would a long-distance traveler want to drive onto a college campus to charge a vehicle? Most university buildings are locked to non-students and many of the food options are for students only. Similarly, if the public charging facility is located at a courthouse, a police station, a fire department, or some other government facility, parking is limited, buildings are at least somewhat secured, and food and rest options are limited. There is no compelling argument to have these government locations build out public restrooms, food options and other conveniences. This investment strategy seems to relegate a customer to spending 30 to 60 minutes sitting in the car.

In addition to locational risk, technology or obsoletion risk would be borne by utility ratepayers. This paper does not discuss the merits of any particular technology. However, by selecting one technology to invest in, the host utility might be giving preference to a particular technology and disadvantaging others, which might sway the market long term. Additionally, the utility is investing in something that likely will be improved upon in a short period of time.

Charging technology will most certainly evolve, including technologies that determine the speed of the charging process. Certain private enterprises will be fully incentivized to continue to invest in these improved technologies to improve their business. A business that invests in EV chargers will seek a charger that closely matches the time it takes to visit its business. A hotel might be perfectly content to invest in Level 2 chargers for the foreseeable future because a visit at a hotel is typically overnight and a full charge can be accomplished in that time. A sit-down restaurant might want to invest in chargers that can deliver a significant charge (80%-90%) in an hour. Businesses like coffee shops, delis, or convenience stores that have rapid customer throughput will strive for and invest in chargers that can charge more quickly. These quick-service businesses are less efficient when a customer lingers. If a customer sits at a deli table for 60-90 minutes, that customer is still only buying one sandwich and occupying a table that the deli would rather use for another customer so it could sell another sandwich. All of these businesses will be optimized when a full charge can be accomplished in the amount of time a customer would typically spend in the business and they will continue to invest in improved charging technologies until that goal is reached.

In contrast to profit-motivated private businesses, utilities (and their regulators) will be reluctant to make ongoing investments in new technologies before costs of initial investments are fully recovered. If utilities abandon investments to adopt new technologies, ratepayers will be responsible for any stranded or underutilized charging resources. If charging technologies improve, utility investments in charging stations will ultimately harm customers. In one scenario, the technologies competing with utility chargers advance, resulting in underutilization of the utility chargers and it takes longer than expected for the utility to recover costs. In the other scenario, ratepayers continue to invest in new technologies, but the old technologies are deemed stranded requiring ratepayers to pay for equipment no longer in use.

E. Product and service innovation under the utility ownership model

Product and service innovation will be hampered by utility ownership of EV charging. Even at this nascent stage, utility roadblocks and regulatory constraints have stifled innovation. Perhaps the most significant factor inhibiting product and service innovation is regulated rate design. Some of the more innovative regulated rates for EV charging are time-of-use rates, or perhaps demand charge discounts. Neither of these are customer focused. They are designed with the utility in mind. The rates might incentivize a utility's desired behaviors, but they do not offer a customer any special good or service. A time-of-use rate might incentivize off-peak charging. That does nothing for a driver who needs to charge a vehicle during peak electricity demand hours. Nor do these rates support a business deploying EV charging services.

Private-sector charging subject to competitive forces would incentivize customer-friendly products and services while at the same time allowing the private sector to capitalize on the time-to-charge aspect of charging electric vehicles. A convenience store could bundle a hot dog, soda and a charge along with car wash at departure for a fixed fee. A restaurant could bundle a meal and a battery charge for a fixed fee. A hotel could offer convenient parking and an overnight charge at a different parking rate than what it charges gasoline-powered cars.

By contrast, the state of Montana, where EV charging is heavily regulated, allows the utility to sell electricity to a business that services charging stations and also confirms that the entities operating the charging stations are not public utilities. It then requires the rates for private sector charging of an electric vehicle not be based on the cost of electricity.[100] The law does not prescribe what is allowed. For example, it could be a time-based fee—$0.20 per minute of charging. Or it could be a parking fee, perhaps $30 for the first hour and $5.00 per hour after that. At first glance, this prohibition might be compatible with innovative product design, but the uncertainty of the law is problematic. If rates were to increase, could the owner of the charger change its "parking rates" charged customers? This is unclear. The law prohibits a fueling charge "based on the cost of electricity." The affirmative act of not tying charging rates to the cost of electricity could result in perverse price signals, potentially giving rise to reliability issues, especially in times of peak demand. A time-based rate might also incentivize certain businesses to underinvest in new more rapid charging technologies since the host would earn less by investing in new equipment. The lack of investment ultimately would contribute to consumer concerns about charging and slow the market adoption of EVs.

Whether the regulatory policy is to require charging rates tied to the cost of electricity or to require that rate not be connected with the cost of electricity, it stifles product design. The

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100 Montana Code §69-8-803(4) "Charges pertaining to fueling electric vehicles may not be based on the cost of electricity".

Alliance for Transportation Electrification, which has utility members, acknowledges, "Utilities have not traditionally had to focus as much on innovative uses of electricity on the demand side, such as EVs and chargers, as they have had on the generation and transmission sides, so they must add capabilities and staff. And, because utilities are fully regulated, all of this planning must be shared with multiple stakeholders and then vetted and approved by each Commission."[101] This is a recipe for costs and delays. Under this model, utilities will need to hire more resources with consumer demand-related product development experience and seek approval from their respective regulatory commissions for the increased costs of those employees. Then the utilities will need to seek approval for the ideas that the new employees design and develop. These regulatory processes take months or years. The resulting delays in charging infrastructure development will slow the evolution and acceptance of EVs. Utilities and regulators should not attempt to regulate and micromanage competitive markets for charging EV batteries. Service and innovation are best accomplished under competitive market structures.

Utilities alone cannot solve the EV charging problem. McKinsey estimates the "cost of hardware, planning, and installation for [the] amount of public charging infrastructure [needed] would come to more than $35 billion over the period to 2030."[102] That number does not include annual operations and maintenance expenses which will add billions of dollars to ratepayer bills. The potential ratemaking impact of ongoing maintenance was addressed above. While utilities can recover their maintenance costs, their business returns are not tied to effective maintenance practices. Maintenance expenses would typically be passed through to ratepayers at cost, with no return on those costs. The return on capital invested is embedded in a utility's base rates. Unlike a utility, a private investor will be incentivized to always keep its charging stations fully functional as charging is adopted as a tool to drive customers to that business. The economic incentives to effectively maintain charging stations is almost non-existent in the utility model, but it will be a core business need under a private ownership model.

101 *See*, Alliance for Transportation Electrification, "More EV Infrastructure," accessed March 2023, https://evtransportationalliance.org/about-us/more-ev-infrastructure/.

102 *See*, Philipp Kampshoff, Adi Kumar, Shannon Peloquin, and Shivika Sahdev, "Building the electric-vehicle charging infrastructure America needs," April 2022, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs.

IX INDEPENDENT (NONUTILITY) PRIVATE OWNERSHIP

The independent (nonutility) private ownership competitive market model is the standard approach in market-based economies. Included in the successes of private ownership is the robust liquid fuels service network already in place throughout the country, in regions both densely populated and rural. This network includes extensive refueling areas along and near the interstate highway system, one-pump gas stations in rural areas, and many others of size, scope and services in between.

Private independent developers have strong incentives to make informed decisions about locating a charger, investing in charging equipment, and operating and maintaining that equipment. Many of these investors will be successful, earning a return on their investment in charging infrastructure. But it is inevitable that some will make imperfect investment decisions, including siting and pricing strategies for the energy obtained and sold to an EV-driving customer. In those instances, the private owners can make further decisions to improve the charger, keep it as is, or abandon the effort. In making these decisions, all financial risk rests with the investor, not ratepayers or taxpayers obliged to compensate the utility in the event of such misjudgment.

The benefits of private ownership include assignment of risk, product development, innovation, and efficient pricing. Risk, as described above, is when a private company makes an imperfect decision; the company and its investors bear the financial burden of that decision. The costs of errors are not borne by anyone other than the investor undertaking the investment risk. This is in stark contrast to risk allocation in a utility or public (government) ownership model. Placing risk squarely on the investor provides proper incentive for the investor to make the best investment decisions.

Innovative product development is unlimited in the private sector. Private ownership allows and incentivizes site hosts to align charging products with the other goods and services the hosts provide. Convenience stores or other types of businesses might choose to align energy products with the products the store already sells. Restaurants might develop products associated with purchased meals. Hotels and motels might develop charging products related to sleep, parking, or travel habits. Grocery stores might offer points to shoppers redeemable at certain charging infrastructure networks. Generally, under independent ownership any business could invest in EV charging and align products and services to others sold by the host business. EV charging-related product and service development will be constrained under the utility regulatory framework.

Efficient pricing, incentivized by private ownership, provides the most important societal value, sending accurate price signals according to supply and demand. This value proposition contrasts with utility ownership which generally provides for fixed pricing over long periods of time.

Private businesses routinely develop prices for their products and services; understanding pricing is a competitive advantage in the private sector. Private businesses design prices to recover costs and earn a profit or a return on the products and services sold while remaining competitive with their peers. The constant threat of competition incentivizes private EV charging stations and their owners to develop competitive, efficient, and profitable prices for EV charging products and services. There is competitive discipline in sectors that are structurally competitive and have many buyers and sellers.

The private sector has an advantage in efficient and competitive pricing. Wholesale electricity prices, a function of fluctuating supply and demand across many state regions, are inherently volatile. As is routine with petroleum fuels prices today, private owners of EV charging could advertise and change the price of charging every day, or even more frequently than that if needed to send an appropriate price signal to consumers. As discussed above, utilities are constrained on pricing in several ways. First and foremost, utilities are rate-regulated. The ratemaking process takes time. That passage of time could make an important difference in terms of system reliability and investment viability. Private-sector owners can and will act fast in response to changing conditions if needed.

X PUBLIC (GOVERNMENT) OWNERSHIP

For completeness, we also consider public ownership, defined as ownership by some level of government, of charging stations. Public ownership of resources should be reserved for resources which might not otherwise be supported by private funds and could only be implemented through taxation. Examples of such resources are military, fire and police protection, parks, and hard assets like the interstate highway system. Also, government agencies will likely own charging stations for their own vehicle fleets, but we do not consider those to be public charging stations for use by the general public. There is ample evidence from existing charging stations, the number of privately financed charging station companies and the overwhelming amount of participation in regulatory proceedings that there is no need for public ownership of charging stations.

In addition to the practical public policy issues that do not support public ownership of EV charging stations, public ownership of charging stations is incompatible with private-sector ownership. The capital and operating cost subsidies would be impossible to overcome. Private capital would be scarce, and the charging network would be inadequate.

XI OWNERSHIP MODEL CONCLUSIONS

We have shown that public EV charging is not a natural monopoly service, as defined by traditional economic principles. Specifically, EV charging does not benefit from a declining long-run average cost. This fundamental economic principle demonstrates that utilities should not have monopoly rights to own and operate EV charging operations.

It is not reasonable to believe a profit-maximizing monopolist will compete fairly with a competitive business interest in an adjacent sector. The New Orleans example presented above is telling. ENO is allowing free charging at its public level 2 charging stations. With its proposed DCFC stations, ENO's proposed plan is to charge a rate that will neither recover costs nor is it cost-based. ENO has just created a random price for charging at these facilities and has told its regulator it may change the rate. These are exactly the reasons that utility ownership of EV Charging stations should be rejected by policy makers. These types of rates are anticompetitive and in the long run will delay development of an extensive EV charging network, ultimately harming consumers.

As EV market penetration grows, the need for public chargers in more locations and in more decentralized locations will be required. It is hard to envision, for example, a charging station in front of every parking spot in an apartment complex, or in front of every home in a densely populated residential city street. Similarly, it is not likely a multi-car family will install multiple chargers on their property. There is already a network of decentralized fueling stations throughout the country. Drivers of gasoline-powered cars seldom if ever experience range anxiety because this network exists. The competitive markets determine the optimal location of fueling stations. The existing network could and should be used to facilitate a rapid expansion of EV chargers. If other locations are needed, or if current locations are unnecessary, the competitive market can and will make timely adjustments. This new EV charging network would be built based on competition and fundamental business and economic principles. Ultimately, the network will be funded by private investors and those costs will be recovered from customers who frequent the charging station or the business that is hosting the charging station.

In a competitive market, these locations would prevail over utility-owned charging stations. The utilities' charging stations will be constrained by regulations, by delays in pricing and by universal service policies incumbent on utilities. Cost subsidies will be the only advantage the utility chargers will have. Those subsidies will come at the expense of ratepayers, many of whom will not own EVs. If the subsidies are allowed, it will slow the development of independent charging stations. Sound public policy militates against utility ownership of EV chargers until such time it is shown the private market will not support the needed growth in chargers.

According to the U.S. Department of Transportation, the intent of the original federal commercialization ban on interstate highways “was to avoid State approved or supported monopolies for traveler services, such as those provided on toll roads.” During the legislative debate, Rep. Charles A. Vanik of Ohio explained what Congress had in mind: “Let the highway traveler turn off the Interstate system if he requires food, motor-vehicle service, lodging or Stuckey’s pecans.”[103] The same logic in avoiding state-supported monopolies should be applied to EV charging stations as consumer adoption of electric vehicles accelerates. Only independent owners should be allowed to own and operate EV chargers across the interstate highway system and in our local communities. The federal government, state governments and utilities should not impede progress in EV charging development and should not decide who owns EV chargers.

103 *See*, US Department of Transportation Federal Highway Administration: https://www.fhwa.dot.gov/interstate/faq.cfm#:~:text=Section%20111%20of%20Title%2023,launched%20the%20Interstate%20Highway%20Program.

XII REGULATORY POLICY TO SUPPORT ROBUST EV CHARGING COMPETITION

New and revised policies are needed to support fair and robust competition in charging stations. These policies must address the regulatory treatment of charging service providers, ratemaking and rates charged to charging station owners, electricity prices that station owners can charge their customers, system upgrades, distribution planning and interconnection policies.

A. Charging stations are not utilities

Many states, if not all, define electric utilities as the entities granted a monopoly franchise right to sell electricity to retail customers. In the states with restructured markets, the laws have been changed to allow for competition. These states similarly define competitive suppliers as the entities allowed to sell electricity to retail customers. These suppliers generally go through a licensing process and have reporting requirements similar to those of vertically integrated utilities.

Legislators and regulators should work to ensure that providers of EV charging services in every state are neither regulated as electric utilities nor as competitive energy suppliers as those terms are currently interpreted. Regulating these entities as utilities or competitive suppliers would put an enormous burden on businesses who have never been regulated by an energy commission. Similarly, it would put an enormous burden on the regulators who now have a finite number of entities over which they watch. Absent this clarification, utility commissions could be in the position of regulating hotels, grocery stores, parking lots, gas stations, coffee shops, convenience stores, shopping malls and innumerable other entities for what might be a financially meaningless portion of their business. In the face of such regulation, many of these entities might choose not to provide EV charging, which would ultimately delay and depress the implementation of charger deployment and EV deployment.

B. Rate regulation

Electricity rates to the charging station owner are and should continue to be regulated by state commissions depending on their state regulatory structure, while the rates charged to EV drivers should be at the discretion of the charging station owner. Each charging station owner will have a unique cost structure in building out its charging network. The cost of land, system upgrades, business constraints and other variables will likely differ from owner to owner. The independent station owners might develop unique products and services to bundle with the EV charging service and will need price flexibility. The price of electricity to the station owner is just one of the cost inputs for developing a charging rate. The prices an EV charging provider charges its customers should not be rate-regulated, just as the price to fill a gas tank is not regulated today.

Commissions should instead focus on utility rates because differing utility rates can significantly impact EV charging station owners and therefore the overall market for EV charging and EV sales. Currently, ratemaking and rate design are complicated and result in anomalous charges to charging site hosts. Charging site hosts must be able to design their charges to compensate for that complexity, and that complexity cannot be managed effectively by regulations governing the site hosts.

If utilities are allowed to own any charging stations, regulators should make sure the rates they charge drivers do not suppress competition. Specifically, a utility should include all charging-related costs in its rates and must not offer different delivery rates to private owners than it includes in its own charging rates to customers. In particular, if demand charges are assessed to private charging stations, they must also be included in the utility's rates to charge.

1. Demand Charges

To better foster development of EV charging networks, regulators should refrain from applying demand charges to EV charging stations. Demand charges will significantly distort prices for charging and will lead to uneconomic and sub-optimal EV charging investments. The normal basis for such charges, to disincentivize consumption at the system peak, does not apply to EV charging stations, as there tends to be little correlation between charging peak demand and system peak demand, and also little responsiveness of charging demand to rates.

As a solution, we recommend a period of at least 15 years where utility rates to EV charging station owners are based on a kWh basis and include no demand component.[104] This recommendation is not suggesting any type of rate discount. It is only suggesting a charge that is free of a demand component and that the costs be recovered based on throughput.

Demand charges create inefficient consumer behavior, since they vary significantly across utility territories. Kum & Go is a gas, grocery, food, and convenience chain with facilities throughout the central and western U.S. The chain has decided to locate chargers in specific utility service territories due to regulated rate designs of those utilities. The company's analysis showed if "four electric vehicles plug into Kum & Go's four chargers at the same moment, they require the utility to summon 250 kilowatts." In one service territory, that kilowattage yields a monthly demand charge of $750. If the station moved south, the charge rises to $2,672. If the charger was built to the north, it would rise to $4,750. An executive at the chain said that identifying utility territories with lower demand charges has become "a checkpoint for us before we approve a site." In those utility territories with higher demand charges, the executive said, "We're trying to avoid it the best we can."[105]

This anecdote is supported by research from the Great Plains Institute, which found, "Demand charges represented the majority of costs in most scenarios studied by this analysis. As a result, the demand charges present in utility rate schedules are a key determining component of a DCFC station's ability to break even or generate profit."[106] The Great Plains Institute research also challenged whether these stations could break even with higher utilization a near certainty in the future. "Our analysis makes clear that demand charges are a barrier to the widespread availability of DCFC. It also makes clear that this is not simply a chicken-and-egg problem that will be solved when there are more EVs and higher levels of utilization at the chargers; demand charges are higher still for higher-capacity DCFC and challenge the economics of operating these chargers even at higher levels of utilization."[107]

Differences in rate designs have the potential to drive different behaviors in developing EV charging infrastructure. Dramatically varying ratemaking policies will result in an inefficient distribution of charging stations. Regulators should be mindful of this example and the impact of demand charges on EV charging rates. If demand charges will prevent a charging station from being profitable, they will not be built in the service territory. This will slow adoption of EVs generally. EV charging stations should be billed for electricity consumption on a kWh basis with no demand charges embedded in the rate structure.

Additionally, regulators should not allow utilities to manipulate the competitive market by changing their rates and rate designs after private investments in charging stations have been made. Radical rate design changes, like moving to a demand-based rate instead of an energy-

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104 This recommendation is not suggesting that EV charging owners and their related businesses be exempt from demand charges. This policy is directed only to the EV charging service portion of that business. This will likely require separate metering at the charging bank and perhaps an EV Charging tariff. The metering may increase the cost of the charging development. However, this small incremental cost is critically important to the robust development of EV charging stations.

105 David Ferris, "The Gas Station's Hidden Battle to Survive," Politico, October 2022, https://www.politico.com/news/magazine/2022/10/28/electric-vehicles-fueling-station-gas-utilities-infrastructure-00063398

106 Great Plains Institute, Analytical White Paper: Overcoming Barriers to Expanding Fast Charging Infrastructure in the Midcontinent Region, July 2019, p. 6, ("GPI Whitepaper"), https://betterenergy.org/wp-content/uploads/2019/08/GPI_DCFC-Analysis.pdf.

107 GPI Whitepaper, p. 6.

based rate, could force charging businesses into an unprofitable situation. The private sector does not have the luxury of rate protection and if suddenly it is unprofitable to offer a service, it will not be offered. Frequent rate design changes will slow development of EV charging stations and the market adoption of EVs.

2. Demand Charge Complications

Utilities recover a significant percentage of their costs through demand charges or demand-based rates. These rates are not typically designed to benefit customers. They are designed to recover some fixed costs as well as costs incurred by a utility to meet electricity demand on peak days or peak hours. At some level, demand charges can incentivize certain customer behaviors. Many electricity customers participate in demand response or other peak load management programs to lower their energy costs. Some customers might even move shift work to off-peak hours. With these customer practices, the utilities can minimize their investment in managing peak loads. That can be a win-win for electricity customers and the host utility.

By contrast, demand charges do not, and will not, incentivize driving behavior and charging behavior at public charging stations. When traveling on an interstate highway a driver will need to recharge. A utility demand charge is not going to change that behavior. A demand charge can be punitive to a charging station owner because a vehicle needed a charge during the system peak hour (or some other hour that determines a demand charge). This driver's behavior could cause one charging station's costs to be higher than the charging station right next door for a month, season, or year because of the driver's choice of charging vendor and nothing else.

Even if a station owner or customer could be incentivized to charge during a peak period, that incentive is not possible to implement because the peak periods are not known until after the fact, perhaps a month, a season or a year after the charging takes place. Utilities do not typically publish with any degree of certainty what hour will be the peak hour. As a result, demand charges become somewhat of a negative lottery for electricity bills. If a low-cost charging station gets a charging customer in the wrong hour, it could become the high-cost provider for as long as a year. This boom/bust potential will disincentivize investments in charging stations and as a result slow market adoption of EVs.

Finally, EV charging is not seasonal, or coincident with system peak based. While the practice of charging will drive a charging business' peak load, charging loads will not differ materially based on traditional utility peaks. Air conditioning is a typical contributor to a utility's summer peak load. There is nothing inherent to public charging that mirrors or exacerbates the air conditioning demand that alters the system peak. There is no evidence that people today refuel at different rates based on weather conditions. If driving in a thunderstorm and the tank is running low, a driver will refuel. If any behavioral patterns exist, it is more likely a customer will shy away from charging on the hottest hours of the year. Charging loads will increase total system loads. Nothing about charging indicates it will drive the system peaks. Those will continue to be driven by seasonality of certain loads.

There is no incentive to assess demand charges on EV charging stations, particularly at current levels of penetration. Utilities and regulators should move away from that model for EV charging. Rates without demand components will result in more rapid and more geographically appropriate deployment of EV charging facilities.

C. Distribution Planning

Distribution system planning is becoming more complex for myriad reasons. Notably, the growth of EV charging is expected to significantly increase the amount of energy consumed through the distribution grid and increase peak demand in areas where EVs are being charged. McKinsey estimates that the "annual demand for electricity to charge them would surge from 11 billion kilowatt-hours [as of April 2022] to 230 billion kWh in 2030".[108] In addition, new technologies, distributed energy resources, storage resources and load management programs and technologies continue to penetrate the electricity market, further complicating the planning process. Policymakers should ensure utilities utilize the most modern planning resources and technologies, enabling a robust expansion of the network to support EV charging and other changes in the market. Additionally, utilities should support each of these technologies, including nonutility-owned technologies, equally. No entity or entities should be disadvantaged by the way a utility performs its planning responsibilities.

D. Interconnection Policy

As noted, interconnection process delays are a significant contributor to long lead times for having public chargers deployed. Strong and direct interconnection policies should be implemented by state utility commissions to ensure timely deployment of EV charging networks. This singular policy change, directing utilities to focus on interconnecting private chargers instead of building out a utility-owned network of chargers, will speed the EV charging timeline.

The Interstate Renewable Energy Council identified six problem areas in the interconnection process. These are: 1) Lack of utility staff and resources dedicated to EV infrastructure projects; 2) Lack of EV infrastructure-specific policies or programs; 3) Lack of clear interconnection processes and timelines for each step of the process; 4) Long lead times for utility equipment upgrades; 5) Lack of grid transparency; and 6) Lack of utility performance measures or incentives. IREC developed this list based on original research through a survey of EV charger developers, but their findings were supported by research from other organizations including energy industry think tanks, trade associations and private industry[109].

This same IREC study also proposed policy solutions for each of the identified problems. To address staffing, utilities should ensure any staff working on EV infrastructure projects have charger-specific knowledge. Dedicated EV staff can complete utility design and approval processes more efficiently. To address the lack of EV infrastructure policies, policy makers

108 *See*: Philipp Kampshoff, Adi Kumar, Shannon Peloquin, and Shivika Sahdev, "Building the electric-vehicle charging infrastructure America needs," April 2022, https://www.mckinsey.com/industries/public-and-social-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs.
109 IREC Study, p. 11.

should require utilities to implement programs that allow for more cost- and time-efficient charger interconnections. Citing best practices developed by the State of New Jersey, IREC suggests that "make-ready" programs can reduce the infrastructure costs incurred by EV charging service developers and, if completed during the construction of new buildings, could help to streamline part of the interconnection process at make-ready sites. Make-ready programs vary, but essentially require a utility to pay some or all the costs on the utility side of the meter and in some cases the customer's side of the meter. In this model, utilities would pay for "service panels, junction boxes, conduit, wiring, and other components necessary to make a particular location able to accommodate [Electric Vehicle Supply Equipment] on a 'plug-and-play' basis."[110]

To address the lack of interconnection process and timelines, IREC suggests regulators require utilities publish interconnection timelines for each step of the process to help applicants with project planning and scheduling and hold the utilities accountable for meeting these timelines when customers request interconnections. Utilities should also publish guides for applicants that detail the interconnection steps and delineate the responsibilities of each party. These guides should be relevant and available for residential and commercial customers as well as independent developers of EV charging infrastructure.

Utilities should better manage inventory of resources to address issues causing long lead times. Utilities should make available public hosting capacity maps to allow potential developers of EV charging facilities to assess system constraints in their planning and budgeting. Finally, to incentivize utility performance, utilities should benefit from meeting certain performance goals associated with timely interconnections. Regulators should allow incentives for (and congruent penalties for non-) performance by utilities involved in the EV interconnection process.[111]

Utilities with an opportunity to own and operate EV chargers have perverse incentives in assisting the development of privately owned EV chargers. Regulators need to ensure utilities do not provide themselves preferential treatment in allocating internal resources needed to develop the EV charging network.

E. Private Sector Infrastructure Upgrades

The private investors seeking to install EV chargers should participate in the development of utility-side capital to speed the implementation process. Historically, the nonutility sector has been forbidden from working on any property on the utility's side of the customer meter. There are many understandable safety, security, and reliability issues associated with nonutility personnel modifying even a small part of the electrical system. This makes sense during normal day-to-day operations. However, utilities frequently rely on third parties to perform maintenance and upgrades to their systems. These range from parties who provide daily infrastructure services to emergency crews brought in as part of a storm or other disaster response. These third parties are trained and have very specific objectives and can operate under utility guidelines while bringing their own resources to complete more timely upgrades.

110 IREC Study, p. 13, citing New Jersey Department of Community Affairs, et al., Charge Up Your Town: Best Management Practices to Ensure Your Town is EV Ready, p. 7 (Feb. 2022), https://nj.gov/dep/drivegreen/pdf/chargeupyourtown.pdf.

111 *See* IREC Study, pp. 13-16.

To speed implementation of an effective EV charging network, utilities could train a network of third-party service providers who could assist in providing the needed infrastructure upgrades. Utilities could provide lists of certified electricians and engineers who could be hired by developers to assist in the development process. The work of these third-party service providers could be paid for by either the utility or the private EV charging investor.

F. Cost Allocation for Grid Upgrades

Utilities will see increased costs as EV chargers are more widely deployed. These costs include increased regulatory costs, changes to the distribution planning processes, improvements to the interconnection process, and capital improvements to the distribution network to support increased charging demand. The changes that will drive these costs are needed not just for EV charging networks, but for the general implementation of customer-focused market participation and the general electrification trend. It is not possible to assign these costs to any specific customer or group of customers because all customers will benefit from these changes.

Some might argue the costs for specific network upgrades should be borne by the customer or customers requesting the upgrade. In most instances, more than one customer will benefit from a network upgrade. The benefits might be direct, to a group of customers, or indirect in the form of delaying otherwise needed infrastructure investments. Even if the capital upgrade will benefit the EV charging station only, allocating the complete capital cost of that upgrade to a single customer could prevent useful resources from being developed. This is especially true if a third-party alternative is not available to ensure the utility's cost to perform the upgrade is reasonable. As a result, a reasonable policy outcome would have distribution network upgrades added to base rates and collected from customers over time.

The exception to this recommendation is the situation where utility-owned EV charging stations are operating in the same general area (utility service territory) as a nonutility-owned charging station. When a utility is operating in direct competition such as this, the utility should be compelled to allocate a portion of the costs of developing that station to that specific station. For example, if a utility were to charge $1,000 to a nonutility entity for interconnection study costs, that utility should be compelled to allocate an equal (or greater) amount to their own chargers, and not to general rates. Guidelines published by NARUC support a "higher of cost or market" allocation of costs to the utility-owned resources operating in competitive situations.

NARUC developed affiliate transaction guidelines to help regulators establish policies for the allocation of costs to a utility's competitive operations. According to NARUC, "The objective of the affiliate transactions guidelines is to lessen the possibility of subsidization in order to protect monopoly ratepayers and to help establish and preserve competition in the electric generation and the electric and gas supply markets."[112] These guidelines, established in 1998, did not envision EV charging, but the concepts are the same, and Commissions should heed the NARUC guidance. The guidelines state:

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112 NARUC, Guidelines for Cost Allocations and Affiliate Transactions, p. 3, circa 1998, https://pubs.naruc.org/pub.cfm?id=539BF2CD-2354-D714-51C4-0D70A5A95C65.

"1. Generally, the price for services, products and the use of assets provided by a regulated entity to its non-regulated affiliates should be at the higher of fully allocated costs or prevailing market prices. Under appropriate circumstances, prices could be based on incremental cost, or other pricing mechanisms as determined by the regulator.

2. Generally, the price for services, products and the use of assets provided by a non-regulated affiliate to a regulated affiliate should be at the lower of fully allocated cost or prevailing market prices."[113]

These two principles must be incorporated into utility ratemaking for utility-owned chargers. If for some reason the utility does not agree with these principles, the guidelines allow for exceptions where it would be "in the best interest of the utility, its ratepayers and competition" and "the burden of proof for any exception from the general rule rests with the proponent of the exception."[114]

G. Determine Public Need Competitively

Regulators may determine a public need exists for charging stations that has not been met by independent investors, or may not be met in the future. Arguments have been made that this situation might arise in multi-family dwelling units, in rural areas or in disadvantaged communities. The policy justification might be to incentivize a more rapid deployment, or to simply serve an area or region where the financial incentives might not exist. In these instances, when that public need is real, utilities are a potential means to solve that problem. Regulators should address that problem but should also consider creative alternatives to solving the problem.

As discussed above, many utilities are offering incentives for EV charging development. These incentives are wide ranging and apply to the cost of the charger installation, the rates from the utility, residential owners, business owners and potentially others. If ratepayer funds are being used for these incentives and would be used in a utility-ownership model, regulators should consider opening solicitations (RFPs) to determine the "need" for private investment. For example, the utility could solicit interest and determine the support needed to put a four-charger station in a remote area where the closest charging station is 50 miles away and where only 2,000 people live within a 50-mile radius. This type of solicitation could allow utilities to continue to focus on expanding the EV charging network instead of focusing on the business of EV charging. It will result in having the competitive market determine the amount of "need" required to develop charging infrastructure where it is lacking.

The worst-case outcome under this option would be that the utility received no interest. The theoretical highest-cost response would be no higher than what the utility would incur if it operated the facility itself. To think otherwise would require an assumption that a utility, expert in electricity delivery, would be more expert in product development, product design, retail management and many other traits than an entity engaged in those services daily.

113 *Id.* p. 4.
114 *Id.* pp. 3-4

Utilities can be an effective way to meet public needs. However, the regulators should endeavor to meet those needs in the most beneficial way to all consumers.

H. Sell the utility-owned charging stations

We acknowledge the reality that utilities will own and operate some public EV charging stations. We also know it is already the case that regulated entities with monopoly franchise rights have been allowed to expand their businesses to include EV charging stations. This paper has clearly demonstrated that a market in which independent charging stations are competing with utility-owned charging stations is not efficient and will lead to a slower roll-out of charging networks and therefore a slower rollout of EVs. Recognizing this economic conflict, regulators have nonetheless moved forward allowing utility-owned charging, generally stating that it is good policy to have the resources available to alleviate EV range anxiety and to resolve access issues for underserved markets. Because the regulated/competitive market situation is irresolvable in the long-run, regulators should consider a timeline for compelling the sale of utility-owned charging stations to willing buyers. An auction or RFP process will accomplish at least two goals. First, it will resolve the anti-competitiveness issues associated with the subsidized utility model competing with independent owners. Second, it will test the value of resources placed on public property and in underserved markets. An auction may reveal that a charger located at a police station has very little market value and one on a college campus is extremely valuable. It might also show the exact opposite and that people prefer the security of a police station, but don't want to be on a campus with nothing to do. It may show that a rural charger could be worthless, and a multifamily unit charger is highly valuable to the market. Alternatively, the rural charger might show some locational market value and the multifamily charger may be valueless. A sale of those resources will reveal the true value.

For many reasons, the results of these auctions will be important for continued development of charging networks. They will help the market determine where to locate future charging stations. They will also help regulators in other jurisdictions with decisions about whether to allow utility ownership (or utility subsidization of independent ownership) of EV chargers in similar areas.

The results of the auctions will ultimately reveal a value. That value will be greater than or less than the cost paid by the utility. The utility losses or gains should accrue to the ratepayers. In this scenario, losses are not actual losses because there was a sound policy reason to justify the deployment in the first place. With or without an auction, the customers would pay for the resource. In an auction, even if the auction values the resource at a lower price than what was paid, the ratepayer is better off by getting at least something back from the buyer. Under utility ownership, the customer will pay the full cost of the charging station.

If the auction proceeds exceed the development costs, it shows the market believes that the charging decision was the right decision. It essentially refunds, with a potential premium, the customers for making the investment. There is precedent to this auction policy. It is very similar to how regulators in some jurisdictions treated generation assets sold by utilities when restructuring the electricity markets in those jurisdictions.

I. Regulatory Policy Conclusion

Regulators have many issues to focus on to support a robust EV charging network. First, regulators should proclaim EV charging to be a competitive service and then focus on policies to support the development of (not the subsidization of) the charging network. These include:

1. **Regulated Rate Policies –** Regulators need to consider the impact of regulated rates and rate design on EV charging stations and station owners. Demand charges can significantly impact EV charging station investment decisions. EV Charging stations should be provided electricity rates based on kWh only that do not include a demand component. This could be a long-term solution, but at a minimum this should be considered for a 15-year transitional period.

2. **Utility Ownership –** Regulators should ban or disfavor utility ownership of charging stations to foster more innovation and competitive pricing for consumers.

3. **Distribution Planning –** Distribution planning needs are fundamentally changing. In addition to significant projected load increases, distribution systems are seeing many demand management technologies and other technologies that support bidirectional movement of electricity. Regulators should support an increased focus on planning using state-of-the-art tools and should allow for proactive, rather than reactive, development of the distribution systems. It is possible that proactive planned development of the grid will lessen the long-run cost of the needed enhancements and allow for a more rapid deployment of EV charging stations and EVs.

4. **Interconnection Policies –** Interconnection timelines are slowing the deployment of EV charging stations. Regulators should support the development of dedicated interconnection personnel, work with utilities to standardize and streamline timelines and processes, allow more flexible policies with respect to inventory and supply chain issues, and ensure that nonutility owners of charging stations receive fair and equal service from the utility when developing charging stations.

5. **Private Sector Access –** Regulators should work with utilities to develop, train, and certify third parties to work with private investors to build out the distribution network, where feasible.

6. **Cost Allocation –** Regulators should create cost-allocation policies fair to all parties to recover the costs of developing the infrastructure required for robust EV charging. These policies should be fully transparent so potential investors can easily know what the required investment will be.

7. **Meeting Public Need at the Lowest Cost –** A public need for EV charging might arise in limited cases. If this need arises, regulators should look for solutions other than a utility to meet the need. This could include a solicitation that would determine a financial need for a private investor to develop the charging station.

8. **Divestiture of utility-owned charging stations –** Regulators should have utilities sell any utility-owned EV charging stations to nonutility entities. If commissions are granting monopoly rights in a market clearly suitable to competition as a means to speed the development of the market, then as the market matures the monopoly should be removed from the market.