REGULATING THE ENERGY "FREE RIDERS"

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ABSTRACT

This Article explores "free rider" arguments in energy policy. It focuses on the use of free rider arguments in three types of contemporary public utility regulatory proceedings—ratepayer-funded energy efficiency programs, utility compensation for customer-generated rooftop solar energy, and utility investments in electric vehicle charging infrastructure. It shows how the term "free rider" is used quite differently in each type of proceeding—as a helpful metric to determine program cost-effectiveness in the energy efficiency context, as a pejorative term synonymous with unfair cross subsidies in the rooftop solar context, and for both purposes in electric vehicle charging infrastructure proceedings.

This Article claims that in evaluating free rider arguments, regulators and the public should consider the source and motivations of the parties making these arguments and, more importantly, both the present benefits and future benefits of the program in question. This is particularly true for programs designed to support energy transition. In other words, if the goal of the program is to reduce barriers to building the infrastructure required to shift to cleaner energy resources or reduce overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. Moreover, regulators should use a range of tools to develop appropriate metrics to determine cost-effectiveness of programs related both to distributed solar energy and to electric vehicle charging investments that build on work done over the past decades in the energy efficiency context. Finally, this Article suggests that regulators can and should use the precautionary principle in developing these programs. Use of the precautionary principle is justified due to the potential for significant harm associated with continued reliance on fossil fuels in the energy sector and the potential for significant benefits to utility customers and the public resulting from increased use of distributed solar and transportation electrification. Additionally, use of the precautionary principle can help address many of the fairness and cross subsidy concerns raised in these regulatory proceedings.

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CONTENTS

INTRODUCTION

As state regulators, electric utilities, and other interested parties attempt to develop programs to encourage a range of beneficial consumer behavior with regard to energy use, critics often are quick to argue that the beneficiaries of these programs are "free riders."[1] This Article examines the use of free rider arguments in contemporary energy regulation. In particular, it explores how state public utility commissions address arguments regarding free riding in three specific contexts—ratepayer-funded energy efficiency programs, compensation for nonutility-owned solar energy,[2] and electric utility investments in electric vehicle ("EV") charging infrastructure.

This Article claims that regulators and the public should exercise caution in evaluating free rider arguments. In particular, they should always consider which parties are making free riding arguments; what their motivations might be; the full range of costs and benefits associated with the policy under consideration; and the difficulty of quantifying those costs and benefits before reaching a conclusion that free riding is occurring, that an unreasonable shift of costs between customer classes is taking place, or that the policy fails to meet a statutory requirement that it be "just and reasonable."[3]

Moreover, regulators and the public should recognize that the term "free rider" is used in very different ways and for very different purposes in these

[1] *See, e.g.*, Charles E. Bayless, *Piggybacking on the Grid*, PUB. UTIL. FORT., July 2015, at 38, 39-40 (comparing rooftop solar to "Piggyback Air," a mythical airline that works by attaching its engineless planes to roofs of competitors' aircrafts); Prosper Org, *Ice Cream for Fairness!*, YOUTUBE (Oct. 21, 2013), https://www.youtube.com/watch?reload=9&v=zJ8tToIeQ_U (depicting electric utility-funded television advertisement suggesting that utility net metering programs are akin to a man bringing his own ice cream to an ice cream truck to take advantage of free toppings provided with ice cream sold at the truck, thus causing the truck owner to raise prices on ice cream for everyone else); Herman K. Trabish, *NV Energy CEO: Solar Has Gotten a 'Free Ride' on the Grid*, GREENTECH MEDIA (Aug. 19, 2013), https://www.greentechmedia.com/articles/read/a-conversation-with-edison-electric-institute-chair-michael-yackira (describing current compensation for excess electricity sold by customers with rooftop solar systems as "free ride" because those electricity sales act as credit against costs rooftop solar customers pay to support distribution grid infrastructure, even though those customers still use grid when they buy electricity from the utility "when the sun goes down").

[2] "Nonutility-owned solar energy" encompasses residential and commercial rooftop solar energy as well as nonutility-owned community solar gardens where a third party generator sells the output of the solar garden to the local utility. *See, e.g.*, *infra* notes 162-69 (discussing Minnesota's community solar garden program).

[3] Most state statutes governing public utilities require that utility rates and charges be "just and reasonable" and that state public utility commissions ensure that rates are just and reasonable through the rate regulation process. *See* JIM LAZAR, ELECTRICITY REGULATION IN THE US: A GUIDE ch. 8 (2d ed. 2016) (summarizing "just and reasonable standard" in utility ratemaking process); Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 TEX. J. OIL GAS & ENERGY L. 211, 228 n.77 (2016) (citing state statutes).

regulatory proceedings. In the energy efficiency context, free riding is a longstanding and recognized metric that must be measured in evaluating the cost-effectiveness of utility-funded energy efficiency programs.[4] In that context, "free riders" are utility customers that would have invested in the energy efficiency product or device even in the absence of the utility subsidy. A high level of free riding results in a finding that the program is not cost-effective and that money spent on energy efficiency should be spent differently.[5] By contrast, in rooftop solar proceedings, parties argue that solar panel owners that receive compensation for the solar energy they produce are "free riding" off the grid, resulting in an unfair cross subsidy from non-solar owners to solar owners. In this context, "free riding" is a pejorative term used to label a program as "unfair" in order to build public, regulatory, and political opposition to the program.[6] Finally, in the EV charging context, some parties in regulatory proceedings are attempting to develop free riding metrics to create cost-effective programs while others, particularly oil companies that are threatened by transportation electrification, are making free riding arguments to oppose such programs as unfair cross subsidies.[7]

Even beyond the definitional discrepancies, regulators should be cognizant of the information asymmetries that permeate utility regulatory proceedings involving claims of free riding. In many of the proceedings, "hard" data on program costs and benefits either is not available at all or is within the control of the electric utility in question. In the face of incomplete information, who should bear the burden of proving that a program provides system-wide and out-of-system benefits and the extent of those benefits? What if present-day benefits are modest but long-term benefits, like reduced climate change and localized air pollution impacts, have the potential to be significant? These are important questions that regulatory commissions are forced to answer in the early stages of customer-funded utility programs; labels of free riding or cross subsidies can limit or stall programs with potentially significant future system-wide benefits if the burden of providing information is misplaced.

The regulatory applications explored in this Article—energy efficiency programs, utility compensation for customer-generated rooftop solar energy, and utility investment in EV charging infrastructure—were chosen for specific reasons. First, each application involves the development of a state policy governing electric utilities within a regulated monopoly system.[8] This means

[4] *See infra* Section I.A (describing utility-funded energy efficiency programs).

[5] *See infra* notes 44-45 (discussing recent studies).

[6] *See infra* Section I.B (discussing free riding in context of rooftop solar panels and demonstrating states' varied approaches to cost-benefit analysis).

[7] *See infra* Section I.C (summarizing ways in which free riding arguments are used by different stakeholders to either support or oppose investment in electric vehicle infrastructure).

[8] For a discussion of how states regulate electric and gas utilities as regulated monopolies through the state public utility ratemaking process, see, for example, LINCOLN L. DAVIES ET

that for each policy, the state public utility commission requires the electric utility to implement a program that will be paid for by all utility customers (also known as "ratepayers") but that may not provide identical benefits to all customers at the outset. This understandably leads to arguments by the utilities, various customer classes, and other interested parties that one group of customers is "free riding" off of the program to the detriment of other groups of customers or that there is a "cross subsidy"—the idea that one group of customers (e.g., EV drivers, rooftop solar owners) is being subsidized by another group of customers, resulting in "unfair" or "unjust and unreasonable" rates.[9]

Second, these applications provide helpful case studies because the identities of the parties making free riding arguments can change dramatically depending on which parties tend to benefit financially from the program in question. For instance, in the early stages of energy efficiency programs in the 1980s, utilities often opposed such programs because they would reduce utility revenues due to lost electricity sales. However, as state legislatures and public utility commissions developed programs to "decouple" utility revenues from energy sales and to otherwise compensate utilities for implementing energy efficiency programs, utility opposition declined, and free riding concerns became a function of measuring the cost-effectiveness of particular programs rather than a reason to oppose energy efficiency programs in general.[10]

As for rooftop solar, utilities have attempted to impose significant limits on state "net metering" programs that require utilities to compensate electricity customers for the energy their solar panels produce at retail electricity rates.[11] Such required purchases cut into utility revenues by reducing the amount of electric energy that net metering customers purchase from the utility. In opposing net metering policies, utilities often raise free riding arguments—namely, that customers with solar panels are paying less than their "fair share" of the costs to support the electric grid, resulting in unfair cross subsidies between utility customers with solar panels and utility customers without solar

AL., ENERGY LAW AND POLICY 281-90 (2d ed. 2018) (describing electric utilities as regulated monopolies and explaining how state and federal laws are designed to prevent utilities from exercising monopoly power); William Boyd & Ann E. Carlson, *Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law*, 63 UCLA L. REV. 810, 825-30, 836-41 (2016) (discussing public utility commission ratemaking process); Alexandra B. Klass, *Public Utilities and Transportation Electrification*, 104 IOWA L. REV. 545, 567-69 (2019) (discussing basics of electric utility ratemaking). *See generally* MELISSA WHITED, SYNAPSE ENERGY ECON., INC., THE RATEMAKING PROCESS (2017), https://www.synapse-energy.com/sites/default/files/Ratemaking-Fundamentals-FactSheet.pdf [https://perma.cc/J53S-S5R5] (summarizing fundamentals of utility ratemaking and rate design).

[9] *See infra* Part I (discussing free riding concerns in electric utility laws and ratemaking procedures).

[10] *See infra* Section I.A (discussing evaluation of free riding in energy-efficiency context).

[11] *See infra* Section I.B (discussing free riding debates in rooftop solar context).

panels.[12] Because solar panel owners pay less for electricity each month but still use the electric grid when the sun is not shining, utilities argue that the costs of supporting the grid are unfairly shifted to non-solar customers who are often less affluent. The extent of this cross subsidy is a matter of significant controversy in state legislatures and state public utility commissions.[13]

With regard to utility investment in EV charging infrastructure, utilities generally support these policies as they create an investment opportunity to build new infrastructure for which they can recover not only their costs from all utility customers but also a rate of return. As a result, in this context it is often the oil companies, not electric utilities, who stand to lose from program adoption and have raised free riding arguments in regulatory proceedings. They contend that requiring all utility customers to pay for utility investments to support transportation electrification is an unfair cross subsidy between EV owners and non-EV owners despite a growing body of evidence that greater use of EVs will ultimately benefit all utility customers through overall reductions in electricity rates due to more efficient use of electric grid assets.[14]

Notably, environmental groups generally support all three types of policies, as they all potentially lead to reduced reliance on fossil fuels to generate electricity and power transportation. Likewise, some consumer advocacy groups have been opposed to all three policies because they can lead to higher (or at least disproportionate) costs on lower-income utility customers in the short term.

These differences in the free riding and cross subsidy arguments in each of the applications allow for greater insights into the evaluation of free riding arguments. They also provide a window into the motivations of the regulated utilities and third parties making the free riding and cross subsidy arguments in the first place.

Part I first sets forth various definitions of free riding from multiple academic disciplines as well as regulatory and judicial treatment of free riding arguments in energy law and policy. It then evaluates more closely the use of free riding and cross subsidy arguments in the three types of state public utility regulatory proceedings described above: (1) ratepayer-funded energy efficiency programs, (2) compensation for customer-generated rooftop solar energy, and (3) utility investment in EV charging infrastructure. In each case, state public utility regulators must evaluate free riding arguments and determine how much weight to give them in setting policies to govern these programs. In each situation, the

[12] *See, e.g.*, Hiroko Tabuchi, *After Rapid Growth, Rooftop Solar Programs Dim Under Pressure from Utility Lobbyists*, N.Y. TIMES, July 9, 2017, at A13 ("Utilities argue that net metering, in place in over 40 states, turns many homeowners into free riders on the grid, giving them an unfair advantage over customers who do not want or cannot afford solar panels. The utilities say that means fewer ratepayers cover the huge costs of traditional power generation.").

[13] *See infra* Section I.B.

[14] *See infra* Section I.C (summarizing positions of various groups opposed to utility investment in EV charging infrastructure).

process is complicated by rapid technological developments; uncertainties regarding program impacts; concerns associated with future environmental harms, such as climate change; and a limited ability to assess program effectiveness today for benefits that may not accrue until years into the future.

Part II claims that regulators should consider both the present costs and benefits and the future costs and benefits of the program in question as well as the extent of cross subsidies when evaluating free riding arguments. In other words, if a goal of the program is to reduce barriers to building infrastructure for a long-term policy initiative, such as a shift to cleaner energy resources or a reduction of overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. This has already been recognized in the energy efficiency context, where regulators have concluded that reduced energy demand means that utilities need not invest in new energy generation plants—including fossil fuel plants—to meet future customer demand.[15] As a result, the debate in the energy efficiency realm has mostly shifted away from whether utilities should implement energy efficiency programs at all and instead focuses on developing appropriate evaluation, measurement, and verification metrics to design programs that are cost-effective and to incentivize behavior that would not occur in the absence of the program.

This shift has not yet occurred in the context of utility compensation for rooftop solar or utility investment in EV charging infrastructure.[16] In both cases, opponents of those programs—electric utilities in the case of rooftop solar and oil companies in the case of EV charging—are relying on free riding and cross subsidy arguments to oppose the policy in question and alleging unfair cost shifts with regard to different classes of current customers. Supporters of both types of programs are marshaling evidence to rebut arguments that an unreasonable cost shift among customer classes will occur, with mixed success.

In the face of the incomplete information that necessarily exists at the start of a new program with the potential for significant public benefits, as well as the serious risks of harms associated with inaction, regulators should utilize the "precautionary principle" in addressing free riding and cross subsidy concerns. The precautionary principle calls for a higher level of regulation—or precaution—when significant but uncertain risks, such as climate change or harm from toxic chemicals, exist.[17]

Applying the precautionary principle to new policy development in the areas of distributed solar energy and utility investment in EV charging reflects the

[15] *See infra* Section I.A.

[16] *See infra* Sections I.B, I.C.

[17] *See* DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY 19 (2010) (noting that "precautionary approaches can be defended as being particularly well suited to safeguarding life and the environment under conditions of uncertainty and ignorance"); *infra* Part II (arguing that regulators should consider present costs of program and future costs of program and apply precautionary principle where potential harm is serious).

significant risks associated with continued reliance on fossil fuels in the energy sector and the potential long-term benefits to utility customers and the public associated with energy transition. Thus, in these circumstances, it is more reasonable to use free riding and cross subsidy concerns to place limits on subsidies for particular investments, such as rebates for residential or commercial EV charging stations, but to allow investments in longer term grid improvements that may benefit all utility customers in the long run. Moreover, this approach allows regulators and electric utilities to build on metrics already used in the energy efficiency context, including the role of free riders, to develop appropriate programs in the rooftop solar and EV charging contexts. Finally, use of the precautionary principle can reduce barriers to important energy transition programs while addressing many of the fairness and cross subsidy concerns raised in contemporary utility regulatory proceedings.

I. FREE RIDING DEBATES IN CONTEMPORARY ENERGY POLICY

The concept of free riding originates in moral philosophy and arguably dates back to Plato's *Republic*.[18] In moral philosophy, free riding hinges on the unfairness of receiving a benefit without paying its associated costs.[19] In defining "fairness," John Rawls states:

> [A] person is [morally] required to do his part as defined by the rules of an institution when two conditions are met: first, the institution is just (or fair), that is, it satisfies the two principles of justice; and second, one has voluntarily accepted the benefits of the arrangement or taken advantage of the opportunities it offers to further one's interests.[20]

In economics, free riding is a broadly defined principle that concerns the receipt of unpaid-for benefits.[21] Concerns over free riding in the economic

[18] *The Free Rider Problem*, STAN. ENCYC. PHIL. (May 21, 2003), https://plato.stanford.edu/entries/free-rider/ [https://perma.cc/JAU5-3B44] (citing PLATO, THE REPUBLIC 38 (C.D.C. Reeve trans., Hackett Publ'g Co. 2004) (c. 375 B.C.E.) ("Now no one, it seems, would be so incorruptible that he would stay on the path of justice, or bring himself to keep away from other people's possessions and not touch them, when he could take whatever he wanted from the marketplace with impunity . . . .")) (noting Glaucon's argument to disobey the law when one cannot be caught); *see also* Hossein Haeri & M. Sami Khawaja, *The Trouble with Free Riders*, PUB. UTIL. FORT., Mar. 2012, at 34, 35 (discussing that origins of free riding date back to Plato's *Republic*; eighteenth century and nineteenth century political philosophers, including Hume and Mill; and later Paul Samuelson and Mancur Olson in 1950s and 1960s).

[19] Garrett Cullity, *Moral Free Riding*, 24 PHIL. & PUB. AFF. 3, 7 (1995) ("[A] free rider is someone whose failure to pay for nonrival goods . . . makes her conduct unfair.").

[20] JOHN RAWLS, A THEORY OF JUSTICE 111-12 (1971). Rawls's two principles of justice mandate (1) equal access to universal basic liberties and (2) that social and economic inequalities are arranged to the benefit of the least well-off. *Id.* at 26.

[21] *Free Rider*, ROUTLEDGE DICTIONARY OF ECONOMICS (3d ed. 2013) ("An individual who does not pay for the goods or services he or she consumes."); *see also* JAMES R. KEARL,

context often focus on "public goods."[22] In other words, markets and regulation should be designed to prevent a party (the "free rider") from receiving the benefit of a public good without contributing to its cost.[23] Classic public goods include national defense, street lighting, and environmental protection.[24] Economists and regulators attempt to design markets and regulations to avoid free riding to ensure sufficient investment in public goods and avoid overconsumption of those public goods.

Free riding arguments appear across a broad range of contexts, such as the auto industry, voting, international trade negotiations, or any area in which someone contends that unpaid-for benefits have accrued.[25] In his classic 1965 work, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Mancur Olson Jr. brought the economic theory of free riding into the public policy realm with his application of the concept to the social science issue of

PRINCIPLES OF ECONOMICS 441 (1993) ("Free riding occurs when a person benefits from or uses a valuable good or service without having to pay for it.").

[22] William Nordhaus, *Climate Clubs: Overcoming Free-Riding in International Climate Policy*, 105 AM. ECON. REV. 1339, 1339 (2015) ("*Free-riding* occurs when a party receives the benefits of a public good without contributing to the costs."). Definitions of a "public good" vary, but in general a public good is defined as one that is available to everyone if anyone has access (jointness in supply), no one can be excluded from its use without excessive cost (nonexcludability), use by one person does not diminish the amount available for consumption by others (jointness in consumption), enjoyment by one person of the good does not diminish the benefits available to others (nonrivalness), no one can avoid using the good if anyone does (compulsoriness), everyone receives the same amount of the good (equality), and each user of the good consumes its total output (indivisibility). *See* Cullity, *supra* note 19, at 3-4.

[23] RUSSELL HARDIN, COLLECTIVE ACTION 20 (1982) (summarizing free rider issues as "costliness or de facto infeasibility of exclusion from consumption of a collectively provided good [that] usually eliminates any direct incentive for individual consumers to pay for the [public] good"); DENNIS C. MUELLER, PUBLIC CHOICE 13 (Phyllis Deane & Mark Perlman eds., 1979); Cullity, *supra* note 19, at 3-4; Paul A. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STAT. 387, 389 (1954) (describing free riding problems arising from collective consumption of goods).

[24] Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61, 73 n.45 (1986).

[25] *See, e.g.*, Rodney D. Ludema & Anna Maria Mayda, *Do Countries Free Ride on MFN?*, 77 J. INT'L ECON. 137, 137-39 (2009) (discussing ability of countries to free ride on other countries' negotiation efforts in international trade deals); Ellen Sewell & Charles Bodkin, *The Internet's Impact on Competition, Free Riding and the Future of Sales Service in Retail Automobile Markets*, 35 E. ECON. J. 96, 97-98 (2009) (discussing ability of online car dealers to free ride on physical services of brick-and-mortar dealers); Björn Tyrefors Hinnerich, *Do Merging Local Governments Free Ride on Their Counterparts When Facing Boundary Reform?*, 93 J. PUB. ECON. 721, 721-23 (2009) (applying economic free riding analysis to politics).

collective action.[26] Because individuals are able to derive most, if not all, benefits of a public good regardless of their individual contributions and because the comparative value of any individual contribution decreases as group size increases, it is rational for individuals to free ride off the contributions of other group members.

Notably, questions of "fairness" often arise in conjunction with free riding arguments. In the legal academy, what role "fairness" should play in developing legal policy remains highly contested, as illustrated by Professors Steven Shavell, Louis Kaplow, and other scholars.[27] The merits of this debate are beyond the scope of this Article but serve as an important backdrop to the discussion that follows—namely, how advocates in energy regulatory proceedings use both free riding and fairness arguments interchangeably to promote their interests.

Free riding arguments are common in the context of energy law and policy proceedings, where regulators routinely determine who will bear the costs and benefits of energy investments. This occurs in ratemaking proceedings before the Federal Energy Regulatory Commission ("FERC"), state public utility commissions, and court proceedings reviewing federal and state regulatory decisions.[28] Advocates often use free riding arguments in a much broader sense than the classic economics definition focused on public goods. They include arguments that participants in a utility subsidy program are being paid for actions or conduct that would have occurred even without the subsidy, thus rendering

[26] MANCUR OLSON, JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 14-15 (1965) (summarizing collective-action problem with public goods that cannot exclude individuals from consumption of the good); *see also* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 38-39 (Canto Classics ed. 2015) (1990) (noting that Olson originally introduced collective-action issue with public goods); Vincent Anesi, *Moral Hazard and Free Riding in Collective Action*, 32 SOC. CHOICE & WELFARE 197, 197-98 (2009).

[27] *See, e.g.*, FAIRNESS IN LAW AND ECONOMICS, at xiii-xvii (Lee Anne Fennell & Richard H. McAdams eds., 2013) (introducing connections between fairness and economics as theoretical framework); LOUIS KAPLOW & STEVEN SHAVELL, FAIRNESS VERSUS WELFARE 3-4 (1st Harvard Univ. Press paperback ed. 2006) (arguing that "notions of fairness like corrective justice should receive no independent weight in the assessment of legal rules" and that a "welfare-based normative approach" should be used exclusively instead); Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115, 127-28 (2014-2015) (relying on Kaplow and Shavell to argue that claims of "fairness" to oppose compensation for rooftop solar energy should be viewed with skepticism and discussing role of fairness in legal policy more broadly).

[28] *See, e.g.*, DAVIES ET AL., *supra* note 8, at 259-374 (discussing federal and state ratemaking processes and judicial review of same); REGULATORY ASSISTANCE PROJECT, REVENUE REGULATION AND DECOUPLING: A GUIDE TO THEORY AND APPLICATION 3-8 (2016), https://www.raponline.org/wp-content/uploads/2016/11/rap-revenue-regulation-decoupling-guide-second-printing-2016-november.pdf [https://perma.cc/R3NN-YARM] (describing traditional rate regulation); WHITED, *supra* note 8, at 1 (summarizing fundamentals of utility ratemaking and rate design).

the program inefficient or "unjust and unreasonable" under governing law. They also include arguments over cross subsidies—that a group of industry actors or customer classes are obtaining excess benefits from costs shared by all industry actors or customer classes and, correspondingly, that some industry actors or customer classes are overpaying or underpaying for the benefits they receive.

For instance, in the context of FERC proceedings, parties—often investor-owned electric utilities—argue for or against a change in FERC policy on the grounds that it permits or encourages free riding. As an example, in 2011, in FERC Order No. 1000 ("Order 1000"),[29] FERC imposed new regional transmission line planning requirements and cost allocation rules on utilities.[30] In response, some utilities argued that other utilities and their customers were free riding by not paying a proportional amount of the costs associated with new electric transmission lines covered by the Order and that the new lines would benefit some utility customers more than others.[31] Those utilities argued that FERC must follow the "cost-causation principle," a requirement derived from the Federal Power Act's mandate that rates be "just and reasonable."[32] They contended that the cost-causation principle requires that FERC can only approve rates that charge consumers roughly proportionally to the benefits they receive.[33]

As one federal court put it, the "cost causation principle targets something called the 'free rider problem,' which FERC acknowledged that it sought to 'address through its cost allocation reforms'" in Order 1000.[34] Although the

[29] Order on Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 136 FERC ¶ 61,051 (July 21, 2011) (final rule) (codified at 18 C.F.R. pt. 35) [hereinafter FERC Order No. 1000].

[30] *See* Order on Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 139 FERC ¶ 61,132, paras. 576, 578 (May 17, 2012) (order on rehearing and clarification) (codified at 18 C.F.R. pt. 35) [hereinafter FERC Order No. 1000-A] (affirming basic determinations in Order 1000 and defining "free riders" as "entities who are being subsidized by those who pay the costs of the benefits that free riders receive for nothing" and who, in the electric transmission line context, "do not bear cost responsibility for benefits that they receive in their use of the transmission grid"); *see also* El Paso Elec. Co. v. FERC, 832 F.3d 495, 499 (5th Cir. 2016) (providing background on FERC's implementation of new rules); Herman K. Trabish, *Has FERC's Landmark Transmission Planning Effort Made Transmission Building Harder?*, UTIL. DIVE (July 17, 2018), https://www.utilitydive.com/news/has-fercs-landmark-transmission-planning-effort-made-transmission-building/527807/ [https://perma.cc/8WDC-UG7Z].

[31] *See* FERC Order No. 1000-A, *supra* note 30, at para. 198.

[32] *Id.* at para. 199.

[33] *See* Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 476 (7th Cir. 2009) ("FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members. '[A]ll approved rates [must] reflect to some degree the costs actually caused by the customer who must pay them.'" (alterations in original) (quoting KN Energy, Inc. v. FERC, 968 F.2d 1295, 1300 (D.C. Cir. 1992))).

[34] *El Paso Elec. Co.*, 832 F.3d at 500 (quoting FERC Order No. 1000-A, *supra* note 30, at para. 562).

facial challenges to Order 1000 were not successful, both the Order itself—in which FERC referenced free riding issues—as well as the court decisions evaluating Order 1000 recognized the potential for free riding in federal transmission planning and cost allocation.[35]

Utilities have also raised free riding arguments in the context of who should pay for upgrades to existing transmission lines.[36] There, utilities have argued that individuals might be forced to subsidize the upgrades of others by paying the cost while others derive the benefits.[37] Free riding arguments can also arise in transmission rate cases for individual utilities.[38] Utilities have argued that transmission customers (i.e., other power providers contracting for transmission services) can free ride by misrepresenting their actual energy demand because charges are calculated on an annual basis, using a snapshot of demand at a single point in time.[39] Utilities worry that transmission customers can intentionally lower demand for that short time to derive unjust benefits for the whole year.[40]

At the state level, public utility commissions and public service commissions frequently address free riding arguments when commissions set rates for electric, gas, and telecommunications utilities. For example, in the early 2000s, telecommunications companies in Illinois and Michigan argued that their competitors were free riding on their phone infrastructure when the competitors used that infrastructure to offer local call pricing for long distance calls.[41] For electric and gas utilities, most state statutes direct utility commissions to ensure that utility rates, charges, and programs are "just and reasonable."[42] Thus, free riding claims associated with one class of ratepayers cross subsidizing another class of ratepayers are arguments that a particular rate, program, or charge is unjust and unreasonable or, in a broader sense, "unfair."[43]

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[35] *See, e.g.*, S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41, 92 (D.C. Cir. 2014) (upholding challenges to FERC Order No. 1000, *supra* note 29).

[36] *See, e.g.*, Sw. Power Pool, Inc., Order on Tariff Filing, 163 FERC ¶ 61,092, para. 21 (May 4, 2018) ("[T]he second generator could essentially free ride on the investment of the first generator as a transmission customer taking point-to-point transmission service.").

[37] *See id.* at para. 22.

[38] *See, e.g.*, PJM Interconnection, L.L.C., Order Rejecting Filing, 162 FERC ¶ 61,136, para. 1 (Feb. 16, 2018) (describing utility company's proposal to "reduce a transmission customer's incentive to avoid consumption during the system peak, and thereby shift transmission costs to other transmission customers").

[39] *Id.* at para. 2.

[40] *Id.*

[41] Focal Commc'ns Corp., No. 00-0027, at *11-12 (Ill. Commerce Comm'n May 8, 2001) (arbitration decision), 2001 WL 902639; Coast to Coast Telecomms., Inc., Case No. U-12382, at *3 (Mich. Pub. Serv. Comm'n Aug. 17, 2000) (order adopting arbitrated agreement), 2000 WL 1409759.

[42] *See supra* note 3 and accompanying text (discussing state statutes).

[43] *See, e.g.*, Peskoe, *supra* note 3, at 228 (discussing state court decisions reviewing public utility commission rate-design issues surrounding cost shifts between customer classes and

When it comes to utility-funded energy efficiency programs, the question is often whether utilities or government actors are subsidizing conduct—such as residential or commercial customer energy efficiency investments (e.g., weatherproofing, energy-efficient light bulbs, energy-efficient boilers)—that would have been undertaken even absent the subsidy.[44] If conduct that would have otherwise occurred is being subsidized, the program causes an unreasonable cost shift among different customer classes. This cost shift is unreasonable because all utility customers pay the utility for administering the program (at a rate determined by the state utility commission), and those customers who would have invested in energy efficiency even absent the program are receiving a subsidy paid for by others. Thus, those investments shouldn't "count" as program benefits because they would have occurred anyway. Because of these concerns—which most energy efficiency experts characterize as free riding—government regulators, utilities, and industry experts have created a range of metrics and have conducted empirical studies to evaluate the cost-effectiveness of these programs and determine the level of free riding.[45]

concluding that most courts defer to commissions so long as such allocation in rate design is reasonable).

[44] *See, e.g.*, Marie-Laure Nauleau, *Free-Riding on Tax Credits for Home Insulation in France: An Econometric Assessment Using Panel Data*, 46 ENERGY ECON. 78, 79 (2014) ("[F]ree-ridership, which is defined as behavior occurring 'when the agents targeted by the policy take the incentives but would have made the investment anyway.'" (footnote omitted) (quoting Anna Alberini, Andrea Bigano & Marco Boeri, *Looking for Free Riding: Energy Efficiency Incentives and Italian Homeowners*, 7 ENERGY EFFICIENCY 571, 572 (2014))); Nicholas Rivers & Leslie Shiell, *Free Riding on Energy Efficiency Subsidies: The Case of Natural Gas Furnaces in Canada*, 37 ENERGY J. 239, 239 (2016) ("We assess the extent to which subsidies for home energy efficiency improvements in Canada have been paid to households that would have undertaken the improvements anyway—the so-called free rider rate."); Kenneth E. Train, *Estimation of Net Savings from Energy-Conservation Programs*, 19 ENERGY 423, 424 (1994) ("The customers who implemented measures under a program even though they would have installed the measures without the program (for example, customers who received rebates for measures that they would have installed anyway) are called 'free riders.'").

[45] *See* Matthew Collins & John Curtis, *Willingness-to-Pay and Free-Riding in a National Energy Efficiency Retrofit Grant Scheme*, 118 ENERGY POL'Y 211, 215 (2018) (defining level of free riding by "compar[ing] the total cost of the completed retrofit, the cost to the household of the retrofit following the award of grant aid, and the total willingness-to-pay of each household for that retrofit"); Peter Grösche & Colin Vance, *Willingness to Pay for Energy Conservation and Free-Ridership on Subsidization: Evidence from Germany*, 30 ENERGY J. 135, 137-38 (2009) (describing methodology of study using empirical data from German single-family home owners); Nauleau, *supra* note 44, at 79 (assessing effectiveness of French income tax credit on investment decisions for household retrofits); Rivers & Shiell, *supra* note 44, at 239 (assessing effectiveness of forced-air natural gas furnace subsidy and Canadian tax credit on free-rider rate); *infra* Section I.A (describing various energy efficiency programs).

In other energy-related contexts, such as utility compensation for customer-generated rooftop solar and utility investments in EV charging infrastructure, free riding is described quite differently. In these cases, rather than labeling as "free riding" behavior that would have occurred even in the absence of a program subsidy, the claim centers more directly on a certain class of utility customers paying "less than their fair share" for a benefit provided by the utility.[46] For instance, rooftop solar owners are often labeled as free riders.[47] This is because customers with solar panels have lower utility bills than customers without solar panels because customers with solar panels receive bill credits for the solar energy they generate, but they still receive the full benefit of the electric grid when the sun is not shining.[48] Likewise, in the context of utility-funded EV charging programs, if all utility customers pay for the utility to install EV charging stations within the utility's service territory but only some customers own EVs and utilize the charging stations, opponents of such programs contend that non-EV owners are subsidizing EV owners and that EV owners are free riders.[49] Just like in the rooftop solar context, opponents of EV charging programs allege that such cost shifts between customer classes are "unjust and unreasonable" under state utility ratemaking statutes and constitute free riding.[50]

Of course, free riding claims are neutralized if in all three instances the public benefits to all utility customers associated with the energy efficiency upgrades, rooftop solar energy generation, or use of EVs are above some determined threshold. The difficulty, though, is determining the nature and amount of the benefits these programs provide on both a near-term basis and a long-term basis. How interested parties, experts, and state utility commissions evaluate these issues is the topic of the remainder of this Part.

A. *Energy Efficiency Programs*

Energy efficiency is a means of reducing energy consumption while still attaining the same output.[51] Energy efficiency is divided into three broad

[46] *See* Tabuchi, *supra* note 12, at A13.

[47] *See id.*

[48] *See id.* (discussing utility claims of free riding in rooftop solar context).

[49] *See* American Petroleum Institute-Illinois Petroleum Council, Comment Letter on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 2 (Ill. Commerce Comm'n Oct. 22, 2018), https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx [https://perma.cc/4947-M7XD] ("The EV charging infrastructure is currently only used by a small fraction of drivers, many of whom are wealthy enough to afford these more expensive vehicles.").

[50] *See id.*

[51] NAT'L ACAD. OF SCIS., NAT'L ACAD. OF ENG'G & NAT'L RESEARCH COUNCIL, REAL PROSPECTS FOR ENERGY EFFICIENCY IN THE UNITED STATES 21 n.1 (2010) (noting that although "'energy efficiency' and 'energy conservation' are often used interchangeably, . . . they refer to different concepts. Improving energy efficiency involves accomplishing an objective, such as heating a room to a certain temperature, while using less

categories: (1) buildings (reducing electricity and space heating needs through new appliances, technologies, increased insulation, and the like), (2) transportation (increasing the efficiency of vehicles and vehicle fuels), and (3) industrial energy use.[52] In the United States, energy use has become significantly more efficient over the past few decades, allowing energy consumption to remain flat even in the face of economic growth.[53] Programs to improve energy efficiency include vehicle fuel economy standards and appliance efficiency standards at the federal level, as well as a range of local and state policies to promote energy efficiency in buildings and appliances through mandates and tax incentives.[54]

Energy efficiency in residential and commercial buildings is particularly significant as it represents a low-cost opportunity to reduce U.S. energy usage as well as the associated greenhouse gas ("GHG") emissions. In 2018, the electric power sector consumed 38% of total U.S. energy, the residential and commercial sectors consumed 11%, the transportation sector consumed 28%, and the industrial sector consumed 23%.[55] With regard to GHG emissions, in 2017, the transportation sector and electric power sector both represented 29% of U.S. emissions, with the commercial/residential sector representing 12%, industry 22%, and agriculture 9%.[56] Notably, in 2018, residential and commercial buildings, which require energy for electricity and for space heating, consumed approximately 40% of U.S. energy and represented approximately the

energy. Energy conservation involves behavior expressed in actions taken to reduce energy use and can involve lifestyle changes—e.g., lowering the thermostat in the winter").

[52] DAVIES ET AL., *supra* note 8, at 137.

[53] *Id.*

[54] *Id.* (describing various federal and state programs aimed at promoting energy efficiency).

[55] *U.S. Energy Facts Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/us-energy-facts/ [https://perma.cc/RLN2-ZKAS] (last updated Aug. 28, 2019) (summarizing energy use sectors by energy source and primary energy consumption data).

[56] *Sources of Greenhouse Gas Emissions: Overview*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions [https://perma.cc/W7HS-UDJE] (last visited Feb. 18, 2020) (summarizing total U.S. greenhouse gas emissions by economic sector).

same percentage of U.S. CO_2 emissions.[57] "In large urban centers such as Chicago and New York," buildings constitute over 70% of energy use.[58]

Thus to the extent the United States can reduce energy use in residential and commercial buildings through energy efficiency, there will be significant cost savings and environmental benefits.[59] Indeed, experts show that, when treated as an energy resource (i.e., as an equivalent to generating power), energy efficiency is the third largest U.S. energy resource (behind coal and natural gas and in front of nuclear energy) and is also the lowest cost resource.[60] As a result of these potential savings and other benefits, there has been a significant emphasis on policymaking at the state level to support energy efficiency programs in general and utility-funded energy efficiency programs in particular.

[57] *Frequently Asked Questions: How Much Energy Is Consumed in U.S. Residential and Commercial Buildings?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=86&t=1 [https://perma.cc/3BWD-L55K] (last updated May 14, 2019); *Overview*, ALLIANCE TO SAVE ENERGY, https://www.ase.org/initiatives/buildings [https://perma.cc/4MMX-EKUN] (last visited Feb. 18, 2020) ("Buildings – including offices, homes, and stores – use 40% of our energy and 70% of our electricity. Buildings also emit over one-third of U.S. greenhouse gas emissions, which is more than any other sector of the economy."); *see also Benefits of Green Building*, *Press Room*, U.S. GREEN BUILDING COUNCIL, https://www.usgbc.org/articles/green-building-facts [https://perma.cc/H3CF-WYNA] (last visited Feb. 18, 2020) ("Buildings account for almost 40 percent of global energy-related CO2 . . . .").

[58] Iain Campbell & Koben Calhoun, *Old Buildings Are U.S. Cities' Biggest Sustainability Challenge*, HARV. BUS. REV. (Jan. 21, 2016), https://hbr.org/2016/01/old-buildings-are-u-s-cities-biggest-sustainability-challenge.

[59] *See, e.g.*, Alexandra B. Klass & Elizabeth J. Wilson, *Remaking Energy: The Critical Role of Energy Consumption Data*, 104 CALIF. L. REV. 1095, 1098-99 (2016) ("[I]nvesting $520 billion in nontransportation energy efficiency by 2020 could generate energy savings worth $1.2 trillion, reduce end-use energy demand by 23 percent compared to current projections, and eliminate over 1.1 gigatons of greenhouse gas emissions annually." (citing MCKINSEY & CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY 1 (2009), https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/epng/pdfs/unlocking%20energy%20efficiency/us_energy_efficiency_exc_summary.ashx [https://perma.cc/T48P-3GTM])).

[60] AM. COUNCIL FOR AN ENERGY-EFFICIENCT ECON., THE GREATEST ENERGY STORY YOU HAVEN'T HEARD: HOW INVESTING IN ENERGY EFFICIENCY CHANGED THE US POWER SECTOR AND GAVE US A TOOL TO TACKLE CLIMATE CHANGE 5-6 (2016), https://aceee.org/sites/default/files/publications/researchreports/u1604.pdf [https://perma.cc/6QRX-HW4S]; Annie Gilleo, *New Data, Same Results—Saving Energy Is Still Cheaper than Making Energy*, ACEEE: ACEEE BLOG (Dec. 1, 2017, 11:29 AM), https://aceee.org/blog/2017/12/new-data-same-results-saving-energy [https://perma.cc/R7VL-Q3ML] (showing cost comparisons of energy efficiency with other energy resources).

1. Utility-Funded Energy Efficiency Programs

Since the 1980s, utilities have offered energy efficiency programs to customers—either voluntarily or as a result of state mandates.[61] Today, such programs exist in one form or another in all fifty states and the District of Columbia and include "financial incentives, such as rebates and loans; technical services, such as audits, retrofits, and training for architects, engineers, and building owners; behavioral strategies; and educational campaigns about the benefits of energy efficiency improvements."[62] States spent approximately $8 billion on energy efficiency programs in the utility sector in 2018, paid for by utility customers through their monthly electric and gas bills.[63] According to the American Council for an Energy-Efficient Economy ("ACEEE"), these programs resulted in over 27 million megawatt hours of electricity saved in 2018.[64] Benefits associated with these energy savings included reduced GHG emissions, reduced energy costs, utility system benefits, and risk management through diversifying utility resource portfolios.[65]

As Professors Michael Vandenbergh and Jim Rossi have noted, the utility is a critical player in efforts to reduce electricity demand through energy efficiency measures:

> [T]he distribution utility serves as an intermediary and gatekeeper between the consumer and the electric grid. A utility that has incentives to reduce household or other demand for electricity can play its information, service,

[61] WESTON BERG ET AL., AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., THE 2019 STATE ENERGY EFFICIENCY SCORECARD 22 (2019) [hereinafter BERG ET AL., ACEEE ENERGY EFFICIENCY SCORECARD], https://aceee.org/sites/default/files/publications/researchreports/u1908.pdf [https://perma.cc/DL3E-5K8J].

[62] *Id.* at 17; *see also* JOSEPH ETO, THE PAST, PRESENT, AND FUTURE OF U.S. UTILITY DEMAND-SIDE MANAGEMENT PROGRAMS 2 (1996), https://emp.lbl.gov/sites/all/files/39931.pdf [https://perma.cc/V36V-E2HE] (detailing different types of utility-funded energy efficiency programs, such as "(1) general information to increase customer awareness of energy use and of opportunities to save energy; (2) technical information, including energy audits, which identify specific recommendations for improvements in energy use; (3) financial assistance in the form of loans or direct payments to lower the first cost of energy-efficient technologies; (4) direct or free installation of energy-efficient technologies; (5) performance contracting, in which a third party contracts with both the utility and a customer and guarantees energy performance").

[63] BERG ET AL., ACEEE ENERGY EFFICIENCY SCORECARD, *supra* note 61, at 1; *see also* STEVEN R. SCHILLER & TOM ECKMAN, SEE ACTION, SEE ACTION GUIDE FOR STATES: EVALUATION, MEASUREMENT, AND VERIFICATION FRAMEWORKS—GUIDANCE FOR ENERGY EFFICIENCY PORTFOLIOS FUNDED BY UTILITY CUSTOMERS 10 (2018) [hereinafter SEE ACTION GUIDE FOR STATES], https://www4.eere.energy.gov/seeaction/system/files/documents/EMV-Framework_Jan2018.pdf [https://perma.cc/3KV6-PFCY].

[64] BERG ET AL., ACEEE ENERGY EFFICIENCY SCORECARD, *supra* note 61, at 1.

[65] *State Energy Efficiency Benefits and Opportunities*, ENVTL. PROTECTION AGENCY, https://www.epa.gov/statelocalenergy/state-energy-efficiency-benefits-and-opportunities [https://perma.cc/V9JR-8UYS] (last visited Feb. 18, 2020).

> and access roles in ways that will induce widespread uptake of efficiency and conservation measures. A utility that does not can discourage widespread uptake of these measures and can do so in a variety of nontransparent ways, whether by increasing consumers' transaction costs (e.g., by requiring numerous or slow approvals for household solar photovoltaic installation, by understaffing key positions necessary for promotion of efficiency and conservation programs, and by imposing stringent requirements on grid access), or by limiting the extent or efficacy of information provided to consumers (e.g., by not making prompt, in-home energy use feedback easily available).[66]

For decades, policymakers have attempted to design programs to align the interests of electric utilities with the goals of energy efficiency.[67] Because utility revenues were historically tied to volumetric sales of electricity, energy efficiency programs resulted in reduced utility revenues.[68] Not surprisingly then, in the early days of energy efficiency programs, utilities opposed such programs on the grounds that they led to free riding and unfair cross subsidies among customer classes.[69] State legislatures and public utility commissions have put in place a variety of mechanisms to minimize or eliminate the adverse financial impact on utilities from energy efficiency programs. The most common mechanisms are: (1) allowing the utility to recover from ratepayers the direct costs of energy efficiency programs; (2) lost margin recovery or "decoupling" programs that ensure that "[a]ctual utility earnings are . . . brought in line with earnings authorized by the governing body, removing – or at least mitigating – the utility's disincentive to invest in energy efficiency programs

[66] Michael P. Vandenbergh & Jim Rossi, *Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction*, 65 VAND. L. REV. 1527, 1544-45 (2012).

[67] *See, e.g.*, Peskoe, *supra* note 3, at 265-66.

[68] *Incentivizing Utility-Led Energy Efficiency Programs*, ACEEE, https://aceee.org/sector/state-policy/toolkit/utility-programs [https://perma.cc/VPZ3-39QF] (last visited Feb. 18, 2020) ("[I]t is widely recognized that spending on energy efficiency programs has a detrimental effect on utility revenues, by reducing sales of the utility's core product, electricity or gas. The reasoning is straightforward: while a utility's variable costs change in proportion to sales volume, fixed costs associated with distribution and customer service do not. . . . This net lost revenue affects the utility's balance sheet, reducing the return to its investors and providing a strong incentive for utilities not to invest in programs that help their customers use energy more efficiently."); *see also* Will Nissen & Samantha Williams, *The Link Between Decoupling and Success in Utility-Led Energy Efficiency*, ELECTRICITY J., Mar. 2016, at 59, 62 (discussing benefits of decoupling and noting that as of January 2016, fifteen states had implemented electricity decoupling with proposals pending in eight additional states); Vandenbergh & Rossi, *supra* note 66, at 1546.

[69] *See, e.g.*, Peskoe, *supra* note 3, at 290 ("In the 1970s and 1980s, it was the [utilities] that raised concerns about intra-class subsidization. The 'paradox of conservation' was that ratepayer-subsidized programs to reduce consumption—in contrast to earlier subsidies designed to increase [utility] sales—could harm non-participating consumers by raising overall rates.").

due to reduced sales"; and (3) performance incentives that allow the utility to earn a return on investments in energy efficiency, similar to the return on investment it earns for building a power plant or transmission infrastructure.[70]

In general, these programs have succeeded in reducing utility opposition to energy efficiency programs, leaving arguments about free riding, evaluation of program performance metrics, and the like to economists and other experts.[71] That does not mean free riding arguments are absent from energy efficiency policy debates. On the contrary, they are front and center. The difference, however, is that the utility is not generally making the free riding argument.[72]

2. Free Riding as a Metric for Determining Cost-Effectiveness of Energy Efficiency Programs

According to the U.S. Department of Energy, "[f]ree-ridership issues are by no means peculiar to energy efficiency; they arise in many policy areas, whenever economic agents are paid an incentive to do what they might have done anyway."[73] The reason free ridership is important in this context is to

[70] *Lost Margin Recovery*, ACEEE, https://aceee.org/sector/state-policy/toolkit/utility-programs/lost-margin-recovery [https://perma.cc/ZH6J-BCDF] (last visited Feb. 18, 2020) (describing decoupling programs); *see also Incentivizing Utility-Led Energy Efficiency Programs*, *supra* note 68 (describing mechanisms of revenue recovery including program cost recovery, lost margin recovery, and performance incentives).

[71] *See infra* notes 84-86 and accompanying text (discussing scholarly proposals and literature examining data concerning energy efficiency programs); *see also* ETO, *supra* note 62, at 10; MARTIN KUSHLER, DAN YORK & PATTI WITTE, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., ALIGNING UTILITY INTERESTS WITH ENERGY EFFICIENCY OBJECTIVES: A REVIEW OF RECENT EFFORTS AT DECOUPLING AND PERFORMANCE INCENTIVES 16-17 (2006), https://aceee.org/sites/default/files/publications/researchreports/u061.pdf [https://perma.cc/M8B4-ZM2H] (concluding that state regulatory approaches to overcoming utility disincentives to promote energy efficiency such as decoupling and performance incentives are effective in states in which they are used).

[72] This is not to say that utilities have become strong supporters of energy efficiency programs. Indeed, as Professors Vandenbergh and Rossi have stated:

> [S]o long as volumetric pricing and guaranteed cost recovery through regulated rates leads utilities to view efficiency and conservation as revenue erosion, they will have incentives to create an appearance of demand reduction (e.g., to maintain reputation, satisfy regulators' demands, etc.), but under the existing approach neither utilities nor customers can be expected to be firmly committed to reducing the aggregate usage of electricity.

Vandenbergh & Rossi, *supra* note 66, at 1548; *see also* Peskoe, *supra* note 3, at 153 (detailing arguments of Edison Electric Institute, the trade association for investor-owned utilities, that decoupling efforts remain insufficient to address "transformative threats" to utility-industry model and that energy efficiency programs continue to act as "cross subsidies" between those customers who directly benefit from energy efficiency programs and those who do not).

[73] STEVEN R. SCHILLER, SEE ACTION, ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-8 (2012) [hereinafter SEE ACTION IMPACT EVALUATION],

ensure that the utility makes "prudent use of energy efficiency dollars."[74] In other words:

> If program dollars are spent on people who would have taken the actions anyway, without program support, then those people are free riders, and those dollars were perhaps misspent. Evaluators are tasked with studying how much of a program's resources were spent on free riders, and what the program savings were, net of free riders.[75]

Or, as stated by one energy expert:

> One of the most vexing problems surrounding the issues of free-ridership is definitional. To the economic purist, the textbook definition of free-ridership is a person who consumes a good without paying for it. For a variety of reasons, the working definition of free-ridership as it pertains to public benefits and utility energy-efficiency programs is significantly different. In this case a free-rider is someone who would install an energy-efficiency measure without any program incentives because of the return on investment of the measure, but receives a financial incentive or rebate anyway. This definition has been adopted by utilities, program directors, and regulatory bodies that are currently discussing energy-efficiency programs.[76]

Energy efficiency experts have developed specific tests to evaluate the cost-effectiveness of utility-funded energy efficiency programs. The most common ones are: (1) Total Resource Cost Test ("TRC"), which compares benefits to the utility ("avoided supply-side-cost benefits, additional resource savings benefits") with costs to participants of installing the measures plus the cost of program administration; (2) Societal Cost Test ("SCT"), which is similar to the TRC except that it "explicitly quantifies externality benefits such as avoided pollutant emissions not represented in market prices and other non-energy

https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf [https://perma.cc/4PJ9-M9EX].

[74] *Id.*

[75] *Id.*; *see also* STEPHEN R. SCHILLER, NAT'L ACTION PLAN FOR ENERGY EFFICIENCY, MODEL ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-1 to -3 (2007) [hereinafter NAT'L ACTION PLAN IMPACT EVALUATION GUIDE], https://www.epa.gov/sites/production/files/2015-08/documents/evaluation_guide.pdf [https://perma.cc/FX9K-JP56] (defining free ridership, spillover effects, and other factors to consider in differentiating gross savings and net savings from energy efficiency programs); Carl Blumstein, *Program Evaluation and Incentives for Administrators of Energy-Efficiency Programs: Can Evaluation Solve the Principal/Agent Problem?*, 38 ENERGY POL'Y 6232, 6234 (2010) ("It is not desirable to reward IOUs for the energy savings of free riders for two reasons: (1) the payments are unearned and (2) payments for free-rider savings would bias IOU programs in favor of programs in which consumers already had a strong predilection to participate.").

[76] Stephen Heins, *Energy Efficiency and the Spectre of Free-Ridership*, ECEEE, https://www.eceee.org/library/conference_proceedings/ACEEE_buildings/2006/Panel_12/p12_8/ [https://perma.cc/VPL4-5HMU] (last visited Feb. 18, 2020).

benefits (e.g., improved health/productivity)"; (3) Program Administrator Cost Test ("PACT"), also known as the Utility Cost Test ("UCT"), which compares the utility's avoided-cost benefits with program expenditures (both the incentives and the administrative costs); (4) Participant Cost Test ("PCT"), which compares "participant benefits (incentives plus bill savings) with participant costs (incremental or capital cost, installation O&M, etc.)"; and (5) Ratepayer Impact Measure ("RIM"), which "compares the utility's avoided cost benefits with the cost of administering energy efficiency programs plus lost revenue from reductions in customer energy consumption."[77]

According to the U.S. Environmental Protection Agency ("EPA"), "[t]here is no single best test for evaluating the cost-effectiveness of energy efficiency."[78] Many states use multiple tests to evaluate cost-effectiveness of energy efficiency programs for a more comprehensive approach as each test "provides different information about the impacts of energy efficiency programs from distinct vantage points in the energy system."[79] The National Action Plan for Energy Efficiency states:

> The most common primary measurement of energy efficiency cost-effectiveness is the TRC, followed closely by the SCT. A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program. The distributional tests (PCT, PACT, and RIM) are then used to indicate how different stakeholders are affected. Historically, reliance on the RIM test has limited energy efficiency investment, as it is the most restrictive of the five cost-effectiveness tests.[80]

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[77] ENERGY CTR. OF WIS., ENERGY EFFICIENCY GUIDEBOOK FOR PUBLIC POWER COMMUNITIES 30 (2009), https://www.seventhwave.org/sites/default/files/guidebook.pdf [https://perma.cc/QT74-FJ7E].

[78] NAT'L ACTION PLAN FOR ENERGY EFFICIENCY, UNDERSTANDING COST-EFFECTIVENESS OF ENERGY EFFICIENCY PROGRAMS: BEST PRACTICES, TECHNICAL METHODS, AND EMERGING ISSUES FOR POLICY-MAKERS, at ES-1 (2008), https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf [https://perma.cc/G47W-63KV].

[79] *Id.* at ES-2; *see also* SEE ACTION IMPACT EVALUATION, *supra* note 73, at xv-xix (describing frameworks and best practices for evaluating, measuring, and verifying utility-funded energy efficiency programs); SYNAPSE ENERGY ECON., INC., THE DATABASE OF STATE EFFICIENCY SCREENING PRACTICES (DSESP)—A RESOURCE OF THE NATIONAL EFFICIENCY SCREENING PROJECT (E4TheFuture 2019), https://nationalefficiencyscreening.org/state-database-dsesp/ (follow "Download the DSESP" hyperlink, then enter information requested and follow "Submit" if agreed to terms and conditions) (showing tests used in all fifty states).

[80] NAT'L ACTION PLAN FOR ENERGY EFFICIENCY, *supra* note 78, at ES-2; *see also* ENERGY CTR. OF WIS., *supra* note 77, at 30 (providing overview of cost-effectiveness tests); NAT'L EFFICIENCY SCREENING PROJECT, NATIONAL STANDARD PRACTICE MANUAL: EXECUTIVE SUMMARY, at vii-xiv (2017), https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_Exec_Summary_5-17-17.pdf [https://perma.cc/9GQP-6VHK] (explaining cost-effectiveness tests); Elizabeth Daykin, Jessica Aiona & Brian Hedman, Whose Perspective? The Impact of the Utility Cost Test 8 (2011) (unpublished manuscript),

Across all these tests, energy efficiency programs are generally evaluated for cost-effectiveness to account for both free riders and "spillovers," with spillovers defined as "additional reductions in energy consumption or demand that are due to program influences beyond those directly associated with program participation."[81] According to the EPA, this is done through evaluating the "net-to-gross ratio" ("NTG ratio") across all program tests, which "deducts energy savings that would have been achieved without the efficiency program (e.g., 'free-riders') and increased savings for any 'spillover' effect that occurs as an indirect result of the program."[82] Of course, identifying the impact of both free riders and spillovers is extremely difficult, and there is a large body of literature discussing various methods to obtain this information through surveys and other data collection methods that is beyond the scope of this Article.[83]

https://www.cadmusgroup.com/wp-content/uploads/2012/11/TRC_UCT-Paper_12DEC11.pdf [https://perma.cc/2T4Z-6ULJ].

[81] Daniel M. Violette & Pamela Rathbun, *Estimating Net Savings: Common Practices*, *in* UNIFORM METHODS PROJECT 3 (2014), https://www.energy.gov/sites/prod/files/2015/01/f19/UMPChapter17-Estimating-Net-Savings.pdf [https://perma.cc/9BKJ-U7VP].

Experts also attempt to evaluate the "rebound effect" associated with energy efficiency programs, which refers to changes in consumer behavior to increase the use of energy, such as raising the thermostat in the winter, using more air conditioning in the summer, and driving more often or longer distances because of technical improvements in energy efficiency that result in lower energy costs to consumers. Although experts agree that the direct-rebound effect is real, there are significant debates over its magnitude. *See, e.g.*, HOWARD GELLER & SOPHIE ATTALI, INT'L ENERGY AGENCY, THE EXPERIENCE WITH ENERGY EFFICIENCY POLICIES AND PROGRAMMES IN IEA COUNTRIES 5 (2005) (explaining rebound effect in energy efficiency and summarizing studies); NAT'L ACTION PLAN IMPACT EVALUATION GUIDE, *supra* note 75, at 5-2 ("Rebound is a change in energy-using behavior that increases the level of service and results from an energy efficient action.").

[82] NAT'L ACTION PLAN FOR ENERGY EFFICIENCY, *supra* note 78, at ES-3; *see also* WILLIAM P. SAXONIS, FREE RIDERSHIP AND SPILLOVER: A REGULATORY DILEMMA 533 (2007), https://www.iepec.org/conf-docs/papers/2007PapersTOC/papers/62_1064_ab_585.pdf [https://perma.cc/P84M-MZD2] (reviewing studies and literature on evaluating free ridership and spillovers and reviewing data in New York on same); Violette & Rathbun, *supra* note 81, at 3-4 (defining net and gross savings); Blumstein, *supra* note 75, at 6234 ("'Spillover' is the other side of the free rider issue. Spillover occurs when the effects of an energy-efficiency program spill over to affect other behavior. Examples of spillover would be a consumer taking action as the result of an energy-efficiency program but not receiving any of the incentives offered by the program (non-participant spillover) or a program participant stimulated to pursue additional energy saving actions that are not subsidized by the program (participant spillover).").

[83] *See, e.g.*, PWP, INC. & EVERGREEN ECON., CURRENT METHODS IN FREE RIDERSHIP AND SPILLOVER POLICY AND ESTIMATION 9-13 (2017), https://www.energytrust.org/wp-content/uploads/2017/07/FR_Spillover_170206.pdf [https://perma.cc/7R8A-996N]; SEE ACTION GUIDE FOR STATES, *supra* note 63, at 39-49; SEE ACTION IMPACT EVALUATION, *supra* note 73, at 5-1 to -11 (defining free riding, spillovers, and net savings in context of determining cost-effectiveness of utility-funded energy efficiency programs); Judson Boomhower & Lucas W. Davis, *A Credible Approach for Measuring Inframarginal Participation in Energy*

3. Criticisms of Energy Efficiency Programs

As stated above, virtually all evaluations of utility-funded energy efficiency programs attempt to evaluate the role of free riders and spillovers in determining the cost-effectiveness of the program. Debates over the cost-effectiveness of energy efficiency programs will undoubtedly continue, and experts will continue to refine the methodological approaches to evaluating free riders. At the same time, some scholars have questioned the scale of overall benefits of utility-sponsored energy efficiency programs from the outset. As early as the 1990s, Professors Paul Joskow and Donald Marron argued that data from utility companies did not bear out the grand claims of overall cost savings from utility-funded energy efficiency programs because of the failure to account for free riding.[84] These criticisms led to significant changes in the measurement and

Efficiency Programs, 113 J. PUB. ECON. 67, 67 (2014) (using "regression discontinuity analysis to examine participation in a large-scale residential energy-efficiency program" and finding that "program participation increases with larger subsidy amounts, but that most households would have participated even with much lower subsidy amounts"); Hunt Alcott & Michael Greenstone, *Measuring the Welfare Effects of Energy Efficiency Programs* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 23386, 2017), https://www.nber.org/papers/w23386.pdf [https://perma.cc/CG68-4YVG] (setting out "framework to evaluate the welfare impacts of residential energy efficiency programs in the presence of imperfect information, behavioral biases, and externalities, then estimat[ing] key parameters using a 100,000-household field experiment"); *Energy Efficiency Programs*, ACEEE, https://aceee.org/portal/programs [https://perma.cc/7QJW-X363] (last visited Feb. 18, 2020) (discussing founding of ACEEE in 1980 during early period of energy efficiency programs to provide research and policy development for utility energy efficiency); *Evaluation, Measurement, and Verification of Energy Data*, ENERGY.GOV, https://www.energy.gov/eere/slsc/evaluation-measurement-and-verification-energy-data [https://perma.cc/5UUL-6YLE] (discussing importance of evaluation, measurement, and verification data to "inform recommendations for improvements in [energy efficiency] program performance"); *Utility Customer-Funded Programs*, BERKELEY LAB: ELECTRICITY MKTS. & POL'Y GROUP, https://emp.lbl.gov/projects/utility-customer-funded [https://perma.cc/K3XR-WQBV] (last visited Feb. 18, 2020) ("The EMP Group tracks and analyzes trends in utility ratepayer-funded energy efficiency programs and enabling policies, and provides technical and policy support to regional authorities, state regulatory commissions, and program administrators by analyzing current practices and projected future spending and savings for efficiency programs.").

[84] Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost? Evidence from Utility Conservation Programs*, 13 ENERGY J. 41, 70-71 (1992); Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost? Further Thoughts and Evidence*, ELECTRICITY J., July 1993, at 14, 16 (responding to criticisms of earlier paper). *But see* ETO, *supra* note 62, at 10-12 (finding more savings attributable to energy efficiency programs than reported by Joskow & Marron but acknowledging that not all utilities were effective at running such programs).

evaluation of the effectiveness of energy efficiency programs to address these and other concerns and to ensure the cost-effectiveness of such programs.[85]

More recently, in 2016, Professor Arik Levinson argued that despite forty years of experience with energy efficiency programs, program benefits continue to be overstated, particularly in the context of state energy building codes.[86] Nevertheless, because of decades of experience with energy efficiency programs and a general recognition that energy efficiency programs can provide benefits for all ratepayers when designed properly, the debate has shifted toward how to identify free riders to improve the cost-effectiveness of programs rather than using free riding concerns as a reason to not have a program in the first place.

The same cannot be said for solar net metering programs and utility investment in EV charging infrastructure. Utility subsidies for these programs are subject to significant debate, with the role of free riders, "fairness," and cross subsidies at the center of arguments over whether these programs should exist at all. The following Sections turn to these issues.

B. *Net Metering: Utility Compensation for Customer-Generated Rooftop Solar Energy*

One of the most frequent, contemporary uses of free riding arguments in energy policy involves utility compensation for customer-generated rooftop solar energy, also referred to as "distributed generation," "distributed energy," or "distributed solar."[87] Beginning as early as the 1980s, states adopted policies requiring electric utilities to compensate owners of rooftop solar panels for the electricity generated by the solar panels that is sent back to the grid in order to incentivize the adoption of rooftop solar.[88] Such polices are often referred to as "net metering" or "net energy metering" ("NEM") because the electricity meter

[85] *See, e.g.*, GELLER & ATTALI, *supra* note 81, at 18-19 (discussing program designed to account for free rider and spillover effects as result of criticisms by Joskow, Marron, and others).

[86] Arik Levinson, *How Much Energy Do Building Energy Codes Save? Evidence from California Houses*, 106 AM. ECON. REV. 2867, 2892 (2016); *see also* Arik Levinson, *Energy Efficiency Standards Are More Regressive than Energy Taxes: Theory and Evidence*, 6 J. ASS'N ENVTL. & RESOURCE ECONOMISTS, Mar. 2019, at S7, S10-S13 (discussing shortcomings of energy efficiency programs); David S. Loughran & Jonathan Kulick, *Demand-Side Management and Energy Efficiency in the United States*, 25 ENERGY J. 19, 33-38 (2004) (reviewing data and finding that actual electricity savings resulting from energy efficiency programs were less than that reported by utilities).

[87] *See* Richard L. Revesz & Burcin Unel, *Managing the Future of the Electricity Grid*, 41 HARV. ENVTL. L. REV. 43, 44 (2017) ("'Distributed generation' is a term used to describe electricity that is produced at or near the location where it is used. Distributed generation systems, also known as 'distributed energy resources,' can rely on a variety of energy sources, such as solar, wind, fuel cells, and combined heat and power. Distributed solar energy is produced by photovoltaic cells, popularly referred to as solar panels, which can be placed on rooftops or mounted on the ground." (footnotes omitted)).

[88] *Id.* at 59-64 (describing history of net metering programs).

on the home or commercial building now runs two ways: It meters electric energy flowing to the customer when the solar panels are not providing all the necessary electricity to the building, and it also meters the electricity flowing back to the utility and the electric grid when the solar panels are producing more electricity than the building requires.[89] Over a monthly or yearly billing period, the customer pays the "net" of the electricity the building uses and produces, resulting in significantly lower electricity bills for the customer and, in some cases, a net profit for the customer.[90]

In the Energy Policy Act of 2005,[91] Congress provided additional support for state net metering policies by encouraging states to adopt them and also to provide tax benefits to customers installing solar generation.[92] Although one can argue that a sale of electric energy by a utility customer to the utility is a wholesale sale of electricity subject to FERC jurisdiction under the Federal Power Act, the Energy Policy Act of 2005 and numerous FERC decisions have disclaimed federal jurisdiction over net metering and instead have encouraged states to regulate the practice as a matter of state jurisdiction over retail sales.[93]

As of 2019, thirty-nine states and the District of Columbia required utilities to offer some form of net metering, and utilities in some of the remaining states offer net metering programs on a voluntary basis.[94] "Conventional" net metering compensates customers with solar panels at the retail electricity rate—the price

[89] ALEXANDRA B. KLASS & HANNAH J. WISEMAN, ENERGY LAW 153-54 (2017); LAZAR, *supra* note 3, at 78-79.

[90] KLASS & WISEMAN, *supra* note 89, at 153-54. For a more detailed description of various types of net metering, along with diagrams, see *Net Metering & Compensation*, MINN. PUB. UTIL. COMM'N, https://mn.gov/puc/energy/distributed-energy/net-metering/ [https://perma.cc/RS7K-F77K] (last visited Feb. 18, 2020).

[91] Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified in scattered sections of 42 U.S.C.).

[92] Revesz & Unel, *supra* note 87, at 59-60; *Residential Renewable Energy Tax Credit*, DSIRE, https://programs.dsireusa.org/system/program/detail/1235 [https://perma.cc/3MRG-2UFH] (last updated Mar. 23, 2018).

[93] *See* Sharon B. Jacobs, *The Energy Prosumer*, 43 ECOLOGY L.Q. 519, 534-36 (2016) (describing rationale for jurisdictional "net metering fiction"); David B. Raskin, *The Regulatory Challenge of Distributed Generation*, 4 HARV. BUS. L. REV. ONLINE 38, 42-45 (2013) (criticizing net metering as unfair subsidy and arguing for federal jurisdiction over net metering); Revesz & Unel, *supra* note 87, at 59-60; Jim Rossi, *Federalism and the Net Metering Alternative*, ELECTRICITY J., Jan.-Feb. 2016, at 13, 13-18 (disagreeing with Raskin and arguing for continued state jurisdiction over net metering); *see also* STATE POWER PROJECT, NET METERING AND FEDERAL/STATE JURISDICTION 1-2 (2016), https://statepowerproject.files.wordpress.com/2015/05/net-metering-policymaker-summary1.pdf [https://perma.cc/RBJ5-SNPZ] (summarizing Rossi's argument).

[94] *Net Metering Policies*, DSIRE (Oct. 2019), https://s3.amazonaws.com/ncsolarcen-prod/wp-content/uploads/2019/10/DSIRE_Net_Metering_Oct2019.pdf [https://perma.cc/85CF-8264]; *see also State Net Metering Policies*, NAT'L CONF. STATE LEGISLATURES (Nov. 20, 2017), http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx [https://perma.cc/V3T2-8TDU].

the customer pays to buy electricity from the utility.[95] A few other states have compensation rules that are not considered to be "net metering" because they compensate customers at something other than the retail rate, such as a lower wholesale rate, or they have a so-called "buy all, sell all" program where there is one meter for the customer's purchases of electricity and another meter for the customer's sale of electricity to the utility.[96] As discussed in more detail below, Minnesota has adopted a "Value of Solar Tariff" for designated utility purchases of certain types of distributed solar generation that attempts to value the full costs and benefits of solar energy on the grid and to avoid the bluntness of compensating customer-generated solar energy based on a retail electricity rate or a wholesale electricity rate.[97]

Beyond the rate of compensation, states vary considerably with regard to other aspects of net metering programs. Many states have capacity limits on individual customer solar systems, such as a 20 kilowatt (kW), 1 megawatt (MW), or 10 MW size limit on the system, with twenty-three jurisdictions imposing a size limit below 100 kW.[98] Other states place limits on capacity based on the customer's total electricity load, such as Arizona's limit of 125% of the customer's total load.[99] States also have imposed limits on aggregate-

[95] Retail electricity rates (the price end-use customers pay to the utility) are always higher than wholesale electricity rates (the price at which the utility buys or sells electricity to or from another wholesale provider of electricity, such as a neighboring utility, a utility-scale wind farm, a natural gas generator, etc.). Wholesale electricity rates vary significantly based on supply and demand and also based on the type of resource producing the electricity—natural gas, coal, nuclear, wind, or solar energy. By contrast, retail electricity rates are set by state public utility commissions and generally do not vary based on scarcity or resources, with some exceptions, such as when a customer enrolls in a "time of use" program that ties retail rates to low and high peak demand times of day. In most states, the "avoided cost rate" (the cost of the utility to purchase energy as wholesale or generate the energy itself) is much lower than the retail electricity rate. Revesz & Unel, *supra* note 87, at 60-61 (comparing avoided cost rates in Wisconsin in 2015 of $0.03 to $0.04 per kWh to retail rates of $0.11 to $0.14 per kWh); *see also* FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 769 (2016) (discussing price fluctuations in wholesale rates based on demand and fact that state regulators generally insulate retail customers from such rate fluctuations).

[96] LAZAR, *supra* note 3, at 134-35 (discussing net metering in the states); Revesz & Unel, *supra* note 87, at 47, 59-71 (discussing different state approaches to net metering and distributed-energy compensation); *see also Customer Credits for Monthly Net Excess Generation (NEG) Under Net Metering*, DSIRE (July 2016), http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2019/07/NEG-1.20161.pdf [https://perma.cc/8AHC-E5JZ] (showing net excess generation credits under statewide policies for investor-owned utilities); *State Net Metering Policies*, *supra* note 94 (discussing states with "buy-all-sell-all" approach).

[97] *See infra* Section I.B.2.

[98] Revesz & Unel, *supra* note 87, at 62-63. For comparison, three kW is common among residential systems and ten MW is common among commercial and industrial systems, with a lot of variation across both types of systems. *Id.* at 62.

[99] *See infra* Section I.B.1.

installed solar capacity within a utility's service territory or within a state. For instance, Georgia limits solar installations to 0.2% of a utility's peak demand, California has a cap of 5% of the utility's peak demand, and Utah's limit is 20% of state peak demand.[100] States also vary in how long customers can maintain bill credits (e.g., next monthly billing period, twelve-month period, or indefinitely) and whether the rate of compensation is uniform across all systems in the state or varies based on system size.

When solar panels were few and far between, net metering was fairly uncontroversial. However, as tax incentives, net metering, and a growing desire for renewable energy encouraged more electricity customers to install solar panels, utilities began to perceive a major threat to their future revenues from electricity sales and sought regulatory relief from state public utility commissions and legislative reform from state legislatures. One of the central arguments utilities made in this context is that non-solar owners are subsidizing solar owners. Because the utility's fixed costs associated with maintaining the electric grid are primarily recovered from customers through volumetric rates, if solar owners are now purchasing 50-80% less electricity each year but the utility still needs to maintain the same level of grid service for when the sun is not shining, the utility will need to raise rates since they are selling less power overall. When those rates go up, the increase will be disproportionately borne by non-solar owners. Thus, utilities increasingly argue that non-solar owners will now be unfairly shouldering a greater amount of those fixed costs, resulting in a cross subsidy to solar owners and solar owners free riding on the grid.[101]

Notably, cross subsidies between different types of retail customers are ubiquitous in the utility world.[102] Customers who live in rural areas require more distribution infrastructure to connect to the electric grid, so urban customers who require less transmission infrastructure are arguably paying more than their "fair share" of transmission line costs.[103] Low-income customers often receive rate discounts through state programs, and industrial customers receive favorable

[100] Revesz & Unel, *supra* note 87, at 63 & n.146 (citing *Database of State Incentives for Renewables and Efficiency*, DSIRE, https://www.dsireusa.org/ [https://perma.cc/CA56-K92V] (last visited Feb. 18, 2020)).

[101] *See, e.g.*, Peskoe, *supra* note 3, at 218 (contending that utlities' "focus on supposed cost shifts among individual ratepayers is self-serving, and that [public utility commissions] have routinely allowed or ignored potential cross subsidization among individual ratepayers, particularly when subsidies benefit the utility system"); Rule, *supra* note 27, at 129-42 (cataloguing different fairness and cross subsidy arguments utilities make in context of rooftop solar compensation); Shelley Welton, *Clean Electrification*, 88 U. COLO. L. REV. 571, 605 (2017) ("The fact that utilities so frequently filter their protectionist concerns through discussions of equity . . . serves to underscore its importance in electricity law: utilities make these arguments because they are aware that regulators care about the equities of clean energy policies.").

[102] *See* Peskoe, *supra* note 3, at 121-29, 169-72; Revesz & Unel, *supra* note 87, at 76; Rule, *supra* note 27, at 131-34.

[103] Rule, *supra* note 27, at 131-34.

rates from public utility commissions if those customers successfully argue that they need those lower rates to remain competitive.[104] In each of those cases, there is a cross subsidy from one customer class to the other. As a legal matter, however, the question is whether that cross subsidy is "unjust and unreasonable" or discriminatory under state law rather than whether it exists at all.[105]

Since approximately 2015, the "net metering wars" taking place in state public utility commissions and state legislatures across the country have resulted in many state commissions reducing the benefits associated with net metering by placing new fixed charges and "demand" charges on solar customers, compensating solar customers at something less than the retail rate, or imposing new aggregate capacity limits on solar installations.[106] In 2018, forty-five states and the District of Columbia took some action with regard to distributed solar, including making changes to net metering, fixed charges, minimum bill increases, or community solar policies.[107] In addition to efforts by utilities to reduce the financial benefits of rooftop solar in state commissions, utilities have worked closely with the American Legislative Exchange Council ("ALEC") to introduce model legislation in states across the country to ban or severely limit net metering or to impose large, fixed fees on owners of solar panels.[108]

In these proceedings, investor-owned electric utilities and ratepayer advocacy groups virtually always argue in favor of limiting or eliminating net metering for rooftop solar. They argue that rooftop solar reduces overall utility revenues

[104] *Id.* There are also cross subsidies between customers who use more electricity during peak demand times and customers who do not. *See* Ian Schneider & Cass R. Sunstein, *Behavioral Considerations for Effective Time-Varying Electricity Prices*, 1 BEHAV. PUB. POL'Y 219, 6-7 (2017). Moving to "time of use" rates for all electricity customers minimizes or eliminates that cross subsidy, but time-of-use rates are still rare among residential utility customers in the United States. *See* Ahmad Faruqui, *Residential Rates for the Utility of the Future*, BRATTLE GROUP (May 13, 2016), https://brattlefiles.blob.core.windows.net/files/7291_residential_rates_for_the_utility_of_the_future_final.pdf [https://perma.cc/JP2Y-7DKH]. For a discussion of time-of-use rates, see *supra* note 95.

[105] *See* Peskoe, *supra* note 3, at 228-30.

[106] *See, e.g.*, *id.* at 260 (noting that in arguments before public utility commissions, utilities "have launched a nationwide campaign against cross subsidies, in the name of consumer protection. They argue that rate structures that have allowed [photovoltaic energy] to gain traction are 'unfair,' 'misleading' to consumers, and 'regressive.' IOUs have also funded media campaigns that have painted [photovoltaic] adopters as thieves who steal their neighbors' money while out-of-state billionaires reap the profits" (footnotes omitted)); Revesz & Unel, *supra* note 87, at 64-71 (discussing challenges in numerous states to net metering); Welton, *supra* note 101, at 592-97 (discussing contentious state utility commission proceedings over net metering and opponents' "nationwide assault on the policy").

[107] AUTUMN PROUDLOVE, BRIAN LIPS & DAVID SARKISIAN, N.C. CLEAN ENERGY TECH. CTR., 50 STATES OF SOLAR: Q3 2018 QUARTERLY REPORT 5 (2018), https://nccleantech.ncsu.edu/wp-content/uploads/2018/10/Q3-18_SolarExecSummary_Final.pdf [https://perma.cc/5KQ6-N2ML] (describing policy changes to state net metering laws).

[108] Revesz & Unel, *supra* note 87, at 65.

(through lost electricity sales) without also lowering utility fixed costs, and that it will thus lead to increased electricity rates for customers to cover those fixed costs. In turn, they argue, those higher rates will fall disproportionately on nonsolar owners, who tend to be less wealthy than solar owners. The players on the other side of the debate include (1) the rooftop solar industry—companies like SolarCity, Sunrun, and Tesla[109]—which benefit financially from the increased financial incentives net metering provides for rooftop solar installations, and (2) environmental groups, which support the growth of rooftop solar because it increases the penetration of renewable, distributed energy into the electric grid; reduces reliance on fossil fuels; and reduces GHG emissions and other fossil-fuel related pollutants.[110]

In a 2017 article on distributed solar and net metering, Professor Richard Revesz and Dr. Burcin Unel surveyed many of the public benefits and costs associated with distributed solar.[111] The benefits to the electric grid include a reduction in the utility system's peak demand; a reduction in fuel and transmission expenses; lower distribution-line power losses, because distributed energy is closer to the end user; long-term costs savings to the system by enabling deferral or complete avoidance of the cost of new power plants; and resiliency benefits during storms and other power outages. The benefits to the public include climate change benefits and health benefits through the displacement of fossil fuels as well as more general environmental protection benefits associated with water quality and land use benefits.[112]

Not surprisingly, free riding and cross subsidy arguments arise frequently in the regulatory proceedings over distributed solar energy, as illustrated below. Here is where a comparison to the use of free riding in the energy efficiency context becomes helpful. Free riding concerns in energy efficiency programs have been present for decades, and economists and other experts have developed ways to address them.[113] One can certainly question how accurate our ability to evaluate free riders is in the energy efficiency context, but experts have at least developed metrics to measure free riders and, even if they are far from perfect, such metrics provide a platform for analysis and debate.

Regulators and experts are at a much earlier stage of data collection and analysis when it comes to free rider concerns in the rooftop solar context. The

[109] *See* Jacob Marsh, *Solar Power Companies in the U.S.: Which Should You Choose?*, ENERGYSAGE (June 28, 2018), https://news.energysage.com/solar-power-companies-us/ [https://perma.cc/95ZW-PVPE] (providing overview for guidance on installing solar panels and companies providing those services).

[110] *See* Peskoe, *supra* note 3, at 154-55; Revesz & Unel, *supra* note 87, at 48-49 (discussing net metering battles).

[111] Revesz & Unel, *supra* note 87, at 79-93.

[112] *Id.* at 79-81. Costs to the grid include the costs of new meter installations, grid interconnection, mismatches in power supply and power demand that the utility cannot yet easily control, and responding to the variability of distributed resources that cannot be turned off and on with a switch on demand. *Id.* at 81-84.

[113] *See supra* Section I.A.3.

question then becomes how much to support rooftop solar as these metrics are being developed. Opponents of rooftop solar, including many investor-owned electric utilities and other electricity providers, argue that states should eliminate net metering in favor of much lower payments for rooftop solar energy because the public benefits provided are limited.[114] Supporters argue that states should continue with net metering until we can more fully calculate the full system-wide benefits and public benefits provided by rooftop solar because we know they exist. Further, they argue that regulators and legislatures should reduce barriers to developing this energy resource.

A review of proceedings in Arizona, Nevada, and Minnesota surrounding compensation for rooftop solar generation shows a range of approaches to this question. In Arizona, the lack of information about the public benefits provided by rooftop solar caused regulators to reduce net metering benefits.[115] In Nevada, the utility commission first followed suit but then reconsidered its decision and used the lack of information as a reason to continue net metering until improved metrics could be developed.[116] And in Minnesota, the state legislature required the state utility commission to adopt a "value of solar tariff" ("VOST") to reduce the information asymmetry between the electric utility and the public and to begin to develop the types of metrics that exist in the energy efficiency context.[117]

1. Arizona and Nevada: Dueling Approaches to Uncertain Costs and Benefits

In 2013, the Arizona Public Service Commission became one of the first state utility commissions to revise a state net metering program to reduce the value of rooftop solar in response to a utility claim of an unfair cost shift between residential customers with solar panels and residential customers without solar panels. The utility, Arizona Public Service ("APS"), filed an "Application for Approval of Net Metering Cost Shift Solution" as "a solution to the cross subsidization of customers with Net-Metering [distributed generation ("DG")] systems by those customers without such systems."[118] Notably, in its filing, APS contended "that the issue is one of fairness to all customers and is not related to a loss of revenue by APS because of [net metering]."[119] Prior to its filing, APS

[114] *See infra* Section I.B.1.

[115] *See* Ariz. Pub. Serv. Co., Application for Approval of Net Metering Cost Shift Solution, Docket No. E-01345A-13-0248, at 3, para. 11 (Ariz. Corp. Comm'n Dec. 3, 2013) (order), 2013 WL 6384419, at *2, para. 11 [hereinafter 2013 Ariz. Pub. Serv. Co. Order].

[116] Sierra Pac. Power Co., Application for Authority to Adjust Annual Revenue Requirement, Docket Nos. 16-06006, 16-06007, 16-06008 & 16-06009, at 47 (Nev. Pub. Utils. Comm'n Dec. 28, 2016) (order), 2016 WL 7635932, at *36 [hereinafter Sierra Pac. Power Co. Order].

[117] MINN. STAT. § 216B.164, subdiv. 10(e) (2019).

[118] 2013 Ariz. Pub. Serv. Co. Order, *supra* note 115, at 3, para. 11.

[119] *Id.*

hosted a technical conference to gather information and propose various solutions, which it presented to the Commission with its application.[120]

In its order ruling on the APS application, the Commission summarized the Commission staff's analysis of the issue and found that "integral to the discussion of DG is the question of what *value* DG offers to APS's electric system and thereby to the customers served by that system."[121] Staff found two values inherent in DG systems: (1) objective value, which consists of "measurable" benefits such as avoided fuel costs to the utility, although it recognized that "[e]ven objective value can be difficult to predict in future time periods"; and (2) subjective value, which "requires the subjective assignment of monetary values to anticipated future benefits that are not easily measurable" and can include "increased grid security and air quality improvements."[122] The Commission, based on the staff report, recognized that several studies existed that attempted to quantify both objective and subjective values of DG, that subjective value "is a public policy issue" that requires "a subjective assignment of values consistent with policy goals," and that both objective value and subjective value would need to be addressed in the utility's next general rate case proceeding to quantify and value the costs and benefits of DG and "allocate[] . . . these costs and benefits equitably among customers [as] a matter of rate design."[123]

As an interim measure, however, the Commission agreed with APS that some additional costs and fees on solar customers were appropriate.[124] It did not place new fees on customers who already had installed solar panels but did place a $0.70 per kW monthly interim charge on all DG customers with installations after December 31, 2013 to "ameliorate the impact of the cost shift on residential non DG customers."[125] This amount, which constituted the first approval of fixed charges on solar customers in the United States, was significantly lower than the $3.00 per kW per month amount it believed APS's data could justify (equivalent to an additional $21 per month for a customer system of 7 kW) and the $70 per month APS said was warranted by the "cost shift issue" in a later proceeding on the same issue.[126]

Contentious battles over how to value and compensate rooftop solar generation continue in Arizona, with APS arguing that its customers "are bearing

[120] *Id.* at 4, para. 12.

[121] *Id.* at 7, para. 24.

[122] *Id.* at 7, paras. 25-26.

[123] *Id.* at 8-9, paras. 30-32.

[124] *Id.* at 23, para. 85.

[125] *Id.* at 28, para. 4.

[126] *See id.* at 23, para. 84; *see also* Ariz. Pub. Serv. Co., Application for Approval of Net Metering Cost Shift Solution, Docket No. E-01345A-13-0248, at 14-15, 31-32, paras. 106, 162 (Ariz. Corp. Comm'n Aug. 31, 2015) (order) [hereinafter 2015 Ariz. Pub. Serv. Co. Order], 2015 WL 5178977, at *9, *23, paras. 106, 162, *order rescinded by* Docket No. E-01345A-13-0248 (Ariz. Corp. Comm'n Oct. 27, 2015), 2015 WL 6660495.

the brunt of the unfair cost shift" associated with continued net metering and arguing for higher fixed fees on solar customers.[127] What is important for purposes of analysis here is the position of APS that there is an "unfair" cost shift between customers with solar panels and customers without solar panels, despite the fact that all parties recognized in the proceeding that it was very difficult to value the benefits to the overall system associated with distributed solar. If that value is high, then any current cost shift may not be unfair to any customers and, in fact, may benefit all customers. This is particularly true if the "value" of distributed solar includes creating markets for developing solar technologies that can result in reduced carbon emissions, greater grid security through distributed generation, and financial value from reducing the need to build more fossil-fuel generation once energy storage technologies develop sufficiently to support distributed solar. APS and other utilities may not "value" those benefits because they may result in reduced revenues for the utility in the short term, but that does not necessarily mean they are an unfair cost shift on utility customers without solar panels or that customers with solar panels are free riding on the utility system.

The analysis was somewhat different in Nevada a few years later in 2016. In early 2016, the Public Utilities Commission of Nevada issued a "Modified Final Order" that phased out net metering for residential customers in Nevada with existing solar systems and tripled the "fixed charges" for those customers over a period of years.[128] This decreased the amount the utility paid customers for rooftop solar from the $0.11 per kWh retail rate to a $0.02 per kWh wholesale rate.[129] It also resulted in an increase in fixed monthly charges on solar customers from $12.75 per month to $38.50 per month.[130] This action resulted in SolarCity and other solar installation companies pulling their operations out of the state entirely with a commensurate loss of solar-related jobs in the state.[131] According to the Commission itself, the "Modified Final Order all but crushed the rooftop solar industry in Northern Nevada, reducing the booming industry from 983

[127] 2015 Ariz. Pub. Serv. Co. Order, *supra* note 126, at 14, para. 103 (citation omitted).

[128] Nev. Power Co., Application for Approval of a Cost-of-Service Study & Net Metering Tariffs, Docket Nos. 15-07041 & 15-07042, at 146-53 (Nev. Pub. Utils. Comm'n Feb. 12, 2016) (modified final order) [hereinafter 2016 Nev. Power Co. Modified Final Order], 2016 WL 693151, at *91-95.

[129] *See* Revesz & Unel, *supra* note 87, at 66 (citing Krysti Shallenberger & Gavin Bade, *Nevada Regulators Approve NV Energy, SolarCity Grandfathering Proposal*, UTIL. DIVE (Sept. 16, 2016), https://www.utilitydive.com/news/updated-nevada-regulators-approve-nv-energy-solarcity-grandfathering-prop/426480/ [https://perma.cc/S237-X6VR]).

[130] *Id.* at 66-67 (citing Julia Pyper, *Nevada PUC to Reconsider Grandfathering Rooftop Solar Customers into New Net-Metering Policy*, GREENTECH MEDIA (Jan. 21, 2016), https://www.greentechmedia.com/articles/read/nevada-puc-to-reconsider-grandfathering-rooftop-solar-customers-into-new-ne).

[131] *See* Katie Fehrenbacher, *Why SolarCity Plans to Ditch Nevada*, FORTUNE (Dec. 24, 2015, 3:23 PM), https://fortune.com/2015/12/24/solar-city-ditches-nevada/.

applications by residential homeowners and small commercial businesses in Sierra Pacific Power service territory in 2015 to [41] applications in 2016."[132]

A significant driver of the Commission's Modified Final Order eliminating net metering was a 2015 statute enacted by the Nevada legislature—Senate Bill 374—in which the legislature directed the Commission to address solar cost shift issues.[133] The relevant provisions of the statute provided that the Commission may establish different rate classes for customers with distributed solar; may establish terms and conditions for participating in net metering, including limits on enrollment in net metering "to further the public interest"; may allow a utility to "establish just and reasonable rates and charges to avoid, reduce[,] or eliminate *an unreasonable shifting of costs* from customer-generators to other customers of the utility"; and shall not authorize rates or charges for net metering "that *unreasonably shift costs* from customer-generators to other customers of the utility."[134]

In its order revisiting its decision, the Commission evaluated the record before it with regard to the extent of any unfair cost shift from net metering customers to non-net metering customers.[135] It found the record "replete with conflicting evidence regarding the existence of a cost shift," with some studies showing that the costs between customer classes will be "very nearly neutral" and total benefits of $36 million over the lifetime of an average rooftop solar system.[136] Other studies, however, showed exactly the opposite, with a significant cost shift based in large part on the differential in price between utility scale solar and rooftop solar, with utility scale solar available at significantly lower rates.[137]

With this conflicting evidence before it, the Commission stated that what it found most significant about the evidence submitted was that "credible and well-educated economists, engineers, [analysts], lawyers, and . . . businesses" failed to agree on fundamental facts and methodologies relevant to the proceeding.[138] The Commission considered that this was perhaps "due to Nevada being at a cross-roads where traditional thinking is colliding with new technology and disruptive business models—new ways of looking at old energy problems are

[132] Sierra Pac. Power Co. Order, *supra* note 116, at 38 (internal citation omitted).

[133] S.B. 374, 2015 Leg., 78th Sess. (Nev. 2015) (codified at NEV. REV. STAT. § 704.7735), *repealed by* A.B. 405, 2017 Leg., 79th Sess. (Nev. 2017).

[134] Sierra Pac. Power Co. Order, *supra* note 116, at 40.

[135] *Id.* at 44-46.

[136] *Id.* at 45 (citing ENERGY & ENVTL. ECON., INC., NEVADA NET ENERGY METERING IMPACTS EVALUATION 7 (2014), http://puc.nv.gov/uploadedFiles/pucnvgov/Content/About/Media_Outreach/Announcements/Announcements/E3%20PUCN%20NEM%20Report%202014.pdf [https://perma.cc/RV3F-R4L8]).

[137] *Id.* at 46 (citing ENERGY & ENVTL. ECON., INC., NEVADA NET ENERGY METERING IMPACTS EVALUATION 2016 UPDATE (2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2016-8/14264.pdf [https://perma.cc/DF3R-ZZQM]).

[138] *Id.*

emerging."[139] The Commission also considered that these divergent views "may also be because the facts regarding energy valuation, in many ways like the price of other commodities, change and continually evolve. What a cost prohibitive energy resource is today could very well be a fantastic value tomorrow."[140] The Commission continued:

> Jumping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving would not serve the public interest and Nevada. No certain answer at this time is better than the wrong one. More information, time, and analysis are necessary to find the appropriate balance for Nevada.[141]

The Commission then stated that, in its prior order eliminating net metering, it had recognized that the relevant factors for analyzing the positive and negative effects of net metering included avoided energy, avoided capacity, reduced energy losses/line losses, avoided CO_2 emissions, avoided criteria pollutant emissions, fuel hedging, utility integration and interconnected costs, and utility administration costs.[142] In that earlier order, according to the Commission, it had "bound those factors to only those things which are 'known and measurable'" but, in doing so, "failed to fully account for other facts and policies—even those difficult or impossible to objectively quantify—which should also be included in a comprehensive NEM valuation analysis."[143] Moreover:

> Until a universally-acceptable formula can be settled upon to determine an appropriate value for NEM rooftop solar generation in Nevada, questions regarding the existence of a cost-shift will remain unresolved. More than "known and measurable" costs need to be included in this analysis. However, how is monetary value to be placed on the prevention of climate change? Clean air? Encouraging job growth? Grid diversity? Energy choice and independence? Building a "New Nevada" for our children?[144]

The Commission went on to find that even assuming the facts support a cost shift from non-solar customers to solar customers, the relevant statute only prohibited the Commission from approving an "unreasonable" cost shift.[145] It found that no unreasonable cost shift would occur because there would be no "discernable cost increase" on the average monthly bill for customers without distributed solar—approximately $0.26 per month—and that most customers would experience a net decrease in the average monthly bill.[146] The Commission

[139] *Id.*

[140] *Id.*

[141] *Id.* at 47.

[142] *Id.*

[143] *Id.* (citing 2016 Nev. Power Co. Modified Final Order, *supra* note 128, at 156).

[144] *Id.* at 51-52.

[145] *Id.* at 52.

[146] *Id.*

also noted that its determination of reasonableness in this case was guided by the Nevada legislature's stated policies supporting renewable energy, including solar energy as a "mainstream alternative for homes."[147] Notably, within a year after the Commission's order, the Nevada legislature ratified the order by repealing its earlier legislation[148] and replacing it with provisions grandfathering in existing customers with full net metering and reducing the rate only slightly when certain installed capacity thresholds are met—for example, 95% of the retail rate in the first 80 MW of installed capacity, with decreases for every additional 80 MW installed until it flattens at a 75% rate of compensation.[149]

As detailed in Part II, what is notable about the Nevada Commission's order is its treatment of the present-day uncertainties regarding the valuation of costs and benefits of rooftop solar as compared with the Arizona Commission.[150] In the face of the absence of hard data regarding present-day and long-term benefits of rooftop solar, the Arizona Commission accepted the utility's arguments and assumed an unreasonable cost shift, while the Nevada Commission did exactly the opposite.[151] The Nevada Commission presumed that benefits to all customers associated with increased solar generation may exist now and would likely increase in the future.[152] It found no existing cost shift between customer classes that was unreasonable based on the evidence before it, and it relied on state legislative policies supporting renewable energy to allow the market for rooftop solar to develop and thrive in the state.[153] By contrast, in Arizona, the Commission saw its role more narrowly—to address the utility's petition regarding cost shifts taking place using the utility's existing rate design, which recovers both fixed and variable costs through volumetric electricity sales.[154] It did not use the proceedings as an opportunity to question the rate design or to

[147] *Id.* at 49 (quoting NEV. REV. STAT. § 701B.190 (2017)).

[148] A.B. 405, 2017 Leg., 79th Sess. § 33 (Nev. 2017) (repealing NEV. REV. STAT. § 704.7735).

[149] *See id.* § 28.3; Julia Pyper, *Nevada's New Solar Law Is About Much More than Net Metering*, GREENTECH MEDIA (June 16, 2017), https://www.greentechmedia.com/articles/read/nevadas-new-solar-law-is-about-much-more-than-net-metering ("Under the new law, new solar customers will immediately begin to be reimbursed for the excess energy they generate at 95 percent of the retail electricity rate. The credit is scheduled to decline . . . to a floor of 75 percent of the retail rate.").

[150] *See infra* notes 303-12 and accompanying text (evaluating use of precautionary principle as compared to cost-benefit analysis to approach regulatory challenges).

[151] *See infra* notes 315-21 and accompanying text (comparing regulatory proceedings in Arizona and Nevada to demonstrate state regulatory commissions' struggles to deal with uncertainties over how to approach net metering policies).

[152] *See infra* notes 318-20 and accompanying text (explaining Nevada Commission's hesitation to jump to conclusions about evolving technology when benefits associated with solar power were uncertain).

[153] *See infra* notes 318-20 and accompanying text.

[154] *See supra* note 123 and accompanying text.

support a growing market for a form of energy generation that posed a direct threat to the utility's existing business model.[155]

2. Minnesota: Moving Beyond Free Rider Arguments by Developing New Metrics

Unlike Arizona and Nevada, where the commissions relied on more general statutory language regarding just and reasonable rates in the context of rooftop solar, in Minnesota the legislature directed the Commission to develop a new method to compensate distributed solar energy.[156] Specifically, in 2013, in addition to using traditional net metering to compensate solar owners for systems up to 1000 kW, the legislature allowed investor-owned utilities to compensate utility customers and third-party solar owners based on "an alternative tariff" that compensates solar generators "through a bill credit mechanism for the value to the utility, its customers, and society for operating distributed-solar photovoltaic resources interconnected to the utility system."[157]

The legislature required that this alternative tariff, known as the "Value of Solar" tariff (also referred to as the "VOS rate" or "VOST") be developed by the Minnesota Department of Commerce no later than January 31, 2014, and be approved, rejected, or modified with the Department's consent by the Minnesota Public Utilities Commission within sixty days of submission.[158] In developing the VOST, the Department of Commerce was required to "consult stakeholders with experience and expertise in power systems, solar energy, and electric utility ratemaking regarding the proposed methodology, underlying assumptions, and preliminary data."[159] The VOST must, "at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value."[160] The Department of Commerce was also authorized but not required to consider "known and measurable evidence of the cost or benefit of solar operation to the utility" and incorporate "other values into the methodology, including credit for locally

[155] *See supra* notes 122-23 and accompanying text (noting that Arizona Commission stuck closely to analysis of existing inputs in cost-benefit analysis).

[156] MINN. STAT. § 216B.164, subdiv. 1 (2019) (declaring statute's intent to "give the maximum possible encouragement to cogeneration and small power production consistent with protection of the ratepayers and the public").

[157] *Id.* § 216B.164, subdiv. 10(a) (alternative tariff); *id.* § 216B.164, subdiv. 3(a) (net metering).

[158] *Id.* § 216B.164, subdiv. 10(e).

[159] *Id.*

[160] *Id.* § 216B.164, subdiv. 10(f). In Minnesota, part of the "environmental value" is determined based on the "externalities" of various energy generation resources, including criteria such as air pollutants and carbon emissions. *See, e.g.*, *id.* § 216B.2422, subdiv. 3(a); *see also* Further Investigation into Environmental and Socioeconomic Costs, Docket No. E-999/CI-14-643, at 57 (Minn. Pub. Utils. Comm'n Jan. 3, 2018) (order updating environmental cost values), 2018 WL 572293, at *52 (discussing requirements of statute).

manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors."[161]

The legislature also required the state's largest utility, Xcel Energy, to create a program for "community solar gardens" defined as facilities that generate electricity "by means of a ground-mounted or roof-mounted solar photovoltaic device whereby subscribers receive a bill credit for the electricity generated in proportion to the size of their subscription."[162] The other two investor-owned utilities in the state are allowed but not required to offer a solar-garden program.[163] Solar gardens must be at a capacity of no more than 1 MW, and each subscription

> shall be sized to represent at least 200 watts of the community solar garden's generating capacity and to supply, when combined with other distributed generation resources serving the premises, no more than 120% of the average annual consumption of electricity by each subscriber at the premises to which the subscription is attributed.[164]

A solar garden must have at least five subscribers, and no single subscriber may have more than a 40% interest in the garden.[165] Solar gardens may be owned by the utility or by a private solar development that contracts with the utility to sell the output of the solar garden.[166]

The purpose of the solar garden statute was to allow residential and "general service" customers (i.e., commercial, industrial, and public entities) to receive the financial benefits of solar energy without the need for the up front capital costs of purchasing solar panels and to encourage the development of a solar industry in Minnesota.[167] Eligible solar gardens "must be located in the service territory of the public utility filing the plan" and subscribers must be retail customers of the public utility located in the same county as the solar garden or a contiguous county.[168] The utility must purchase all energy that the community

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[161] MINN. STAT. § 216B.164, subdiv. 10(f).

[162] *Id.* § 216B.1641(b).

[163] *Id.* § 216B.1641(a). Minnesota Power and numerous rural electric cooperatives and municipal utilities have voluntary community-solar programs. *See, e.g.*, *Minnesota's Solar Gardens: The Status and Benefits of Community Solar*, VOTE SOLAR, https://votesolar.org/policy/policy-guides/shared-renewables-policy/minnesota-solar-gardens-community-solar-report/ [https://perma.cc/3SMK-X7K6] (last visited Feb. 18, 2020) (describing community solar programs in Minnesota and providing interactive map).

[164] *Id.* § 216B.1641(b).

[165] *Id.* § 216B.1641(a).

[166] *Id.*

[167] *See* BOB ELEFF, MINN. HOUSE OF REPRESENTATIVES, RESEARCH DEP'T, XCEL ENERGY'S COMMUNITY SOLAR GARDEN PROGRAM 1 (2017) (explaining that solar garden provision "removes the significant barrier of large initial capital costs that often inhibits . . . customers from installing a solar energy system").

[168] MINN. STAT. § 216B.1641(c).

solar garden generates and the purchase shall be at the VOS rate or, until the commission approves the VOS rate, at the applicable retail rate.[169]

The Minnesota Public Utilities Commission reviewed and approved the VOST prepared by the Department of Commerce in April 2014.[170] In its order, the Commission began by stating that the Department of Commerce "intends for the methodology to avoid cross subsidies and disincentives for conservation inherent in net metering."[171] The Department's methodology included eight relevant components, chosen because they were values "based on known and measurable evidence of the cost or benefit of solar operation to the utility"—avoided fuel costs, avoided fixed plant operations and maintenance, avoided variable plant operations and maintenance, avoided generation-capacity cost, avoided reserve-capacity cost, avoided transmission-capacity cost, avoided distribution-capacity cost, and avoided environmental costs.[172] According to the Commission, the components collectively "account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value attributable to solar [photovoltaics]."[173] The Department also included two "placeholder components" for future analysis—avoided voltage-control cost and solar-integration cost—on the grounds that these costs and benefits will be "known and measurable in the future" and thus can be added to the calculation at that time.[174] The Department declined to include as components the "compliance" value of Solar Renewable Energy Credits and the value of economic development on grounds that such values were not known or measurable at that time.[175] The Department anticipated that additional value and cost components would be added in the future "as more data and analysis becomes available about distributed solar and its costs and benefits."[176]

The Commission approved the Department's methodologies with a few modifications relating to fuel-price-escalator factor, calculating avoided distribution-capacity costs, and non-CO_2-avoided environmental cost values.[177] Pursuant to the statute, the utility must submit an annual calculation for Commission approval according to the Department of Commerce's VOST

[169] *Id.* § 216B.1641(d).

[170] *See generally* Establishing a Distributed Solar Value Methodology, Docket No. E-999/M-14-65 (Minn. Pub. Utils. Comm'n Apr. 1, 2014) (order approving distributed solar value methodology), 2014 WL 1347985.

[171] *Id.* at 1.

[172] *Id.* at 9.

[173] *Id.* at 10.

[174] *Id.*

[175] *Id.* (agreeing with Department's decision to exclude "compliance" components that were not known or measurable at time of order).

[176] *Id.*

[177] *Id.* at 15.

methodology.[178] Subscribers to community solar gardens must be reimbursed at the VOST, but the utility can elect to use VOST or net metering for other types of solar purchases such as customer-sited rooftop solar in the utility's territory.[179] Since the first VOST was established, it has been a few cents less than the retail rate used in traditional net metering.[180]

Despite the lower price of VOST, Xcel Energy has opted to continue to use net metering when it can as a matter of risk mitigation because VOST prices may fluctuate dramatically in the future, leading to more uncertainty with regard to costs on the part of the utility.[181] When the first community solar gardens came online, the Commission directed Xcel to compensate subscribers using the applicable retail rate with a renewable energy credit payment to provide sufficient incentives to get the solar-garden program started and so stakeholders to gain more experience with the program.[182] In 2016, the Commission directed Xcel Energy to transition its solar garden program to VOST because the legislature directed it to do so; because VOST will "provid[e] predictable yearly rate increases," thus improving the ability of solar gardens to obtain financing; because it would allow the utility to meet its solar-energy standard by purchasing solar energy credits at a commission-approved price; and because VOST will "address concerns that nonparticipating ratepayers are subsidizing the program."[183] The Commission has also been working with Xcel to use "location-specific avoided costs in calculating avoided distribution capacity" to ensure that the benefits of solar gardens located near load and the costs of solar gardens further from load are appropriately considered. Further, these avoided costs are factored into the benefits associated with reducing peak demand and deferring the need for distribution system upgrades.[184]

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[178] *Id.* at 16.

[179] MINN. STAT. § 216B.1641(d) (2019) (explaining that public utility must purchase all energy generated by solar garden at Commission-approved rate).

[180] *See* N. States Power Co., Docket No. E-002/M-13-867, at 7-8 (Minn. Pub. Utils. Comm'n Sept. 6, 2016) (order approving value-of-solar rate) [hereinafter N. States Power Co. Order], 2016 WL 4701453, at *5-7 (comparing value-of-solar rate based on changes in input data in approved value-of-solar methodology to applicable retail rates tied to varying customer classes). Northern States Power Company does business as Xcel Energy.

[181] *See, e.g.*, Frank Jossi, *Xcel Energy Seeks Changes as 'Value of Solar' Rate Spike Looms in Minnesota*, ENERGY NEWS NETWORK (Sept. 9, 2019), https://energynews.us/2019/09/09/midwest/xcel-energy-seeks-changes-as-value-of-solar-rate-spike-looms-in-minnesota/ [https://perma.cc/6BU6-PFQR] (discussing Xcel Energy's concerns that VOST will spike from $0.11 per kWh in 2019 to $0.25 per kWh for projects coming online in 2020 as result of changes to VOST "avoided distribution costs" calculation factor).

[182] *See* ELEFF, *supra* note 167, at 2-3 (explaining that Commission established details of legislature's energy credit system).

[183] N. States Power Co. Order, *supra* note 180, at 13-14 (detailing Commission's reasons for advocating for switch to value-of-solar rate).

[184] *Id.* at 14; *see also* Gabriel Chan, Matthew Grimley & Bixuan Sun, Reply Comment Letter on Xcel Energy's May 1, 2019 Filing 17 (Aug. 23, 2019),

Throughout the proceedings, the utilities, consumer advocacy groups, solar developers, and others have disagreed about appropriate inputs, assumptions, and other aspects of Minnesota's VOST.[185] Nevertheless, VOST provides a framework to address the cost shift and free riding arguments inherent in traditional net metering by creating identifiable inputs, cataloguing which inputs are known and unknown, and allowing the Commission to refine the methodology as needed to determine the costs and benefits of solar on the utility's system and statewide. VOST thus provides the primary alternative to net metering that exists today, and it provides a pathway to move beyond the free riding and cost shift arguments that will otherwise always be present in debates over net metering.

C. *Electric Utility Investment in EV Charging Infrastructure*

Utility investment in EV charging infrastructure provides a third illustration of the use of free riding arguments in state energy policy. The debates in this context are more recent than those involving energy efficiency, which have had decades to develop, as well as those involving rooftop solar, which have been in play since approximately 2013 and have reached virtually all states.[186] The debates over utility investment in EV charging infrastructure existed in only a few states prior to 2016, at which time an increasing number of state commissions began to open dockets on the topic.[187]

1. EV Sales in the United States and the Role of EV Charging Infrastructure

EV sales in the United States have increased significantly in recent years, constituting just over 2% of total vehicle sales in the United States in 2018, up

https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={002ECE6C-0000-C218-86FC-6D68DC732F45}&documentTitle=20198-155427-0 [https://perma.cc/Q68F-5QN3] (discussing location-specific avoided-cost calculations).

[185] *See, e.g.*, ELEFF, *supra* note 167, at 3 (discussing range of disputed issues surrounding VOST and solar gardens since enactment of statutory provisions); Gabriel Chan, Matthew Grimley & Nick Stumo-Langer, Comment Letter on Xcel Energy's 2019 VOS Calculation 1 (Nov. 7, 2018), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={009A5A67-0000-CC15-BF69-3E12D10B78DD}&documentTitle=201811-148058-01 [https://perma.cc/SGT2-TNQ4] (discussing conceptual errors, conceptual extensions, and process reforms for yearly VOS proceeding); Laura Hannah, *Xcel Energy's Community Solar Program Hits Major Milestones in Year 3*, GREENTECH MEDIA (Dec. 21, 2017), https://www.greentechmedia.com/articles/read/xcel-energy-community-solar-program-turns-three (discussing program developments and debates).

[186] *See supra* Section I.A (discussing utility-funded energy efficiency programs); *supra* Section I.B (discussing utility compensation for customer-generated rooftop solar energy).

[187] *See* Klass, *supra* note 8, at 567-74 (discussing state legislative and regulatory action).

from just over 1% in 2017.[188] That percentage is significantly higher in some states—particularly California—where the percentage of EV sales in 2018 approached 10% of all vehicles sold.[189] The growth of EVs has resulted from improved battery technology as well as mandates that auto companies sell a certain percentage of EVs in some U.S. states (led by California) as well as in the European Union and China.[190] As of June 2019, there were more than 1.27 million EVs on U.S. roads, and analysts project that there will be over 18 million EVs in the United States by 2030.[191] Since 2018, many major auto companies have publicly embraced EVs and have announced plans to invest heavily in the technology.[192]

Environmental groups—along with some U.S. states—strongly support widespread EV adoption because it provides an opportunity to reduce the use of oil and its related GHG emissions and other pollutants in the transportation

[188] *See* Press Release, Jonathon Berman, Sierra Club, Electric Vehicle Sales Skyrocketed in 2018 (Jan. 7, 2019), https://www.sierraclub.org/press-releases/2019/01/electric-vehicle-sales-skyrocketed-2018 [https://perma.cc/BUM4-8M6W].

[189] *See EV Market Share by State*, EVADOPTION, https://evadoption.com/ev-market-share/ev-market-share-state/ [https://perma.cc/JSJ8-VA3Q] (last visited Feb. 18, 2020).

[190] *See Detailed Sales Data*, VELOZ (Mar. 4, 2019), http://www.veloz.org/wp-content/uploads/2019/03/2_feb_2019_Dashboard_PEV_Sales_veloz.pdf [https://perma.cc/A7K4-3RDT] (depicting chart of EV sales in California and nationally in 2019); Echo Huang, *China Buys One out of Every Two Electric Vehicles Sold Globally*, QUARTZ (Feb. 18, 2019), https://qz.com/1552991/china-buys-one-out-of-every-two-electric-vehicles-sold-globally/ (attributing growth in EV sales in China to government support to EV sector, tax cuts for consumers, and government subsidies for carmakers); *Strong Policy and Falling Battery Costs Drive Another Record Year for Electric Cars*, INT'L ENERGY AGENCY (May 30, 2018), https://www.iea.org/newsroom/news/2018/may/strong-policy-and-falling-battery-costs-drive-another-record-year-for-electric-ca.html [https://perma.cc/TZK2-KXAY] (explaining that growth in EVs across China, Europe, and United States was motivated by government policies).

[191] *See Electric Transportation*, EDISON ELECTRIC INST., https://www.eei.org/issuesandpolicy/electrictransportation/Pages/default.aspx [https://perma.cc/U3SX-RFBX] (last visited Feb. 18, 2020) (giving overview of electric transportation in United States); *see also* Jeffrey Ryser & Keiron Greenhalgh, *US EV Sales Jump 72.5% on Year in 2018, Top 354,000*, S&P GLOBAL (Jan. 3, 2019, 10:56 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/electric-power/010319-us-ev-sales-jump-725-on-year-in-2018-top-354000 (reporting that 2018 was "break-out year" for EVs with "sales of more than 354,000 vehicles, or 72.5% more than the 199,000 EVs sold in the US in 2017").

[192] *See, e.g.*, Mark Matousek, *40 Electric Cars You'll See on the Road by 2025*, BUS. INSIDER NEDERLAND (July 11, 2019), https://www.businessinsider.nl/electric-cars-that-will-be-available-by-2025-2018-1/?fb_comment_id=1935043216559681_1936466436417359&jwsource=cl [https://perma.cc/K2BJ-AVCG] (discussing auto companies' investments in new models of EVs); Dan Neil, *Think Electric Vehicles Are Great Now? Just Wait . . .* , WALL STREET J. (Oct. 28, 2018, 10:28 PM), https://www.wsj.com/articles/think-electric-vehicles-are-great-now-just-wait-11545838139 (discussing growth in EV market).

sector, which, as of 2018, emits more GHG emissions than any other sector.[193] Moreover, although fossil fuels still made up over 63% of U.S. electricity generation in 2018, that percentage is far less in many states and is declining nationwide as a result of state renewable portfolio standards ("RPSs") and declining costs of utility-scale and distributed renewable energy.[194] As a result, electrifying transportation is an important component of efforts worldwide to reduce GHG emissions.

As part of its efforts to reduce statewide GHG emissions from the transportations sector, California has enacted a Zero Emission Vehicle ("ZEV") mandate that requires auto companies to generate a certain number of "credits" that come with the sale of EVs. Twelve other states have adopted the ZEV mandate,[195] and some of these ZEV states have also enacted legislative policies to facilitate the development of widespread EV charging infrastructure to increase consumer demand for EVs and reduce "range anxiety."[196] During the Obama Administration, the EPA granted California a preemption waiver under the Clean Air Act to enact the ZEV standard, but the Trump Administration EPA

[193] *See Preliminary US Emissions Estimates for 2018*, RHODIUM GROUP (Jan. 8, 2019), https://rhg.com/research/preliminary-us-emissions-estimates-for-2018/ [https://perma.cc/U79T-NGTE] ("The transportation sector held its title as the largest source of US [CO_2] emissions for the third year running, as robust growth in demand for diesel and jet fuel offset a modest decline in gasoline consumption.").

[194] *See* Nadja Popovich, *How Does Your State Make Electricity?*, N.Y. TIMES (Dec. 24, 2018), https://www.nytimes.com/interactive/2018/12/24/climate/how-electricity-generation-changed-in-your-state.html (showing that over half of California's electricity is generated from renewable energy resources; that percentages are even larger in Idaho, Vermont, and Washington; and that nearly 40% of Iowa's electricity is generated from wind energy alone); *see also Frequently Asked Questions: What Is U.S. Electricity Generation by Source?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=427&t=3 [https://perma.cc/4X7H-5ESR] (last updated Oct. 25, 2019).

[195] *See* Catherine Morehouse, *Minnesota, New Mexico Propose Clean Car Rules as Trump Attacks California Standards*, UTIL. DIVE (Sept. 26, 2019), https://www.utilitydive.com/news/minnesota-new-mexico-propose-clean-car-rules-trump-california-auto-standards-emissions-zev/563762/ [https://perma.cc/5BSA-EJH4] (discussing announcements from governors in Minnesota and New Mexico to adopt California's ZEV standards as well as lawsuit by states against EPA and National Highway Traffic Safety Administration over regulatory action to revoke preemption waiver); *What Is ZEV?*, UNION OF CONCERNED SCIENTISTS (Aug. 7, 2012), https://www.ucsusa.org/resources/what-zev [https://perma.cc/VU75-UXEY] (listing California, Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont as ZEV states).

[196] *See* Camille von Kaenel, *Luring Electric Vehicle Buyers with Swift Charging, Roller-Skating*, GOVERNORS' WIND & SOLAR ENERGY COALITION (Jan. 17, 2018), http://governorswindenergycoalition.org/luring-electric-vehicle-buyers-with-swift-charging-roller-skating [https://perma.cc/7GEX-ZACT] (discussing industry, state, and utility efforts to build out public EV charging stations to reduce range anxiety and support EV drivers).

revoked it in 2019.[197] Thus, the ability of California and the other states to enforce the mandate is in question and is currently subject to litigation.[198]

Electric utilities have the opportunity to play a central role in building out EV charging infrastructure. This infrastructure includes not only charging stations themselves but also distribution wires and related equipment necessary to power the charging stations. With regard to the charging stations, private charging companies such as Blink, ChargePoint, EVgo, and Greenlots have developed a range of business models to support home and business charging.[199] In addition, the Volkswagen ("VW") emissions cheating scandal resulted in a $14.7 billion settlement in 2016 that required VW to provide $2.7 billion in funds for grants to states to reduce diesel-related emissions; to build EV charging infrastructure; and to create a new company, Electrify America, to spend $2 billion building charging networks on interstate highways and in cities across the country.[200]

These provisions of the VW settlement are a recognition that in order for consumers to embrace EVs, sufficient EV charging infrastructure must be built through a combination of EV charging stations on highway corridors and at homes, workplaces, shopping centers, government buildings, and even gas stations.[201] It is well documented that the lack of EV infrastructure can present

[197] *See* The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program, 83 Fed. Reg. 51,310, 51,331 (Sept. 27, 2019) (to be codified at 40 C.F.R. pts. 85, 86 and 49 C.F.R. pts. 531, 533) (revoking California preemption waiver under Clean Air Act for ZEV program that was granted in 2009).

[198] *See* Morehouse, *supra* note 195 ("[A]ttorneys general from 23 states and the District of Columbia, as well as Los Angeles and New York City filed a lawsuit against the administration's actions.").

[199] *See* Mark Kane, *Four Charging Networks Control over 60% of Charging Points in U.S.*, INSIDEEVS (Oct. 23, 2018, 7:14 AM), https://insideevs.com/news/340565/four-charging-networks-control-over-60-of-charging-points-in-us/ [https://perma.cc/Q2JY-X8YK] (describing business models of leading companies in electric car charging station industry).

[200] INGRID MALMGREN & CASSIE POWERS, NAT'L ASS'N OF STATE ENERGY OFFICIALS, VOLKSWAGEN SETTLEMENT: BENEFICIARY MITIGATION PLAN TOOLKIT 4-5, 37 (2017), https://www.naseo.org/Data/Sites/1/naseo-vw-beneficiary-mitigation-plan-toolkit-final.pdf [https://perma.cc/YTG2-GC7T]; David Ferris, *7 Takeaways from a Wild Year for EVs*, ENERGYWIRE (Dec. 21, 2018), https://www.eenews.net/stories/1060110359/ (noting that VW needs to spend "several billion dollars on EV charging" and that most of that money is from its "new subsidiary, Electrify America").

[201] Although the major oil companies generally oppose transportation electrification because of its impact on market share, some companies see an opportunity for increased sales of convenience store items if they install EV charging stations because customers will be forced to spend more time at the stores while they wait for their cars to charge. *See, e.g.*, Tina Casey, *It's Over: Oil Giant Shell Doubles Down on EV Charging Stations*, CLEAN TECHNICA (Oct. 16, 2017), https://cleantechnica.com/2017/10/16/oil-giant-shell-doubles-ev-charging-stations/ [https://perma.cc/WBP8-EMA8] (reporting on oil company Royal Dutch Shell's decision to install EV charging stations at its gas stations in the European Union); Ken Doyle & Erika Myers, *Why Aren't More Convenience Stores Installing Electric Vehicle Chargers?*, SMART ELECTRIC POWER ALLIANCE (Nov. 9, 2017), https://sepapower.org

a "chicken and egg" or "market coordination" problem in which consumers will not want to purchase an EV due to perceived lack of support, while no company will invest in EV infrastructure because it does not see sufficient demand.[202]

Who should build this infrastructure and who should pay for it, however, have become hotly contested issues in state public utility regulatory proceedings and state legislatures in recent years. Private charging companies and state commissions were initially opposed to utility investment in EV charging infrastructure, fearing that the utilities would stifle competition and overbuild infrastructure in pursuit of profits.[203] That opposition has softened considerably, however, and led the California Public Utilities Commission to reverse its position on the issue when it determined that substantial private infrastructure investment would not emerge until regulated utilities were permitted to enter the

/knowledge/arent-convenience-stores-installing-electric-vehicle-chargers/ [https://perma.cc/69K3-MQWT] (discussing financial benefits of EV chargers for service stations and convenience stores, including "revenue from non-fuel sales, such as food, drinks and ice"); David Ferris, *Chevron Makes Landmark Investment in Chargers*, ENERGYWIRE (May 21, 2019), https://www.eenews.net/energywire/2019/05/21/stories/1060369775 (reporting that Chevron will offer charging stations at some gas stations because "highest-margin product is actually the coffee and the chips and drinks inside, not the gas outside"); Jenny Mandel, *Shell Establishes U.S. Charging Base by Buying Greenlots*, ENERGYWIRE (Feb. 1, 2019), https://www.eenews.net/energywire/stories/1060119225 (reporting that Shell bought Greenlots, "an EV-charging and power management company," in order to make charging stations "more accessible and more attractive to utilities, businesses and communities"); Christa Marshall & Blake Sobczak, *First U.S. Gas Station to Switch to 100% EVs Opens*, ENERGYWIRE (Sept. 30, 2019), https://www.eenews.net/energywire/stories/1061182039 (reporting on EV refueling stations in Maryland and gas stations in other states that have added EV chargers to their offerings).

[202] *See, e.g.*, Fresh Energy, Natural Resources Defense Council, the Sierra Club, and Minnesota Center for Environmental Advocacy, Initial Comments on Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E999/CI-17-879, at 17 (Minn. Pub. Utils. Comm'n July 27, 2018) [hereinafter CEO Initial Comments], https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={80FFDC64-0000-CF18-AE69-6C936C279BF4}&documentTitle=20187-145282-01 [https://perma.cc/TU6H-ZTX8] (describing market coordination problem); Adele Peters, *Want Electric Vehicles to Scale? Add Chargers to Gas Stations*, FAST COMPANY (Oct. 8, 2018), https://www.fastcompany.com/90247078/want-electric-vehicles-to-scale-add-chargers-to-gas-stations [https://perma.cc/9W3T-ZM9U] (discussing "chicken and egg" problem in context of EV charging and potential solutions).

[203] Klass, *supra* note 8, at 584.

market.[204] Other state commissions, as well as state legislatures, have quickly followed suit.[205]

2. State Regulatory Proceedings Governing Utility Investment in EV Charging

Regulators, scholars, auto manufacturers, environmental advocacy groups, and electric utilities nationwide are still struggling to determine best practices for cost-effective EV charging infrastructure investment. Nonetheless, proponents have pointed out that EV adoption has substantial benefits, including "great potential to dramatically reduce local air pollution, greenhouse gas emissions and resulting climate change impacts, and oil use from the transport sector."[206] Widespread EV adoption could also lead to lower electricity rates by better allocating grid load to more optimally use all power generated.[207] On the other hand, EV adoption is not without potential downsides, especially if EVs spike electricity demand at peak demand times.[208]

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[204] *Id.* (noting that state commission approved utility investment after "strong business case for non-utility public EV charging did not materialize"); David Roberts, *Electric Vehicles Are Gaining Momentum, Despite Trump*, VOX (July 18, 2018, 10:28 AM), https://www.vox.com/energy-and-environment/2018/6/26/17500074/electric-vehicles-evs-zevs-fuel-trump [https://perma.cc/8EYE-JG7G].

[205] *See* Jeffrey Tomich, *In Car-Loving Mich., an EV Master Plan Takes Shape*, ENERGYWIRE (Jan. 14, 2019), https://www.eenews.net/energywire/stories/1060111745/ (discussing approval of Michigan utility Consumers Energy's $10-million investment that was supported by private charging industry and was designed to "future-proof" charging network to allow for future technology developments and avoid stranded assets); Herman K. Trabish, *The Keystone State May Have Found the Key to the Next Wave of Transportation Electrification*, UTIL. DIVE (Jan. 11, 2019), https://www.utilitydive.com/news/the-keystone-state-may-have-found-the-key-to-the-next-wave-of-transportatio/545008/ [https://perma.cc/Q7MR-J89V] (reporting on collaboration by utilities, regulatory bodies, and legislature for EV charging plan in Pennsylvania that includes major utility and private sector investments); Robert Walton, *Michigan Regulators Approve DTE $273M Rate Increase, EV Pilot, Net Metering Replacement*, UTIL. DIVE (May 3, 2019), https://www.utilitydive.com/news/michigan-regulators-approve-dte-273m-rate-increase-ev-pilot-net-metering/554027/ [https://perma.cc/FN5N-KYQW] (reporting on approval of Michigan utility DTE Energy three-year EV program investing $13 million in "incentives for residential and non-residential chargers, along with education and outreach and a school bus charging program").

[206] DALE HALL & NIC LUTSEY, INT'L COUNCIL ON CLEAN TRANSP., EMERGING BEST PRACTICES FOR ELECTRIC VEHICLE CHARGING INFRASTRUCTURE, at iii (2017), https://www.theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf [https://perma.cc/XS5R-M722].

[207] Lisa Cohn, *Should All Utility Customers Pay for EV Infrastructure and Microgrids?*, MICROGRID KNOWLEDGE (June 22, 2018), https://microgridknowledge.com/ev-infrastructure-rate-based-microgrids/ [https://perma.cc/QY8R-NUNG].

[208] HALL & LUTSEY, *supra* note 206, at 24 (citing concern of extensive demand from "drivers plugging in after arriving home from work"). This could be particularly problematic as solar power plays an increasingly large role in nationwide grids if EV owners opt to charge

As noted above, utilities have been central actors in efforts to expand EV charging infrastructure. Many of the ZEV states have enacted legislation authorizing utilities to recover their costs and receive a rate of return on investments in EV charging infrastructure.[209] Indeed, state legislatures and regulatory commissions have justified requiring all utility customers to pay for these investments based on evidence of the system-wide public benefits noted above—namely, reduced GHG and other air pollutant emissions associated with transportation electrification and the potential for reduced electricity rates stemming from more efficient electric grid utilization.[210]

State public utility commissions approved major utility investments in EV charging infrastructure in 2018, including nearly $740 million in California, more than $20 million in Massachusetts, and $10 million in Ohio.[211] As of the end of 2018, utility proposals related to EV charging infrastructure filed with utility commissions in eighteen states for review and approval in 2019 totaled $1.5 billion.[212] Each of these proposals would allow utilities to recover a rate of

their EVs at home after the sun sets. *Id.* ("This could be compounded by increasing use of solar power, which may decline in output at the same time of day that charging demand spikes."). However, Hall and Lutsey hypothesize that improvements in technology may eliminate this issue. *See id.*

[209] *See* Klass, *supra* note 8, at 583-89, 592-94. There are three primary regulatory models for utility investment in EV charging infrastructure: (1) the "make-ready model," where the utility owns the traditional utility infrastructure, such as the transformers, utility services, meters, conduits, and wiring that supports the charging station, but the "site host," such as a parking lot or shopping mall, contracts with a private charging company like ChargePoint or Greenlots for the purchase and maintenance of the station itself; (2) the "end-to-end model," where the utility owns the charging station itself in addition to the utility infrastructure required to support the station; and (3) a "hybrid model," where the utility has end-to-end ownership in underserved markets, such as multifamily housing or low-income areas, but only "make-ready" ownership in more competitive arenas, such as workplace charging or public charging. *See* CEO Initial Comments, *supra* note 202, at 13-16 (discussing models of utility investment in EV charging infrastructure).

[210] *See* HALL & LUTSEY, *supra* note 206, at 24; *infra* notes 229-30 and accompanying text (discussing evidence submitted in Illinois Commission proceeding by environmental groups showing efficiency benefits and lower electricity rates for all electricity customers resulting from transportation electrification).

[211] Ferris, *supra* note 200.

[212] *Id.*; *see also* Baltimore Gas and Electric Company et al., Additional Comments of the Signatory Parties in Further Support of the Petition for Implementation of a Statewide Electric Vehicle Portfolio, Case No. 9478, at 7-11 (Md. Pub. Serv. Comm'n Aug. 30, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_86\JointSignatoriesComments_FF.pdf [https://perma.cc/Q99Y-WLSL] (summarizing utility proposals nationwide for EV charging investments); Gavin Bade, *10 Trends Shaping the Electric Power Sector in 2019*, UTIL. DIVE (Jan. 2, 2019), https://www.utilitydive.com/news/10-trends-shaping-the-electric-power-sector-in-2019/545119/ [https://perma.cc/NM4T-F3HA] (noting that in third quarter of 2018 alone, "32 states and D.C. took some action on electric vehicles, including the approval of

return on their investments, similar to traditional utility investments in electricity generation, transmission, and distribution assets.[213]

Although there are familiar free riding arguments in the EV charging infrastructure context, some of the key players in these debates have "switched sides" from the rooftop solar proceedings. Because of the anticipation of increased profits from EV charging infrastructure investments and increased electricity sales,[214] utilities may favor policies encouraging EV adoption and utility-owned EV charging. Thus, utilities are aligned with environmental groups in these proceedings in arguing that such investments will ultimately provide system-wide benefits to all ratepayers, even those who do not currently own EVs. On the other side, many ratepayer advocacy groups oppose utility investment in EV charging infrastructure. They argue that such incentives will result in free riding and unfair cross subsidies by providing financial benefits to EV owners that will be paid for disproportionately by non-EV owners who, like non-solar owners, tend to have lower incomes.[215] But there are also new advocates making free riding arguments when it comes to EV charging—the oil companies.[216] Like the utilities in the rooftop solar debates, the oil companies

utility EV charging programs in Massachusetts, Rhode Island, and earlier, in Nevada"); Evannex, *2018 EV Recap: The Year of the Electric Vehicle and Tesla Prevails*, INSIDEEVS (Dec. 31, 2018, 9:35 AM), https://insideevs.com/news/341847/2018-ev-recap-the-year-of-the-electric-vehicle-and-tesla-prevails/ [https://perma.cc/D4XG-CSB4] (summarizing state commission approval of utility investment in EV charging infrastructure); *Michigan Approves Consumers Energy EV Charging Program*, ASSOCIATED PRESS (Jan. 9, 2019), https://apnews.com/ac34aaed4df64d8091834e7aed3e9b6a [https://perma.cc/2EVT-SG8S] (reporting on approval of utility's three-year, $10 million pilot program that includes five-hundred-dollar rebate for consumers who purchase an EV and sign up for utility's time-of-use rate to encourage nighttime charging and $5000 rebates for purchases of chargers installed in public areas like workplaces and multiunit dwellings).

[213] Klass, *supra* note 8, at 569.

[214] Utilities only benefit from increased electricity sales due to EV or any other increased load in states that have not "decoupled" utility revenues from electricity sales. *See supra* notes 69-70 and accompanying text (discussing decoupling policies).

[215] Press Release, The Util. Reform Network, PG&E Ignores CPUC Order, Demands Excessive, Unnecessary Electric Vehicle Charging Experiment (Mar. 23, 2016), http://www.turn.org/press-release/pge-ignores-cpuc-order-demands-excessive-unnecessary-electric-vehicle-charging-experiment/ [https://perma.cc/N65H-A7BS] (arguing that cost of utility-funded EV expansion will fall on customers and that unless subsidies for buying EVs are also provided, charging stations will not be used in low-income areas).

[216] *See* Evannex, *supra* note 212 (discussing how, in 2018, oil companies "stepped up their efforts in Washington and state capitals" to oppose policies that support EVs); Catherine Morehouse, *Minnesota Shuts Down Oil, Manufacturing Groups' Attempt to Derail Xcel EV Pilot*, UTIL. DIVE (Oct. 9, 2019), https://www.utilitydive.com/news/minnesota-shuts-down-oil-manufacturing-groups-attempt-to-derail-xcel-ev-p/564637/ [https://perma.cc/M76Z-FJF4] (reporting on oil companies' opposition to utility-funded EV charging projects in Minnesota); Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, ENERGYWIRE (Oct. 25, 2018), https://www.eenews.net/stories/1060104353 (reporting on

are using free riding, cross subsidy, and "fairness" rhetoric to argue that utility customers will be hurt by these programs and that such programs are not "just and reasonable" as required by state statutes governing utility rates.[217]

In the most recent of these proceedings, it was clear that proponents of utility investment in EV charging have learned from the contentious rooftop solar net metering disputes and have marshaled more sophisticated empirical evidence to support system-wide benefits of transportation electrification that requires EV charging programs. They also have the advantage of the utility supporting rather than opposing the program. For instance, in the net-metering context, it is generally the utility that files a request with a state commission to eliminate net metering or impose fixed charges on solar customers, putting solar advocates in a defensive posture to justify the continuation of a net-metering program.[218] Moreover, supporters of net metering necessarily have more limited information on current costs and benefits of rooftop solar to the electric grid than the utilities possess. By contrast, when it comes to EV charging infrastructure, utilities are generally aligned with environmental groups. Collectively, such groups are making affirmative requests to state commissions to approve EV charging investment proposals and providing evidence of public benefits to support the proposals.

The remainder of this Section focuses on regulatory proceedings in Illinois, Missouri, and Maryland regarding utility investment in EV charging. These state proceedings show a range of arguments and analysis relating to free riding. This group of states also includes both ZEV and non-ZEV states, which impacts whether free riding and cross subsidy arguments are used to oppose programs in their entirety or modify them to ensure that any program approved is cost-effective. As a general matter, in non-ZEV states, advocates cannot rely on a specific legislative or executive policy to support EV adoption or utility investment in EV charging infrastructure and instead must rely on more general state law governing "just and reasonable" rates.[219] This lack of legislative

efforts by American Petroleum Institute, American Fuel and Petrochemical Manufacturers, and others to lobby state utility commissions and Congress not to allow utilities to build EV charging infrastructure). This recent activity is part of a larger campaign by U.S. oil companies to retain market share in the transportation sector. The *New York Times* reported in December 2018 that the major U.S. oil companies had worked behind the scenes to encourage the Trump Administration to repeal the Obama Administration's signature vehicle fuel efficiency standards and vehicle emission standards; to discourage new states from adopting California's more stringent vehicle emission standards; and to work to revoke California's authority to set its own vehicle emission standards for GHG emissions, including the state's ZEV program. *See* Hiroko Tabuchi, *Big Oil Angles, Quietly, to Ease Emissions Cuts*, N.Y. TIMES, Dec. 14, 2018, at A1.

[217] *See infra* notes 240-48, 264-65, 289-90, and accompanying text.

[218] *See generally, e.g.*, 2013 Ariz. Pub. Serv. Co. Order, *supra* note 115; N. States Power Co. Order, *supra* note 180; Sierra Pac. Power Co. Order, *supra* note 116.

[219] Some states have adopted California's ZEV mandate through legislation while others have done so through executive action. *See* Klass, *supra* note 8, at 578. Many ZEV states have

direction gives opponents of utility investment in EV charging stronger grounds to oppose such programs because there has not been a legislative recognition of the public benefits of EVs and EV charging like in California and other ZEV states.[220]

Finally, the proceedings in all three states highlight how oil companies and their trade associations are reacting to the threat of EVs and employing free riding, fairness, and cross subsidy arguments in the name of utility customers to oppose these programs.[221] Thus, the oil companies have taken on the mantle of protecting the utility customers from programs allegedly rife with free riding just as the utilities have done in the rooftop solar context.

a. *Illinois*

In September 2018, the Illinois Commerce Commission initiated a Notice of Inquiry proceeding to gather "information and opinions from stakeholders on electric vehicles ('EVs') to help the Commission identify issues, potential challenges, and opportunities in EV deployment."[222] The Commission's goal was to use the proceeding "for studying and understanding the technical, financial, and policy implications of electric vehicles."[223] The Notice of Inquiry asked participants to respond to a range of issues including the impact of EVs and EV charging infrastructure on energy efficiency and grid reliability in the state, the costs and environmental benefits associated with EV deployment, and whether utilities should own EV charging stations and be allowed to include such investments in the utility's rate base.[224]

The Notice of Inquiry prompted a range of comments from the state's two investor-owned utilities, Ameren Illinois and Commonwealth Edison; environmental and energy efficiency groups; ratepayer advocates; the Illinois Attorney General's Office; industrial utility customers; an oil company trade

also adopted specific legislation supporting EVs in general and utility investment in EV charging stations in particular. *See id.* at 583-90.

[220] For a discussion of state public utility commission proceedings in ZEV states, see Ferris, *supra* note 200 (summarizing developments in the states); Klass, *supra* note 8, at 577-90.

[221] *See, e.g.*, Tomich, *supra* note 216 (reporting that oil industry argued to Illinois Commerce Commission that "[c]onsumers and taxpayers should not be forced to pay more in taxes, fees and/or electric utility rates so that someone else can purchase and operate an expensive electric vehicle").

[222] *Notice of Inquiry Regarding Electric Vehicles*, ILL. COM. COMMISSION, https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx [https://perma.cc/TM8V-2AWB] (last visited Feb. 18, 2020) (describing Notice of Inquiry and providing links to all comments submitted in proceeding and relevant news articles); *see also* Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 3 (Ill. Commerce Comm'n Sept. 24, 2018) [hereinafter Ill. Commerce Comm'n NOI], https://www.icc.illinois.gov/downloads/public/ev/EV%20NOI.pdf [https://perma.cc/N4VL-W2U2].

[223] *Notice of Inquiry Regarding Electric Vehicles*, *supra* note 222.

[224] Ill. Commerce Comm'n NOI, *supra* note 222, at 4-7.

association; Americans for Prosperity (a political advocacy group funded by the Koch brothers); EV charging companies; and others.[225]

Not surprisingly, Ameren Illinois and Commonwealth Edison both supported regulatory policies to encourage transportation electrification and utility investment in EV charging infrastructure, along with market approaches that included private EV charging companies.[226] The utilities also focused their comments in large part on how such programs would work in tandem with existing energy efficiency programs in the state to increase grid efficiencies and provide cost and environmental benefits for all utility customers.

Commonwealth Edison cited U.S. Department of Energy statistics showing that conventional vehicles convert only about 17% to 21% of the energy stored in gasoline to vehicle power, while EVs convert about 59% to 62% of electric energy from the grid to vehicle power.[227] It also cited potential energy efficiency opportunities of electric buses as compared to diesel buses.[228] The utility was careful to note that it was not using these statistics to argue that transportation electrification contributed directly to the utility's energy efficiency program established under the 2016 Future Energy Jobs Act,[229] but it did state that "additional EV charging stations could directly impact the Company's Energy Efficiency Program if the Program is able to incent and claim savings from energy efficient charging stations."[230] Commonwealth Edison further focused on how pricing signals through time-of-use rates would encourage EV users to charge at low-demand times, resulting in better utilization of grid resources, and "could put downward pressure on per kWh rates."[231]

Commonwealth Edison also cited an M.J. Bradley & Associates study showing the environmental benefits of wide-scale EV adoption through reduced

[225] *See Notice of Inquiry Regarding Electric Vehicles*, *supra* note 222.

[226] Ameren Illinois Company, Initial Comments in Response to NOI Questions and Issues, No. 18-NOI-01, at 17 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/18-NOI-01%20Ameren%20Illinois%20Initial%20Comments.pdf [https://perma.cc/2ZVY-HTDB]; Commonwealth Edison Company, Initial Comments on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 10 (Ill. Commerce Comm'n Oct. 22, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/ComEd%20-%20NOI%20Comments.pdf [https://perma.cc/P8HJ-Y2KW].

[227] Commonwealth Edison Company, *supra* note 226, at 2.

[228] *Id.* (citing studies finding that "compared to 4.2 miles per diesel gallon achieved by traditional diesel transit buses, electric buses can achieve the equivalent of up to 17.3 miles per diesel gallon" (footnote omitted)).

[229] *See* Future Energy Jobs Act, 220 ILL. COMP. STAT. 5/8-103B(a) (2019) (requiring utilities "to use cost-effective energy efficiency and demand-response measures to reduce delivery load"); Press Release, Commonwealth Edison Co., New Energy Efficiency Benefits Coming to Illinois Consumers (June 28, 2017), https://www.comed.com/News/Pages/NewsReleases/2017_06_28.aspx [https://perma.cc/NK76-CN57] (announcing that utility would be filing new efficiency program plan under Future Energy Jobs Act).

[230] Commonwealth Edison Company, *supra* note 226, at 3.

[231] *Id.* at 7.

GHG emissions, reduced vehicle noise, and other aesthetic benefits.[232] It stressed that utility programs for EV charging could target "low-income communities not currently being served by the competitive EV charging market" to increase EV adoption in those communities as well as to make way for electric buses and trains in underserved neighborhoods.[233] Ameren's comments were similar, focusing on the "economic benefits that can be socialized to all utility customers, most notably the potential downward rate pressure that can result from EV owners charging their vehicles."[234]

Environmental and energy nonprofit groups focused their comments on expert studies showing that EVs "provide the opportunity for broad-based cost savings for ratepayers" as well as "improved security from reduced dependence on imports of conventional fuels, improved local air quality, and reduced greenhouse gas emissions."[235] They also cited studies showing that increased EV adoption, coupled with time-of-use rates and other "smart charging" programs, "can actually reduce costs for all ratepayers while benefiting the grid and providing a range of societal benefits."[236] The Sierra Club and Natural Resources Defense Council stressed that transportation electrification is "not at odds with the utilities' statutorily-defined energy efficiency goals" and that EVs themselves "are a form of energy efficiency because they reduce total energy consumption" as compared with conventional vehicles.[237]

ChargePoint also filed supportive comments. It cited studies showing that transportation electrification had the potential to "create value for all ratepayers" because "the expected long-term energy revenues from incremental EV load generally exceeds the costs for the grid to support that load," which will "exert a downward pressure on unit energy costs that can benefit all utility customers

[232] *Id.* at 7-8 (citing M.J. BRADLEY & ASSOCS., ELECTRIC VEHICLE COST-BENEFIT ANALYSIS 14 (2017), https://mjbradley.com/sites/default/files/IL%20PEV%20CB%20Analysis%20FINAL%2026sep17.pdf [https://perma.cc/VP6Z-TFGE]).

[233] *Id.* at 9.

[234] Ameren Illinois Company, *supra* note 226, at 1.

[235] Advanced Energy Economy, Comments on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 1 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/AEE%20Comments%20ICC%20EV%20NOI%2010-23-18.pdf [https://perma.cc/8MBZ-CNVU]; *see also* Sierra Club and Natural Resources Defense Council, Comments on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 2 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/Sierra%20Club%20and%20NRDC.pdf [https://perma.cc/8GKA-TSEF]; Union of Concerned Scientists, Comment Letter on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 3-4 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/2018_UCS%20Comment%20to%20ICC%2018_NOI_01_withAppendicies.pdf [https://perma.cc/3KTE-M3S7].

[236] Advanced Energy Economy, *supra* note 235, at app. A at 14.

[237] Sierra Club and Natural Resources Defense Council, *supra* note 235, at 2, 4.

regardless of EV ownership."[238] ChargePoint cautiously supported ratepayer funding of utility investment in EV charging, citing specific criteria developed in other jurisdictions and highlighting the need to "maintain customer choice, encourage innovation, and stimulate competition."[239]

Some of the strongest opposition to ratepayer-funded utility investment in EV charging infrastructure came from Americans for Prosperity—a political advocacy group funded by David and Charles Koch of Koch Industries, a $110 billion private company with major investments in the oil refining and distribution industries.[240] It argued that the Commission must "carefully consider the rights and interests of all ratepayers" as it evaluates EV charging programs.[241]

Americans for Prosperity stated it was submitting comments "in the interest of protecting ratepayers and consumers from program designs, rules and regulations that promote unfair and regressive forms of cross subsidization that have been enacted in other jurisdictions."[242] It emphasized that "the Commission is required to prevent discriminatory practices where captive electric utility customers are forced to underwrite a distribution utility incursion into the EV charging infrastructure market" and that "[f]airness dictates that funding of non-public utility service needs to be done with shareholder funds, not through charges imposed on captive ratepayers with guaranteed cost recovery plus a guaranteed rate of return for the utility."[243] It contended that ratepayer-funded infrastructure is "unfair"[244] because it will only "benefit the wealthiest ratepayers" who own EVs.[245] In closing, it cited the Commission's statutory mandate to ensure "just and reasonable" utility rates and charges and to prohibit and declare unlawful any "unjust and unreasonable" charges.[246]

The American Petroleum Institute-Illinois Petroleum Council expressed similar sentiments, stating that "[c]onsumers and taxpayers should not be forced to pay more in taxes, fees and/or electric utility rates so that someone else can

[238] ChargePoint, Inc., Comments on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 1-2 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/ChargePoint.pdf [https://perma.cc/8VTD-XQKP].

[239] *Id.* at 10-11.

[240] *See Koch Industries*, FORBES, https://www.forbes.com/companies/koch-industries/#732c6aa074ce [https://perma.cc/T8TP-KG5R] (last visited Feb. 18, 2020).

[241] Americans for Prosperity-Illinois, Comment Letter on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 1 (Ill. Commerce Comm'n Oct. 23, 2018), https://www.icc.illinois.gov/downloads/public/evnoi/Americans%20for%20Prosperity%20Illinois-Notice%20of%20Inquiry%20Regarding%20Electric%20Vehicles%2018-NOI-01.pdf [https://perma.cc/D4LL-LPTW].

[242] *Id.*

[243] *Id.* (emphasis omitted).

[244] *Id.*

[245] *Id.* at 3.

[246] *Id.* (quoting Just and Reasonable Rates Charges, 220 ILL. COMP. STAT. 5/9-101 (2019)).

purchase and operate an expensive electric vehicle."[247] It stated that EV charging "is currently only used by a small fraction of drivers, many of whom are wealthy enough to afford these more expensive vehicles," and that to allow utility investment in EV charging infrastructure and recover costs from all ratepayers "will result in an unfair shifting of costs onto those who have not opted for this technology."[248]

These comments show a range of views regarding the benefits of transportation electrification and utility investment in EV charging. Most commenters explicitly tied EV charging to energy efficiency, as the Commission had requested in its initial Notice of Inquiry order, and provided guidance on how EV charging could be made consistent with energy efficiency goals even though electricity use would likely increase through EV adoption. With utilities and environmental groups aligned, both groups could benefit from the Illinois utilities' expertise with Illinois customer and grid data and the environmental groups' experience participating in numerous similar proceedings in other states.

Whether to focus on current costs and benefits to ratepayers as opposed to future costs and benefits remained a constant theme in these proceedings, similar to the debate in the rooftop solar net metering context. And, once again, the party with the most to lose from the program—here, the oil companies—hid behind ratepayer fairness and cross subsidy arguments just as the utilities have done in the rooftop solar arena. Finally, it is important to note that the Illinois proceeding was a Notice of Inquiry soliciting responses to specific Commission questions, rather than an evaluation of a concrete utility proposal for investment. This means that the scope of inquiry was fairly broad and avoided the need to delve too deeply into any of the data provided by proponents or opponents.

b. *Missouri*

Unlike the proceeding in Illinois, the Missouri proceeding involved a specific utility proposal for investment in EV charging infrastructure. In November 2017, Ameren Missouri filed an "efficient electrification program" tariff case with the Missouri Public Service Commission.[249] Within this case was "[a] proposal to allow Ameren Missouri to provide incentives to encourage electric vehicle charging stations."[250] This "Charge Ahead—Electric Vehicles" program would "defray part or all of the cost of installing and operating electric vehicle

[247] American Petroleum Institute-Illinois Petroleum Council, Comment Letter on Notice of Inquiry Regarding Electric Vehicles, No. 18-NOI-01, at 1 (Ill. Commerce Comm'n Oct. 22, 2018) (emphasis omitted), https://www.icc.illinois.gov/downloads/public/evnoi/Revised%20Comments%20API-IPC%20letter%20to%20ICC%20Palivos-%20EV's.pdf [https://perma.cc/4947-M7XD].

[248] *Id.* at 2.

[249] Union Elec. Co., Notice of Case Filing, File No. ET-2018-0132, at 1 (Mo. Pub. Serv. Comm'n Nov. 15, 2017), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936117687 [https://perma.cc/75LJ-GSJ7].

[250] *Id.*

('EV') charging stations" and would include workplace, public space, multifamily dwelling, and interstate/highway corridor chargers.[251] The program would cost $11 million.[252] Ameren Missouri claimed that the program, along with a related program to provide financial incentives for adoption of electric forklifts and other business equipment (called the "Business Solutions Program") would

> (a) provide benefits to both Ameren Missouri and its customers, both from the standpoint of lower overall rates, more efficient utilization of the electric grid, and reduced emissions in the areas where those customers work and live; and (b) not negatively affect[] either the Company's customers who are not participants in the program or regulated alternative fuel suppliers competing in the Company's service territory.[253]

Notably, in explaining why the program would benefit all utility customers, Ameren Missouri's written testimony relied expressly on various energy efficiency cost-effectiveness tests, including the Ratepayer Impact Measure ("RIM") test.[254] In its Statement of Position supporting the program, Ameren stated that:

> The Rate Impact Measure ("RIM") test, a common cost-effectiveness test that looks at the impact of a program on customer rates, indicates that the cost of the program will be more than fully offset by the benefits arising from the EVs using the program. The amount above program costs is a contribution to recovery of the fixed costs of the electric system which results in lower rates for all Ameren Missouri customers.[255]

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[251] Union Elec. Co., Application, File No. ET-2018-0132, at 3 (Mo. Pub. Serv. Comm'n Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936135248 [https://perma.cc/6CLZ-DAPR].

[252] *See Ameren Plans $11 Million Program to Add Charging Stations*, ASSOCIATED PRESS (Feb. 22, 2018), https://apnews.com/8c6391c965e343b7a61b6eb56d5ef548 [https://perma.cc/446X-Z35U].

[253] Union Elec. Co., Application, *supra* note 251, at 4-5.

[254] Union Elec. Co., Direct Testimony of David K. Pickles on Behalf of Union Electric Company, File No. ET-2018-0132, at 9-11 (Mo. Pub. Serv. Comm'n Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936135253 [https://perma.cc/5MXT-5EVY]; Union Elec. Co., Direct Testimony of Michael W. Harding on Behalf of Union Electric Company, File No. ET-2018-0132, at 9-11 (Mo. Pub. Serv. Comm'n Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936135259 [https://perma.cc/2P9C-QBMV]; Union Elec. Co., Direct Testimony of Steven M. Wills on Behalf of Union Electric Company, File No. ET-2018-0132, at 16-40 (Mo. Pub. Serv. Comm'n Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936135251 [https://perma.cc/7A32-4MMZ].

[255] Union Elec. Co., Ameren Missouri's Statement of Position, File No. ET-2018-0132, at 2 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193655 [https://perma.cc/5G2V-GQCZ].

Thus, in its analysis, the utility expressly relied on energy efficiency cost-effectiveness tests to provide an evaluation of cost-effectiveness for EV charging programs.[256]

However, the Commission's Staff recommended the rejection of the EV program as proposed, and urged the Commission to "order modification of the Workplace, Multifamily, and Public Area subprograms to minimize free ridership and maximize public policy benefits."[257] Staff conceded that all customers would in fact pay lower rates if Ameren Missouri could incentivize sufficient EV adoption such that additional revenues would exceed the costs of grid expansion, subsidies, and program costs.[258] Nevertheless, it found that the utility had not provided sufficient evidence that such adoption would occur.[259] Indeed, Staff warned that, "as designed, these programs are rife with opportunities for free ridership and fail to include provisions to maximize public policy related benefits."[260] Based on the current proposal, Staff found that

> Ameren Missouri has made no clear connection between this program and its estimate of an additional 7,500 electric vehicles in the Ameren Missouri service territory for parties to begin to determine what level of adoption is naturally occurring and what would be attributable to the $11 million ratepayer subsidy.[261]

The Office of Public Counsel[262] was also critical of the proposal but ultimately recommended approval of the program coupled with a performance-based recovery mechanism linking Ameren Missouri's recovery to EV adoption rates in its service territory.[263]

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[256] For a discussion of the various tests used for determining cost-effectiveness of energy efficiency programs, including the RIM, see *supra* notes 77-80 and accompanying text.

[257] Union Elec. Co., Staff Position Statements, File No. ET-2018-0132, at 1 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193672 [https://perma.cc/69DP-UW6N].

[258] *Id.* at 3.

[259] *Id.*; *see also* Union Elec. Co., Rebuttal Testimony of Sarah L.K. Lange, Case No. ET-2018-0132, at 2-13 (Mo. Pub. Serv. Comm'n Oct. 1, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936184226 [https://perma.cc/LTS2-AN5A] (criticizing Ameren cost-effectiveness analysis).

[260] Union Elec. Co., Staff Position Statements, *supra* note 257, at 6.

[261] *Id.* at 1-2.

[262] The Missouri legislature created the Office of Public Counsel in 1975 to represent the interests of utility customers in proceedings before the Missouri Public Service Commission. *See Who We Are*, MO. OFF. PUB. COUNS., https://opc.mo.gov/who-we-are.html [https://perma.cc/7EGX-BC62] (last visited Feb. 18, 2020).

[263] Union Elec. Co., Position Statement of the Office of the Public Counsel, File No. ET-2018-0132, at 1 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193667 [https://perma.cc/2846-6836].

Not surprisingly, the Missouri Petroleum Marketers and Convenience Store Association ("MPCA") opposed approval of the EV charging program. It noted that Missouri had not adopted the ZEV Memorandum of Understanding, and thus there was no policy in the state supporting EVs.[264] More importantly, it argued that the proposal "seeks to gamble on potential future consumer behavior, financed by, and the risk borne, by its ratepayers."[265]

On the other side, the Sierra Club and Natural Resources Defense Council recommended approval of the program with only minor modifications.[266] They claimed that the utility had actually been conservative in its estimate of public benefits of EV adoption and that it should be allowed full recovery of prudently incurred costs.[267] The environmental groups' position focused on the claim that the public benefits of EVs actually are quite large and are sufficient to mitigate any cost shift.[268] The Missouri Division of Energy also supported the proposal, but it recommended that 10% of the budget be allocated to support EV charging station development in "underserved and low-income communities" as a way to combat cost shifting.[269] ChargePoint echoed these calls for approval, claiming that Ameren's "program design reduces risks to ratepayers, lowers the cost barrier to [EV charging infrastructure] deployment, allows the charging station site host to determine which equipment and services best meet their needs, and builds a sustainable EV charging marketplace to help accelerate EV adoption."[270]

The Missouri proceeding, which is still pending before the Commission, showcases many of the same arguments made in the Illinois proceeding but in the context of a concrete utility proposal for EV charging investment.[271] Although the $11 million requested for the program is significantly more modest than other programs approved in 2018 in California, Massachusetts, and other states, the Missouri Commission will need to act without the benefit of

[264] Union Elec. Co., Brief of Amicus Curiae of Missouri Petroleum Marketers & Convenience Store Association, File No. ET-2018-0132, at 3 (Mo. Pub. Serv. Comm'n Jan. 7, 2019), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936199799 [https://perma.cc/3XDZ-BN3H].

[265] *Id.* at 5 (footnote omitted).

[266] Union Elec. Co., Statement of Position of Sierra Club & Natural Resources Defense Council, File No. ET-2018-0132, at 1 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193556 [https://perma.cc/FC32-7DNK].

[267] *Id.* at 2.

[268] *Id.* at 3-4.

[269] Union Elec. Co., Missouri Division of Energy's Statement of Positions, File No. ET-2018-0132, at 1 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193636 [https://perma.cc/JA6K-7X3S].

[270] Union Elec. Co., ChargePoint, Inc.'s Statement of Position on the Issues, File No. ET-2018-0132, at 2 (Mo. Pub. Serv. Comm'n Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936193649 [https://perma.cc/N97C-4P6L].

[271] *Id.* at 1-2.

legislative or executive branch direction declaring the public benefits of transportation electrification or utility investment in EV charging. Instead, the parties supporting the program must rely on general statutory language regarding just and reasonable rates and fit the program within the cost-effectiveness regime that exists for utility-funded energy efficiency programs, which is potentially a helpful model for other similarly situated states.

c. *Maryland*

In Maryland, in 2018, a coalition of charging companies, environmental groups, four Maryland investor-owned utilities, and other interested parties (referred to as the "Signatory Parties") filed a joint "Proposal to Implement a Statewide Electric Vehicle Portfolio" that included utility investments in EV charging totaling over $100 million.[272] Program components included rebates for residential and commercial EV chargers; utility-owned public charging networks; funding for customer outreach, innovation, and technological development; and implementation of time-of-use rates to support "smart charging."[273] Most of the rebates for private charging included dollar caps or percentage caps on the cost of the charger. In support of the program, the Signatory Parties cited to state policies supporting EVs and EV charging infrastructure, including the State's Greenhouse Gas Reduction Act, the eight-state Zero-Emission Vehicle Memorandum of Understanding, Maryland's role in the Transportation Climate Initiative, the legislatively created Electric Vehicle Infrastructure Council, and the Maryland EV Recharging Equipment Rebate Program.[274]

The Signatory Parties contended "that a targeted ratepayer investment facilitated by the Utilities and made in conjunction with private market participants will seed the burgeoning Maryland EV landscape in a manner that will promote a healthy, competitive, and lasting private market moving forward."[275] The Signatory Parties also discussed a range of Maryland-specific expert cost-benefit studies to establish the cost-effectiveness of the Proposal and explain how all utility customers will benefit from the investment.[276] They also proposed an "evaluation, measurement, and verification" strategy similar to the approaches used in the energy efficiency context.[277]

[272] PC44 Electric Vehicle Work Grp., Signatory Parties, Proposal to Implement a Statewide Electric Vehicle Portfolio, Case No. 9478, at 27-31, 56-60 (Md. Pub. Serv. Comm'n Jan. 19, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/9400-9499/9478/\1.pdf [https://perma.cc/4LFA-F3LA].

[273] *Id.* at 27-29.

[274] *Id.* at 3-9.

[275] *Id.* at 9.

[276] *Id.* at 19-20.

[277] *Id.* at 36-39.

Numerous participants in the regulatory proceeding raised free riding and cost shift arguments targeted primarily at the rebates for residential and commercial EV chargers. This part of the program most closely resembles energy efficiency programs in that is it important to determine the extent to which utility customers would have purchased the EV chargers even in the absence of the subsidy. In energy efficiency parlance, those customers are free riders and their actions should not be included as program benefits.

For instance, the Maryland Office of People's Counsel expressed concern that the utility programs would replace or subsidize private investment in EV charging, resulting in excessive costs for ratepayers and stifling the private market.[278] It found deficiencies in the proposed cost-benefit analyses and suggested that, "similar to the evaluation of energy-efficiency programs, an evaluation of the EV Proposal could also include deriving metrics like freeridership and net-to-gross."[279] In later comments, the Office of People's Counsel again stressed free riding concerns, stating that the utilities should use the metrics and data on free riding from their own energy efficiency programs and finding that the rebates proposed for EV chargers were at a much higher percentage than those used in the past for water heaters and other appliances.[280] It warned that "[i]f rebates are set at a level that is higher than what is optimal, then less customers will be able to participate in the program and free ridership will increase."[281] Despite these criticisms, it expressed support that program modifications, along with a full evidentiary hearing, could "bring significant benefits to Maryland's ratepayers" once further developed.[282]

Likewise, the Maryland Energy Administration ("MEA") found that the proposal did not sufficiently support a determination that the investment would lead to the increase in EVs needed to meet program goals and achieve system-wide benefits.[283] While it supported the time-of-use-rate programs and pilot programs to assess managed charging, it opposed any subsidies or other utility

[278] Md. Office of People's Counsel, Additional Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 26 (Md. Pub. Serv. Comm'n Mar. 27, 2018) [https://perma.cc/Z3HM-NAQE], https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/9400-9499/9478/\37.pdf.

[279] *Id.* at 27.

[280] Md. Office of People's Counsel, Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 7 (Md. Pub. Serv. Comm'n Aug. 30, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/9400-9499/9478/\85.pdf [https://perma.cc/X9Y3-KTTH].

[281] *Id.*

[282] *Id.* at 15.

[283] Md. Energy Admin., Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 2-4 (Md. Pub. Serv. Comm'n Mar. 29, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_49\MEAEVCOMMENTS.pdf [https://perma.cc/8QCG-QQZ6].

investments in EV charging in areas that were not publicly accessible, which would mean eliminating most of the residential and commercial rebates for EV chargers.[284] In later comments, the Administration again warned against allowing subsidies for private EV charging: "Meaningful portions of total program costs . . . represent large transfers to individual households . . . . This, in effect, means that lower-income households could be subsidizing upper-income households without receiving direct benefits, which presents a serious issue of equity for Maryland ratepayers."[285]

For its part, the Commission Staff filed comments that included free rider concerns associating with EV charger rebates.[286] It suggested limiting rebates to EV owners who purchased EVs after the start of the program on the theory that utility customers with EVs before the start of the program would be more likely to purchase an EV charger even without the program subsidy.[287] Staff also urged that the Commission reduce the subsidy amount in order to limit cross subsidization and to forbid utilities from owning public chargers because the private charging market could serve that role and because of rate design challenges.[288]

Finally, the American Petroleum Institute argued against the program in its entirety, warning that "[c]onsumers, ratepayers, and taxpayers should not be forced to pay more in taxes, fees and/or electric utility rates so that someone else

[284] *Id.* at 5-11.

[285] Md. Energy Admin., Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 4-5 (Md. Pub. Serv. Comm'n Aug. 31, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_88\MEAEVPosition08312018.pdf [https://perma.cc/X2CV-JLAN].

[286] Staff of Md. Pub. Serv. Comm'n, Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 2-3 (Md. Pub. Serv. Comm'n Sept. 28, 2018) [hereinafter PSC Staff Comments Sept. 28], https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_102\StaffComments3-FINAL.pdf [https://perma.cc/S5PV-A5FY]; Staff of Md. Pub. Serv. Comm'n, Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 6 (Md. Pub. Serv. Comm'n Aug. 31, 2018), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_80\StaffComments2Asfiled.pdf [https://perma.cc/2VPZ-DBUM]; Staff of Md. Pub. Serv. Comm'n, Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 5-7 (Md. Pub. Serv. Comm'n Mar. 27, 2018) [hereinafter PSC Staff Comments Mar. 27], https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=//Coldfusion/Casenum/9400-9499/9478/Item_35\StaffComments—03272018.docxFINAL.pdf [https://perma.cc/D4NL-4MQS].

[287] PSC Staff Comments Sept. 28, *supra* note 286, at 3; PSC Staff Comments Mar. 27, *supra* note 286, at 6.

[288] PSC Staff Comments Sept. 28, *supra* note 286, at 2.

can purchase and operate an expensive vehicle."[289] It contended that cost recovery from all ratepayers "will result in an unfair shifting of costs onto those who have not opted for this technology."[290]

In 2019, the Maryland Commission issued its decision.[291] It found that the $104 million the utilities requested was "overly broad and costly to ratepayers," so it cut down the proposed number of chargers the utilities could install at customer residences using ratepayer funding from 18,000 to 3000, cut the rebates per charger from $500 to $300, and allowed utilities to build and own 850 public chargers to support growth in that market.[292]

In its order, the Commission began by detailing the various legislative and executive branch statements of support for transportation electrification, including the status of Maryland as a ZEV state.[293] It then turned to the evidence associated with the cost-benefit assessments provided by the utilities and the opponents of the programs.[294] The Commission acknowledged that "[d]etermining the cost-effectiveness of the EV Portfolio has been challenging, as the record lacks detailed cost effectiveness information, and the Utilities' own cost assessments are superficial at best."[295] The Commission also recognized, however, that "there are challenges with identifying an appropriate cost-benefit test insofar as the EV industry is still nascent and evolving, and quality data remains sparse."[296] It noted that "EV charging deployments do not fit well with any current cost-benefit test" (with reference to the Ratepayer Impact Measure test, Total Resource Cost test, and Societal Cost Test) and that a combination of tests may lead to more successful results.[297]

The Commission noted both the "short- and long-term benefits" of expanded EV infrastructure and EV adoption, including "enhancing grid resiliency, improving air quality for all Maryland citizens, creating jobs, reducing costs of personal transportation, and strengthening the resilience of transportation networks."[298] In light of the lack of solid cost-effectiveness evidence, however,

[289] Md. Petroleum Council, Comments on Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 1 (Md. Pub. Serv. Comm'n Sept. 27, 2018) (emphasis omitted), https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/94009499/9478/\107.pdf [https://perma.cc/4SWU-B3A9].

[290] *Id.*

[291] Petition for Implementation of Statewide Electric Vehicle Portfolio, Case No. 9478, at 2 (Md. Pub. Serv. Comm'n Jan. 14, 2019) (order) [hereinafter Md. Order], https://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/Casenum/9400-9499/9478/\109.pdf [https://perma.cc/962U-RRET].

[292] *Id.* at 47-48, 63-66.

[293] *Id.* at 2-4.

[294] *Id.* at 40-44.

[295] *Id.* at 43.

[296] *Id.*

[297] *Id.*

[298] *Id.*

the Commission held it could not justify approving the entire $104 million investment at the present time, opting instead for a scaled-down pilot project for residential chargers with the lower rebate cap and more limited utility investments in public charging.[299] Notably, the Commission approved utility investments and incentives in EV charging in multiunit dwellings and other underserved areas.[300] The Commission found that such investments were in the public interest and "afford[ed] the Utilities the opportunity to test whether these incentives can encourage a broader range of communities to purchase electric vehicles."[301]

Maryland provides an example of a state commission proceeding regarding utility investment in EV charging where the Commission and many of the parties used arguments regarding cost-effectiveness tests and concerns over free riders to help develop an appropriate utility EV charging program rather than oppose the investment completely. Moreover, the Commission order is similar to the Nevada Commission's net metering decision discussed earlier. In both cases, the Commission authorized a program that had the potential to provide significant but uncertain future benefits to the public even though evidence of present-day cost-effectiveness was limited at best.

II. MOVING BEYOND FREE RIDING AND CROSS SUBSIDY ARGUMENTS IN ENERGY POLICY: LESSONS FROM THE PRECAUTIONARY PRINCIPLE

This Part builds on the previous discussion and suggests approaches for regulators in evaluating free riding and cross subsidy arguments in electric utility "energy transition" proceedings such as removing barriers to distributed solar or encouraging transportation electrification. In doing so, it proposes a long-term view of both costs and benefits for new programs that invokes the precautionary principle. More specifically, in the context of distributed solar and EV charging policies, it suggests that regulators adopt principles developed in the energy efficiency context and modify them for current program development. Such an approach has the potential to reduce barriers to contemporary energy transition efforts and to address many of the fairness and cross subsidy concerns raised in utility regulatory proceedings.

As discussed in Part I, regulators have decades of experience evaluating utility-funded energy efficiency programs, as well as the system-wide benefits of those programs on a long-term basis. The metrics are far from perfect, as evidenced by continuing debates over the role of energy efficiency programs in

[299] *Id.* at 43-44; *see also* David Iaconangelo, *Md. Regulators Approve Scaled-Back Charger Proposal*, ENERGYWIRE (Jan. 16, 2019), https://www.eenews.net/stories/1060115253; Catherine Morehouse, *Maryland Scales Back EV Charger Program Nearly 80%*, UTIL. DIVE (Jan. 16, 2019), https://www.utilitydive.com/news/maryland-scales-back-ev-charger-program-nearly-80/546164/ [https://perma.cc/N3LP-XQSR].

[300] Md. Order, *supra* note 291, at 58.

[301] *Id.*

reducing energy use.[302] Nevertheless, there is at least a general consensus that energy efficiency can have significant present benefits and future benefits to all utility customers even if the full extent of free riders, spillovers, and other factors remains in dispute. The same cannot be said for the long-term benefits of distributed solar and EV charging. From a regulatory perspective, these programs are in their infancy. As a result, state public utility commissions are reviewing dockets—sometimes with and sometimes without the benefit of specific legislative direction—and making decisions that will impact technological developments, utility experience, and utility customer choices.

In many ways, there are important parallels between these current regulatory challenges and the longstanding debates pitting cost-benefit analysis against the precautionary principle in developing environmental, health, and safety regulations. Cost-benefit analysis "is a well-established, if fallible, methodology for ensuring that regulations enhance, rather than detract from, overall social welfare."[303] It does so by attempting to prevent inefficient regulations by comparing the costs and benefits of a particular regulatory action.[304] Many scholars criticize cost-benefit analysis as being inherently imprecise and subjective.[305] Indeed, it is very difficult to place a monetary value on many of the benefits of environmental, health, and safety regulations—such as clean air, clean water, human life and health, scenic and aesthetic values, and plant and animal health.[306]

Environmental law scholars have long pointed to the precautionary principle as a potential alternative approach.[307] The precautionary principle calls for a higher level of regulation—or precaution—when significant but uncertain risks exist, such as harm from climate change or toxic chemicals.[308] One articulation

[302] *See supra* notes 84-86 and accompanying text.

[303] *See* Daniel H. Cole, *Reconciling Cost-Benefit Analysis with the Precautionary Principle*, REG. REV. (Mar. 5, 2012), https://www.theregreview.org/2012/03/05/reconciling-cost-benefit-analysis-with-the-precautionary-principle/ [https://perma.cc/KY9P-7Y79].

[304] *Id.* ("[Cost-benefit analysis] acts as a filter, capturing inefficient regulations while allowing efficient regulations to pass through."); *see also* David M. Driesen, *Cost-Benefit Analysis and the Precautionary Principle: Can They Be Reconciled?*, 2013 MICH. ST. L. REV. 771, 776.

[305] *See* Cole, *supra* note 303; *see also* Daniel A. Farber, *Coping with Uncertainty: Cost-Benefit Analysis, the Precautionary Principle, and Climate Change*, 90 WASH. L. REV. 1659, 1689-90 (2015).

[306] *See, e.g.*, Daniel A. Farber, *Rethinking the Role of Cost-Benefit Analysis*, 76 U. CHI. L. REV. 1355, 1392-93 (2009) (discussing difficulty of calculating costs of climate change).

[307] Farber, *supra* note 305, at 1672 ("Critics often advocate the precautionary principle as an alternative to cost-benefit analysis, based on the idea that 'we should pay attention to early warnings of serious hazards, rather than wait for final proof and precise quantification of the expected impacts.'" (quoting FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 225 (2004))).

[308] *See* KYSAR, *supra* note 17, at 19 ("[P]recautionary approaches can be defended as being particularly well suited to safeguarding life and the environment under conditions of

of the precautionary principle from the 1992 Rio Declaration on Environment and Development states that "[w]hen there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[309] Thus, the precautionary principle generally places the burden of proof on those who would limit regulation with the potential to enhance public welfare—particularly environmental health and safety—in the face of uncertainty. By contrast, cost-benefit analysis places the burden of proof on proponents of regulation; if benefits of regulation or risks of harm in the absence of regulation are uncertain or difficult to value, regulation is likely to be deemed inefficient under a cost-benefit test.

The literature supporting and criticizing cost-benefit analysis and the ability to manipulate its inputs is extensive and beyond the scope of this Article. So too are the scholarly and regulatory debates on the role of the precautionary principle, both as an alternative to cost-benefit analysis and as a principle to integrate into cost-benefit analysis.[310] Similar concerns, however, come up repeatedly in the regulatory proceedings over how to value the costs and benefits of distributed-solar compensation and EV charging investments. Questions arise over how to weigh current and future costs to non-solar customers and non-EV drivers against system-wide benefits that may not accrue to all utility customers until far into the future, if at all.[311] Should the precautionary principle be applied to these regulatory analyses to reduce barriers to distributed solar and transportation electrification? Or should a narrower form of cost-benefit analysis be applied? Does the precautionary principle justify borrowing one of the broader cost-effectiveness tests from the energy efficiency context, like the Societal Cost Test, in evaluating these programs or should regulators use a more conservative test, like the Ratepayer Impact Measure?[312] The remainder of this Part provides an evaluation of these issues.

uncertainty and ignorance, as opposed to the conditions of probabilistic sophistication that are presupposed by proponents of the economic approach.").

[309] Cole, *supra* note 303; *see also* Farber, *supra* note 305, at 1671-78 (discussing precautionary principle and scholarly criticisms of same). For another alternative approach to cost-benefit analysis, see Jonathan Koomey, *Moving Beyond Benefit-Cost Analysis of Climate Change*, ENVTL. RES. LETTERS, Oct.-Dec. 2013, at 1, 1 (arguing against use of cost-benefit analysis to address climate change and in support of approach that analyzes "cost effectiveness of achieving a normatively defined warming target").

[310] *See supra* notes 303-09.

[311] *See, e.g.*, KYSAR, *supra* note 17, at 64 ("On the precautionary account, environmental, health, and safety regulation is not merely an opportunity to maximize an existing set of individual preferences or interests, but rather a moment to consider the regulating body's obligations to its present members and future members, to other political communities, and to species.").

[312] *See supra* notes 77-80 and accompanying text (explaining different cost-effectiveness tests).

A. *Addressing Uncertainty in Evaluating Costs and Benefits of Distributed Solar*

The regulatory proceedings in Arizona and Nevada illustrate state regulatory commissions struggling to deal with uncertainties over how to monetize, calculate, and weigh future costs and benefits associated with creating incentives for rooftop solar through net metering policies. Both commissions were faced with a similar problem, namely the absence of reliable data regarding the costs and benefits of a utility subsidy program—net metering—that may provide more obvious benefits for one group of customers now but may provide overall benefits to all customers both now and in the future, including reduced electricity bills and improved public welfare through reduced GHG emissions and other air pollutants. In both cases, the utility raised free riding, fairness, and cross subsidy arguments and, because of its role in managing the grid and customers, was at an information advantage compared to solar proponents. One commission, Arizona, was receptive to the utility's arguments regarding fairness[313] while the other commission, Nevada, looked beyond those arguments to the bigger picture of the overall benefits that rooftop solar could provide to the entire utility system and the state.[314]

In the Arizona proceeding, the Commission found a lack of measurable objective and subjective values that distributed solar provided to the utility system.[315] In the absence of hard data showing those values were equitably distributed across all customers, the Commission decided to place at least some additional charges on solar customers.[316] Even though the fixed charges the Commission imposed were far less than those requested by the utility, the order assumed there was at least some cross subsidy that must be addressed to ensure just and reasonable rates.[317]

By contrast, in Nevada, the Commission focused on whether there was an "unreasonable" cost shift between customer classes rather than any cost shift at all based on the applicable statute.[318] In finding no unreasonable cost shift, the Commission recognized that the evidence was in conflict, that present costs and benefits and future costs and benefits could not be measured accurately, and that "[j]umping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving would not serve the public interest and Nevada."[319] The Commission was concerned that a wrong answer was worse than an uncertain answer, particularly when the benefits associated with distributed solar were real but "hard to quantify."[320] This analysis has many

[313] Sierra Pac. Power Co. Order, *supra* note 116, at 42.

[314] *See supra* Section I.B.1.

[315] *See* 2013 Ariz. Pub. Serv. Co. Order, *supra* note 115, at 7, paras. 25-27.

[316] *See supra* notes 121-23 and accompanying text.

[317] *See supra* notes 124-26 and accompanying text.

[318] Sierra Pac. Power Co. Order, *supra* note 116, at 51-52.

[319] *Id.* at 47.

[320] *Id.*

hallmarks of the precautionary principle, even if the Commission did not use that term. In the face of uncertainty, it chose a policy that would potentially provide environmental and system-wide economic benefits to all utility customers in the future as well as public benefits to the entire state even if there may be some shifting of costs to certain utility customers in the short term.

Moreover, although neither commission expressly referred to the cost-effectiveness tests from the energy efficiency realm, the debate over whether to use a narrow test looking at current, distributional fairness or a broader test that considers future, societal impacts could be seen just barely below the surface of the proceedings. Both commissions recognized they were working with incomplete information on costs, benefits, and distributional implications of the policies under consideration. The Arizona Commission appeared to apply a more traditional cost-benefit analysis that heavily weighed the inputs the utility provided while the Nevada Commission took a different approach that more resembled application of the precautionary principle. Both commissions recognized that their results were crude at best and would need to be modified in the future.[321]

Most experts in the field recognize that solar net metering is a fairly rough approach to compensating a growing energy resource across the country, particularly when the costs of net metering on a kWh basis far exceed those of utility-scale solar and other utility-scale renewable energy resources in wholesale markets.[322] By the same token, paying distributed-solar customers a rate that is based on wholesale prices for utility-scale wind and solar energy may also not be appropriate as such pricing may fail to compensate distributed-solar customers for the value of distributed energy, which, if widely adopted, may lead to new markets, technology and investment in microgrids, battery storage, and the like.

In considering new approaches, however, public utility commissions should be cautious of free riding arguments articulated by utilities in a regulatory forum that cannot fully value the present costs and benefits and future costs and benefits of distributed solar energy on the electric grid.[323] More states are beginning to enact legislation and regulations to replace net metering similar to Minnesota's to avoid the net metering disputes on display in the Arizona and

[321] *See id.*; 2013 Ariz. Pub. Serv. Co. Order, *supra* note 115, at 11, para. 32 ("Once the costs and benefits of DG have been adequately quantified and valued, the allocation . . . is a matter of rate design.").

[322] *See supra* note 95 and accompanying text (discussing markets for wholesale electricity sales that value energy based on demand and resource).

[323] *See, e.g.*, Welton, *supra* note 101, at 595 ("Frustratingly for regulators, empirical evidence does not provide conclusive answers to this debate. Most studies show that average retail rates—at which net-metered customers are credited—approximate the value of solar to the grid, with about half of the studies finding that solar is underpaid, and the other half finding that solar is overpaid. These divergent results point to a deeper challenge in framing this equity debate as an empirical question." (footnote omitted)).

Nevada proceedings.[324] Scholars have also suggested an "avoided cost plus social benefit" approach that resembles some of the broader energy efficiency tests discussed in Section I.A by expressly valuing social benefits of distributed solar.[325] These approaches begin to not only reduce regulatory barriers to distributed solar but also address legitimate fairness and cross subsidy concerns by helping design pricing programs that more appropriately compensate rooftop solar owners based on present costs and benefits and future costs and benefits.

In the interim, there is value in recognizing that in most areas of the country, penetration levels of distributed solar energy are still extremely low. Regulators have time to develop metrics to evaluate the costs and benefits of distributed solar now and worry about the effects of larger penetration and ultimate rate design later, when more is known about the scale at which solar penetration will have a measurable positive or negative impact on rates, utility costs, and other factors. Using a precautionary approach will allow regulators to place the burden on utilities and others to show that rooftop solar is currently a problem for system maintenance or that cross subsidies are significant. To merely assume that rooftop solar presents system-maintenance problems and unfair cross subsidies risks stifling expansion of an important energy resource with the potential for significant public benefits. This is particularly true because improved metrics will be developed within a regulatory system where cross subsidies have always existed and will continue to exist, often without objection by participants and regulators. To single out one type of cross subsidy without recognizing the context in which it exists is short sighted.[326]

B. *Using Energy Efficiency Metrics to Develop Frameworks for Utility Investment in EV Charging*

In the EV charging context, proponents are approaching state regulatory commissions with increasingly sophisticated analyses of future program benefits, and this time it is the opponents of such programs who are at a relative information disadvantage. This is because in the EV charging context, utilities are mostly aligned with private charging companies and environmental nonprofit groups, reducing some of the information asymmetries on display in

[324] *See, e.g.*, Julia Pyper, *Maine Proposes to Replace Net Metering with a Market-Based Alternative*, GREENTECH MEDIA (Feb. 26, 2016), https://www.greentechmedia.com/articles/read/maine-proposes-to-replace-net-metering-with-a-market-based-al (discussing legislative proposals in Maine to replace net metering); *The Value Stack*, N.Y. ST., https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources [https://perma.cc/8GSC-RLAH] (last visited Feb. 18, 2020) (discussing new regulations for valuing solar in New York State as replacement to net metering).

[325] *See* Revesz & Unel, *supra* note 87, at 84-95, 99-101.

[326] *See, e.g.*, *id.* at 102 ("Cost recovery and cost-shifting problems are unintended consequences of the current, inefficient retail rate designs, and should not be blamed on net metering policies."); Rule, *supra* note 27, at 132-33 (discussing cost shifts inherent in utility ratemaking process).

the rooftop solar context. However, there is still an information deficit because there are many unknowns regarding the extent of climate change damage associated with continuing to drive conventional vehicles; the pace of EV adoption; and the impact of EVs, both positive and negative, on the electric grid. This information will not exist until electric utilities, drivers, car companies, and others can evaluate the impacts of broad-based transportation electrification.

Nevertheless, state regulatory commissions are responding to utility proposals for EV charging investments, and participants in these proceedings are making much more explicit use of energy efficiency cost-effectiveness tests than they are in the distributed-solar context. This is in part because the parallels between utility investment in energy efficiency programs and utility investment in EV charging are much more obvious, at least in the context of utility rebates for EV chargers, which are a component of many utility proposals. In the energy efficiency context, a major goal of regulatory design is to identify free riders—utility customers who would have purchased a new furnace, energy efficient lighting, new insulation, or the like even in the absence of the utility subsidy. In the same way, a utility program to incentivize the purchase of EV chargers is not cost-effective if significant ratepayer funds are being used to subsidize customer purchases of EV chargers that would have occurred even absent the subsidy program.[327]

For instance, in the Illinois Notice of Inquiry proceeding described above, the Commission specifically asked participants to discuss how EVs would contribute to energy efficiency in Illinois through fuel switching and how EV charging stations would affect utility energy efficiency programs.[328] Because the Illinois Commission was not considering a specific utility proposal, the participants did not evaluate any cost-effectiveness tests but instead provided general information on how EVs and EV charging would impact utility energy efficiency programs in the state.[329]

In Missouri, by contrast, there was significant testimony regarding whether the utility's EV charging proposal would meet the Ratepayer Impact Measure Test, with Ameren contending that it would meet the test as well as provide environmental benefits.[330] In response, Commission Staff recommended rejection of the EV program because there was inadequate evidence that the program would result in sufficient EV adoption to increase utility revenues

[327] Indeed, the National Efficiency Screening Project, a stakeholder organization with a mission to improve cost-effectiveness evaluation of energy efficiency resources, has stated that its metrics designed for energy efficiency programs "can be used to assess the cost-effectiveness of supply-side resources or distributed energy resources (DERs)—including [energy efficiency], demand response, distributed generation, distributed storage, electric vehicles, and strategic electrification technologies." NAT'L EFFICIENCY SCREENING PROJECT, *supra* note 80, at xiii.

[328] *See* Ill. Commerce Comm'n NOI, *supra* note 222, at 4-5.

[329] *See supra* Section II.C.2.a.

[330] *See supra* note 254-256 and accompanying text.

enough to cover the costs of the grid expansion, subsidies, and program costs.[331] Moreover, Commission Staff found that Ameren Missouri did not provide sufficient evidence that the subsidy proposed for EV chargers would avoid significant free riding.[332] Comments from the Office of Public Counsel were similar, arguing that the utility had failed to meet its burden of showing the program was cost-effective.[333]

Notably, in their comments, opponents of Ameren's proposal used energy efficiency metrics to oppose the program in its entirety rather than to urge revisions to the program, as would be the case in the energy efficiency context.[334] This is not surprising. There is no legislation in Missouri that promotes EVs or EV charging, in contrast to utility-funded energy efficiency programs that are creatures of state statute.[335] As a result, free riding arguments in non-ZEV states can easily be used in a pejorative way similar to their use by electric utilities in the rooftop solar context.

This stands in contrast to Maryland, where free riding arguments by parties were primarily used to attempt to modify the program and to encourage the development of metrics to ensure cost-effectiveness, more similar to the use of free riding in the energy efficiency context.[336] The Maryland Commission order also followed this approach. It recognized the present-day uncertainty of program benefits but allowed pilot projects to proceed.[337] It based this decision on the importance of transportation electrification in general and confidence that the pilot would lead to better data to support program development.[338] It also ensured that significant program dollars would go towards encouraging EV adoption among customers living in multifamily dwellings and in underserved areas.[339] In this way the Maryland proceedings are an example of a productive use of free riding arguments and an application of the precautionary principle. In particular, the emphasis by all parties on the need for infrastructure investment in low-income communities and multifamily housing shows how cross subsidy and fairness concerns can be addressed through program development.[340]

Finally, the state EV charging proceedings illustrate how developing better metrics for transportation electrification programs can address legitimate fairness and cross subsidy concerns raised by ratepayer advocacy groups like the Office of Public Counsel in Missouri and Office of People's Counsel in

[331] *See supra* note 259 and accompanying text.

[332] *See supra* note 260 and accompanying text.

[333] *See supra* note 263 and accompanying text.

[334] *See supra* notes 264-65 and accompanying text.

[335] *See supra* note 264 and accompanying text.

[336] *See supra* notes 278-82 and accompanying text.

[337] *See supra* notes 298-301 and accompanying text.

[338] *See supra* notes 298-301 and accompanying text.

[339] *See supra* notes 300-01 and accompanying text.

[340] *See supra* notes 300-01 and accompanying text.

Maryland.[341] These ratepayer advocacy groups have an important mission to advocate on behalf of state utility customers—particularly residential, small business, and low-income customers—to ensure rates are not excessive and that particular classes of customers are not unduly burdened by rate increases.[342] As a result, their concerns should be given far more weight than similar arguments made by oil companies and their trade associations. But such arguments should not focus narrowly on the current costs and benefits of new regulatory policies just because future benefits are difficult to value. A precautionary approach designed to develop improved metrics for evaluating present costs and benefits and future costs and benefits of EV charging investments can integrate these concerns into a broader analysis that includes both cost-effectiveness metrics and a calculation of broader benefits associated with transportation electrification.

CONCLUSION

There is an important role for free riding, fairness, and cross subsidy concerns in both the distributed solar and EV charging regulatory proceedings, just as there has been for decades in the energy-efficiency realm. But it is clear that opponents of regulatory programs to incentivize distributed solar and EV adoption have used and will continue to use free riding, fairness, and cross subsidy arguments to block programs that may hurt them financially. Commissions should look beyond these arguments and consider free riding, fairness, and cross subsidy concerns for purposes of requiring program advocates to develop appropriate metrics to optimize the programs at issue, rather than to impede such programs before they can provide system-wide benefits. In order to do so, state utility commissions can apply a precautionary approach with regard to evaluating present costs and benefits and future costs and benefits. They can also urge participants in regulatory proceedings to look to existing energy efficiency metrics as a starting point for analysis and to modify these metrics to meet the needs of developing programs and the public.

[341] *See supra* notes 262-63, 278-82, and accompanying text.

[342] The same can be said for state Attorney General offices and, in many cases, state public utility commission staff that must consider the distributional impacts of electricity rate increases in their evaluation of net metering, EV charging, energy efficiency, or other state policy developments.