The Energy Prosumer

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Decentralization is becoming a dominant trend in many industries, and the electricity industry is no exception. Increasing numbers of energy consumers generate their own electricity and/or provide essential grid services such as storage, efficiency, and demand response. This Article offers a positive account of the emergence of these new energy actors, which it calls "energy prosumers." It then frames several doctrinal and procedural puzzles that prosumers create, including jurisdictional puzzles, distributional concerns, and democratic challenges. Ultimately, it concludes that prosumers can be a positive disruptive force in the electricity industry if courts and regulators can manage these challenges effectively. The Article suggests that increased prosumption not only helps further traditional energy law goals, but also is consistent with a modernized canon of energy law norms, including environmental protection and market competition. The Article concludes by outlining regulatory pathways to a prosumer future. It emphasizes the policy experimentation currently taking place and suggests conditions for, and core elements of, a more centralized, synoptic regulatory strategy.

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INTRODUCTION

Consumers have assumed a more active role in the new energy economy. Modern electricity law, defined as electricity regulation since the rise of the centralized public utility, assumes that consumers are passive: they take electricity from the grid but do not provide any goods or services in return. That paradigm, however, is changing.[1] Small-scale distributed generation, which allows homes and businesses to generate their own power, is becoming more widespread.[2] Customers are storing energy on-site and are using that storage both to support distributed generation and to provide services to the grid. In addition, regulators and utilities are shifting their focus from the supply

1. Former Federal Energy Regulatory Commission (FERC) Chairman Jon Wellinghoff has noted that converging trends are allowing electricity customers to achieve more control over such diverse concerns as reliability, security, and efficiency. Steven Schultz, *Growth of 'Distributed' Electricity Could Transform Utility Systems*, PRINCETON SCH. OF ENG'G & APPLIED SCI. (May 2, 2013), http://www.princeton.edu/engineering/news/archive/?id=10241.

2. *See infra* Part II.

side of the market equation (which concentrates on power generation) to the demand side (which puts energy efficiency front and center). This shift enables traditional consumers to become more active participants in energy markets, controlling their own electricity usage as part of energy efficiency programs and even selling commitments to reduce electricity usage in retail and wholesale markets.

While commentators have examined these developments individually,[3] this Article identifies them as elements of a larger phenomenon: the rise of the energy "prosumer." "Prosumers" are consumers in the traditional, passive sense who also produce goods or services for sale in the energy marketplace. By introducing the term to the legal vernacular, this Article seeks to minimize conceptual confusion resulting from the application of existing legal and policy constructs to these new market actors. The growth of prosumption challenges traditional energy law paradigms that were established based on an understanding of "consumer" and "producer" as distinct, non-overlapping categories. Erosion of the boundary between the two creates puzzles for both courts and agencies as they seek to adapt existing laws, policies, and procedures to a new energy landscape.

Energy is not the only field in which consumers are becoming more active.[4] But prosumer developments in energy law are striking for at least two

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3. On distributed generation, see Melissa Powers, *Small is (Still) Beautiful: Designing U.S. Energy Policies to Increase Localized Renewable Energy Generation*, 30 WIS. INT'L L.J. 595 (2012) (explaining the benefits of distributed generation and proposing revisions to existing policy to promote its deployment); Allyson Umberger, *Distributed Generation: How Localized Energy Production Reduces Vulnerability to Outages and Environmental Damage in the Wake of Climate Change*, 6 GOLDEN GATE U. ENVTL. L.J. 183 (2012) (examining the potential for distributed generation to mitigate the impacts of climate change and natural disasters); Kristin Bluvas, *Distributed Generation: A Step Forward in United States Energy Policy*, 70 ALB. L. REV. 1589 (2007) (arguing that the federal government should encourage distributed generation to promote grid stabilization and the integration of renewable resources).

For articles discussing the use of energy storage, see Amy L. Stein, *Reconsidering Regulatory Uncertainty: Making a Case for Energy Storage*, 41 FLA. ST. U. L. REV. 697 (2014) (finding that some regulatory uncertainty in the context of energy storage can be beneficial); Deborah Behles, *An Integrated Green Urban Electrical Grid*, 36 WM. & MARY ENVTL. L. & POL'Y REV. 671, 681–88 (2012) (elaborating the benefits of energy storage).

On energy efficiency and demand response, see Sharon B. Jacobs, *Bypassing Federalism and the Administrative Law of Negawatts*, 100 IOWA L. REV. 885 (2015) (finding federal demand response programs beneficial but arguing that a legislative amendment clarifying federal authority over demand response in wholesale markets would be desirable); Joel B. Eisen, *Who Regulates the Smart Grid?: FERC's Authority Over Demand Response Compensation in Wholesale Electricity Markets*, 4 SAN DIEGO J. CLIMATE & ENERGY L. 69 (2013) (defending federal jurisdiction over demand response); Noah M. Sachs, *Can We Regulate Our Way to Energy Efficiency? Product Standards as Climate Policy*, 65 VAND. L. REV. 1631 (2012) (arguing that reducing energy demand is the most promising way to cut greenhouse gas emissions and defending the existing regulatory strategy).

4. Professor Yochai Benkler has identified a parallel trend in communications, noting that "[t]echnology now makes possible the attainment of decentralization and democratization" by allowing some users to participate "in the production of their information environment." Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000).

reasons. First, key statutory language in energy law is, at least at the federal level, badly out of date. The Federal Power Act's (FPA's) jurisdictional line between areas of federal and state regulation, for example, has not been updated since 1935.[5] As will be explored in more detail in Part III, prosumption highlights the disconnect between such antiquated standards and modern developments. Second, energy prosumption is spreading rapidly, creating pressing challenges for regulators.[6] This Article will examine both the desirability and the mechanisms of that development.

The Article unfolds in several parts. Part I introduces the concept of energy "prosumers" and indicates limits to the term's application. Part II then offers a positive account of decentralization and the rise of the energy prosumer. It introduces the most prominent examples of energy prosumption: retail electricity customers' on-site production of power, termed distributed generation; customer storage of electricity; and customer participation in energy efficiency and demand response programs that offer compensation for reducing consumption.[7]

Regulating innovation can be challenging.[8] In the case of distributed energy resources, developments on the ground are occurring more quickly than regulatory structures are evolving.[9] Part III explores several legal and policy puzzles created by the rapid rise of the prosumer. First, subpart III.A examines two instances of jurisdictional confusion created by the erosion of the consumer/producer dichotomy. In both cases, courts have struggled to determine whether, under the FPA, certain prosumer activities are properly regulated by state utility commissions or by the Federal Energy Regulatory Commission (FERC).

Prosumer participation in energy markets also raises distributional concerns, with some arguing that compensation structures unfairly shift costs from prosumers to traditional consumers. Subpart III.B examines two ongoing pricing debates implicating these distributional concerns. Finally, subpart III.C

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5. For thoughts on why energy policy reform has been so difficult to achieve, see David B. Spence, *Regulation, "Republican Moments," and Energy Policy Reform*, 2011 BYU L. Rev. 1561 (2011) (positing that major policy shifts are unlikely due to the complexity of the subject matter and the fact that those who will benefit from reform differ from those who will bear its costs).

6. A new report predicts that the worldwide annual installed capacity of distributed generation will double by 2023. DEXTER GAUNTLETT & MACKINNON LAWRENCE, NAVIGANT RESEARCH, EXECUTIVE SUMMARY: GLOBAL DISTRIBUTED GENERATION DEPLOYMENT FORECAST 3 (2014). Customers are also becoming more active in managing their energy demand. *See, e.g.*, FED. ENERGY REGULATORY. COMM'N, ASSESSMENT OF DEMAND RESPONSE AND ADVANCED METERING 1 (2015) (noting an increase in deployment of advanced meters and the development of programs at the state and federal levels).

7. Together, these innovations are often referred to as distributed energy resources.

8. *See, e.g.*, Tim Wu, *Agency Threats*, 60 Duke L.J. 1841 (2011) (proposing a threat-based governance regime for emerging technologies and processes); Nathan Cortez, *Regulating Disruptive Innovation*, 29 Berkeley Tech. L.J. 175, 179 (2014) (arguing that regulators should use threats as a stopgap rather than as a permanent solution).

9. On the challenge of using existing legal infrastructure to address new problems, see Jody Freeman & David B. Spence, *Old Statutes, New Problems*, 163 U. PA. L. REV. 1 (2014).

describes the ways in which prosumers create challenges for democratic governance at the agency level. The modern trend favors democratic, or at least pluralistic, decision making within energy regulatory agencies.[10] Prosumer interests are currently being represented by proxies, including industry trade organizations, middlemen (such as solar services companies and demand response providers), environmental groups, and traditional consumer advocates. The limitations of such representation by proxy are likely to be tested as prosumer activity increases.

Part IV makes the case that, notwithstanding these challenges, prosumption is consistent with the values underlying our system of energy governance. This Part defines a new set of norms that animate electricity regulation today, including environmental protection and market competition. While prosumption in many respects harmonizes with traditional goals of electricity governance (accessible, reliable service at low cost), it is an even better fit with this updated normative canon.

Part V turns to the future of prosumption. First, it describes the various regulatory strategies that have been employed to boost prosumption, including efforts to localize electricity decision making through municipalization of electric utilities. It then suggests that these strategies are best understood as part of a decentralized, investigatory approach to regulation that incorporates features of incrementalism as well as democratic experimentalism. The experimentalist approach is appropriate given the relative novelty and complexity of prosumption. However, to maximize prosumption's benefits, policymakers must address well-known critiques of experimentalism, including the frequent failure to achieve consensus on goals or implement effective monitoring and measurement programs. Finally, while an experimentalist approach is justified at present given the newness of prosumption and its enabling technologies, Part V concludes with thoughts about when and how more centralized, coordinated regulation of prosumption should emerge and what essential features would enable such a regulatory framework to promote electricity law's values, both traditional and modern.

I. THE ENERGY PROSUMER

Until recently, a clean line separated electricity consumers on the one hand, and generators and service providers on the other. As described above, however, today many consumers are playing a more active role in energy markets. These hybrid energy consumers and producers are most accurately described as "prosumers." Some state statutes have begun to describe

10. *See, e.g.*, Cary Coglianese et al., *Transparency and Public Participation in the Federal Rulemaking Process: Recommendations for the New Administration,* 77 GEO. WASH. L. REV. 924, 926–27 (2009) (asserting that public participation can enhance the democratic goals of legitimacy and oversight and produce better quality decisions); Mark Seidenfeld, *A Civic Republican Justification for the Bureaucratic State*, 105 HARV. L. REV. 1511, 1515 (1992) (imaging agencies as loci of civic republicanism).

customers with distributed generation on-site as "customer-generators."[11] However, "prosumer" is more useful as a general term because the modern energy consumers described above do more than generate electricity. They also provide essential grid services, such as storage, regulation, and demand response in both retail and wholesale markets.

To date, there has been virtually no discussion of "prosumers" as such in the legal literature. However, scholars in other disciplines have examined the phenomenon in more detail.[12] Web and software users who generate content have been deemed "prosumers,"[13] as have home creators of audio and video imagery,[14] and even authors of fan fiction.[15] The editors of a special issue of *American Behavioral Scientist* that focused on prosumption claimed that "humans are by their very nature prosumers" and declared that "the existence of largely separable producers and consumers is, at best, a historical anomaly."[16] Our error, the authors concluded, has been "to treat production and consumption as a binary."[17]

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11. S*ee, e.g.*, WASH. REV. CODE § 80.60.010 (2007) (defining a "customer-generator" as a user of a net metering system). Courts have adopted this nomenclature. *See* FirstEnergy Corp. v. Pub. Utils. Comm'n, 768 N.E.2d 648, 650 (Ohio 2002); Babb v. Mo. Pub. Serv. Comm'n, 414 S.W.3d 64, 67 (Mo. Ct. App. 2013); City of Great Falls v. Mont. Dept. of Pub. Serv. Reg. 254 P.3d 595, 599 (Mont. 2011) ("'customer-generator' [] means 'a user of a net metering system'"); ARIPPA v. Pa. Pub. Utils. Comm'n, 966 A.2d 1204, 1212 n.4 (Pa. Commw. Ct. 2009) (citing state statutory provision that referred to a "customer-generator").

12. The term "prosumer" was coined by futurist Alvin Toffler in his 1970 book, *Future Shock*. Sarvapali D. Ramchurn et al., *Putting the 'Smarts' Into the Smart Grid: A Grand Challenge for Artificial Intelligence*, 55 COMM. OF THE ACM 86, 88 n.c (2012). For a collection of articles on prosumers from a behavioral perspective, see George Ritzer et al., *The Coming of Age of the Prosumer*, 56 AM. BEHAV. SCIENTIST 379, 380 (2012) (noting the "expansion of work on this topic in the last few years"). The term "prosumer" has been given at least two additional related, but distinct meanings. First, it has been used to describe "professionalized consumers" as opposed to consumer/producers, especially in the marketing context. *See* Susan Gunelius, *The Shift from CONsumers to PROsumers*, FORBES Jul. 3, 2010, http://www.forbes.com/sites/work-in-progress/2010/07/03/the-shift-from-consumers-to-prosumers/#6522e0c6543f (documenting a shift from prosumers as mere professional consumers to "product and brand advocate[s]"). Second, the term has been used to mean "someone who makes little distinction between his or her home and work lives." WILLIAM GERHARDT, CISCO INTERNET BUSINESS SOLUTIONS GROUP, PROSUMERS: A NEW GROWTH OPPORTUNITY 1 (2008).

13. *See* Aaron Shaw & Yochai Benkler, *A Tale of Two Blogospheres: Discursive Practices on the Left and Right*, 56 AM. BEHAV. SCIENTIST 459, 461 (2012) (defining blog authors as prosumers); Jamie Skye Bianco, *Social Networking and Cloud Computing: Precarious Affordances for the "Prosumer,"* 37 WOMEN'S STUD. Q. 303, 303–04 (2009) (using a broad definition of self-production and distribution that would deem social network users who simply post a URL on a friend's "wall" prosumers).

14. *See* Kathleen Bell Welch, *Electronic Media: Implications of the "Third Wave" View of Electronic Media,* 70 ENG. J. 86, 87 (1981) (citing Toffler). For examples, consider the individuals who upload videos of themselves to YouTube.

15. *See* Abigail De Kosnik, *Should Fan Fiction Be Free?*, 48 CINEMA J. 118, 124 n.21 (2009) (citing Suellen Regonini, *They Aim to Misbehave: A Case Study of Technology, Fan Activities, and the Prosumer Economy* (paper presented at the 2006 Conference of the Popular Culture Association in the South and the American Culture Association in the South, Oct. 7, 2006)).

16. Ritzer et al., *supra* note 12, at 380.

17. *Id.* at 381.

The idea of prosumption is increasingly being applied in the context of energy markets.[18] Two defining features of energy prosumption are autonomy and market participation. Energy prosumers exercise increased autonomy in that they take more ownership of their consumption decisions than traditional consumers, either taking active steps to regulate their consumption or engaging in self-supply. These behaviors, however, are supplemented by their activities as market participants. Some prosumers sell excess energy generated on-site back to their local utilities, some bid energy storage services into ancillary services markets, and some receive compensation for reducing their electricity usage through demand response programs. Each of these activities will be explored in greater detail in Part II.

One point of clarification is needed: because they are a species of customer, prosumers may be divided into the familiar classes of residential, commercial, and industrial. Size is relevant to prosumption activities, especially when it comes to the question of participation in regulatory processes. Small residential prosumers tend to lack the means and sophistication to participate vigorously in legislative and regulatory debates. Larger commercial and industrial customers have a greater stake in regulatory outcomes (because their levels of program participation tend to be higher) and often have the resources to influence policymaking in a way that smaller prosumers do not.

In addition, it is worthwhile to note that the rise of the prosumer has also led to the rise of the energy middleman. Some prosumers act entirely on their

18. *See, e.g.*, STEPHENS ET AL., SMART GRID (R)EVOLUTION 29-30 (2015) (noting that the term is useful in part because it denotes a class of individuals whose simultaneous production and consumption of electricity are harbingers of a systemic change); Joseph P. Tomain, *A Perspective on Clean Power and the Future of U.S. Energy Politics and Policy*, 39 UTILS. POL'Y 5, 9 (2016) (stating that "[a]ccording to some, a prosumer society is starting to develop."); Jennie C. Stephens & Elizabeth J. Wilson, *Climate Change, Technological Innovation*, 72 BULL. ATOMIC SCIENTISTS 4, 5 (2016) (remarking on the empowerment of individual citizens in energy systems).

Until recently, the use of the term "prosumer" in energy markets has been primarily in the technical and economics literature on grid management systems and the smart grid. *See, e.g.*, Ramchurn et al., *supra* note 12, at 94-95 (describing the emergence of prosumers as one of the challenges facing build-out of the smart grid and predicting that as the number of prosumers grows, "electricity will become a commodity with similar properties to those traded on stock markets."); Agata Filipowska et al., *Towards Forecasting Demand and Production of Electric Energy in Smart Grids*, *in* PERSPECTIVES IN BUSINESS INFORMATICS RESEARCH (Andrzej Kobylinski & Andrzej Sobczak eds. 2013) (offering a solution for managing energy consumption and production in microgrids); ILIANA SHANDURKOVA ET AL., A PROSUMER ORIENTED ENERGY MARKET, IMPROSUME PUBLICATION SERIES (2012) (describing research on the impact of prosumers on smart grid development in Europe). The term has also been used in policy and sociology articles discussing subsidies for renewable generation. *See* Wladyslaw Mielczarski, New Subsidies for Renewables 3 (unpublished manuscript), http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6607273&tag=1 (noting that the development of regional transmission infrastructure could help encourage renewable energy prosumers); Fritz Reusswig, *Sociological Tasks in View of the Transition to Post-Carbon Societies*, 1 INT'L REV. SOC. RES. 189, 190–91 (2011) (explaining that renewable energy systems can occur in both centralized systems and decentralized networks of individual energy "prosumers"). Much of the discussion of prosumers in the energy field comes from outside of the United States, which is unsurprising given that other economies have had greater experience with the competitive energy markets in which prosumers thrive and have thus had more time to consider the challenges they pose.

own initiative. As prosumer activity has expanded, however, new companies have taken advantage of the growing market to offer their services as middlemen between prosumers and energy markets. In the distributed generation context, the best known of these companies are solar services providers who install, maintain, and operate solar panels on a customer's property.[19] In such cases, the solar services company may itself sell excess power back to the grid, minimizing the customer's involvement. Because customers who are party to such agreements abdicate most of the production, management, and sales responsibilities to solar companies, they often behave more like traditional consumers than prosumers.[20] Nevertheless, these customers are more active than traditional consumers in that they are using their own resources to generate a product that can be sold on energy markets.

Notwithstanding these definitional caveats, prosumers stand in contrast to traditional consumers—those whose sole interactions with electricity markets are to purchase goods and services. Prosumers do not fit neatly into the classic mold of either energy consumer or energy producer—they engage in behaviors characteristic of both.

What motivates some consumers to become prosumers? Many prosumers purchase on-site generation and storage capacity and participate in demand-side management programs because it provides them with greater control over their electricity supply and their consumption patterns. As an extreme example, consider the movement to go "off-grid" entirely. The primary reasons individuals might wish to supply all of their own power center around the desire for greater autonomy. They might wish to live in an isolated location without access to a utility system.[21] Or, libertarian ideals might motivate them to disconnect from local utilities, which are heavily regulated by the

19. According to the Solar Energy Industries Association, third-party financing agreements accounted for 90 percent of New Jersey's residential solar market, 50 percent of New York's distributed generation systems, and 69–81 percent of distributed generation systems installed in California in the first quarter of 2014. *Third-Party Solar Financing*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/finance-tax/third-party-financing (last visited Feb. 25, 2015). One popular model is the solar lease, under which customers pay the costs of their system over many years. Another model is the power purchase agreement, wherein the customer never acquires ownership of the system but signs an agreement with the solar services company to purchase electricity from the system at a specified rate. *What's a Solar Lease or Solar Power-Purchase Agreement?*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/about/solar-energy/solar-faq/what's-solar-lease-or-solar-power-purchase-agreement (last visited Jan. 7, 2016).

20. As the founder of one solar services company put it, "[w]e're trying to build a convenient, Netflix-like experience." Ehren Goossens & Will Wade, *The New Solar Middlemen*, BLOOMBERG BUSINESSWEEK (Mar. 24, 2011, 2:00 PM), http://www.bloomberg.com/news/articles/2011-03-24/the-new-solar-middlemen (quoting Danny Kennedy, founder of Sungevity).

21. USA Today reported in 2006 that approximately 180,000 people live off the grid in the United States. Paul Davidson, *Off the Grid or On, Solar and Wind Power Gain*, USA TODAY (Apr. 12, 2006, 10:53 PM), http://usatoday30.usatoday.com/tech/news/techinnovations/2006-04-12-off-the-grid_ x.htm. For a vivid description of what such off-grid living can be like, see Robert Walton, *Diary of a Grid Defector: How an Energy Reporter is Going off the Grid*, UTILITYDIVE (July 10, 2015), http://www.utilitydive.com/news/diary-of-a-grid-defector-how-an-energy-reporter-is-going-off-the-grid/401953/.

government.[22] They might also desire full control over the source of their power consumption for environmental reasons.[23]

A key motivation for prosumption, however, is economic. Individual electricity customers are often able to save money on their utility bills, or even make a net profit, by generating energy on-site, using energy storage to supplement generation or provide services to the grid, or participating in energy efficiency and demand response programs. Even factoring in the effects of government subsidies, the capital costs of on-site solar systems in particular have declined precipitously over the past several years.[24] The costs of batteries used in electric vehicles dropped by 40 percent between 2010 and 2012.[25] Meanwhile, the returns customers can earn by participating in demand–side management programs have increased.[26]

II. BACK TO THE FUTURE: A DECENTRALIZING ENERGY LANDSCAPE

This Part describes the three basic means by which prosumers can participate in energy programs: generating and selling their own electricity (distributed generation), selling energy storage services, or committing to reduce consumption or shift their consumption patterns (energy efficiency and demand response).

Fundamentally, there is nothing new about decentralized energy production. As commentators have remarked, before centralized power

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22. *See generally* NICK ROSEN, OFF THE GRID: INSIDE THE MOVEMENT FOR MORE SPACE, LESS GOVERNMENT, AND TRUE INDEPENDENCE IN MODERN AMERICA (2010).

23. Often, interest in "going green" is what drives customers to attempt off-the-grid living. *See, e.g.*, WILLIAM H. KEMP, THE RENEWABLE ENERGY HANDBOOK: THE UPDATED AND COMPREHENSIVE GUIDE TO RENEWABLE ENERGY AND INDEPENDENT LIVING 1–3 (2009); C. DENNIS BARLEY ET AL., NAT'L RENEWABLE ENERGY LAB., THE VAN GEET OFF-GRID HOME: AN INTEGRATED APPROACH TO SAVING ENERGY (2004). *See also* PAUL DENHOLM ET AL., NAT'L RENEWABLE ENERGY LAB., METHODS FOR ANALYZING THE BENEFITS AND COSTS OF DISTRIBUTED PHOTOVOLTAIC GENERATION TO THE U.S. ELECTRIC UTILITY SYSTEM 2-3 (2014) (measuring the costs and benefits of distributed photovoltaic generation, including the environmental benefits). As discussed in greater detail in Part II.D, reduced consumption and clean self–generation can mitigate the need for new fossil fuel–fired power plants.

24. In a report for the Department of Energy, the National Renewable Energy Laboratory and the Lawrence Berkeley National Laboratory reported that solar photovoltaic system prices declined by 12–15 percent in 2013 and were predicted to fall further still in 2014. DAVID FELDMAN ET AL., PHOTOVOLTAIC SYSTEM PRICING TRENDS: HISTORICAL, RECENT, AND NEAR-TERM PROJECTIONS 4 (2014).

25. Zachary Shahan, *40% Drop in EV Battery Prices From 2010 to 2012*, CLEANTECHNICA (Jul. 8, 2013), http://cleantechnica.com/2013/07/08/40-drop-in-ev-battery-prices-from-2010-to-2012/ (citing a Bloomberg New Energy Finance study by Michael Liebreich from Apr. 17, 2013). Tesla Motors predicts that battery costs will decline further—by 30 percent or more—when it builds its promised "Gigafactory" for lithium–ion batteries. *See* Alan Ohnsman, *Musk's $5 Billion Tesla Gigafactory May Start Bidding War*, BLOOMBERG (Feb. 27, 2014, 12:18 PM), http://www.bloomberg.com/news/articles/2014-02-26/tesla-plans-1-6-billion-note-offering-to-fund-gigafactory.

26. *See Demand Response Compensation in Organized Wholesale Markets*, Order No. 745, 134 F.E.R.C. ¶ 61,187 at P 2 (2011) (mandating that retail demand response providers in wholesale energy markets be paid the same amount for each "negawatt" they forego as power plants are paid for each megawatt they produce).

production, all energy was local.[27] As late as the second half of the nineteenth century, indoor lighting was mostly achieved through the use of kerosene, candles, or gas manufactured from coal.[28] The first power plant, Thomas Edison's Pearl Street generating station, began operations on September 4, 1882.[29] Soon, central installations dominated.[30] The development of increasingly large steam turbines in the early twentieth century made larger power plants possible, allowing each station to exploit economies of scale. This technological development fully ushered in "[t]he era of central station power."[31]

More than one hundred years later, decentralized energy production, also known as distributed generation, is experiencing a renaissance. In addition, customers are increasingly participating in energy efficiency and demand response programs. The latter, offered at both the retail and wholesale levels, provide compensation for scaling back electricity usage at times of peak use. Demand response programs in particular involve the sale of a "product"—the commitment not to consume—into energy markets. Collectively, distributed generation, distributed storage, energy efficiency, and demand response are known as "distributed energy resources."[32]

The most visible manifestation of decentralization is distributed generation. A Congressional Budget Office report described distributed generation as "small customer-owned generators . . . sited at or near the locations where the electricity is used."[33] Distributed generation currently

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27. *See, e.g.*, Garrick B. Pursley & Hannah J. Wiseman, *Local Energy,* 60 EMORY L.J. 877, 897 (2011) ("At the distributed scale, renewables fit an energy production model that has existed for thousands of years; energy is consumed close to its source.").

28. JOHN F. WASIK, THE MERCHANT OF POWER: SAMUEL INSULL, THOMAS EDISON, AND THE CREATION OF THE MODERN METROPOLIS 14 (2006).

29. *Id.* at 20. The New York Times was one of the first customers to take electricity from the station. Its reporters noted in awe that night that "[i]t seemed almost like writing by daylight." *Id.* at 20–21.

30. While Edison's plant was the first in operation, it was only because of the development and eventual triumph of alternating current power that transmission of power over longer distances (and the resulting rise of large, centralized plants) became possible. *See* JOEL B. EISEN ET AL., ENERGY, ECONOMICS, AND THE ENVIRONMENT: CASES AND MATERIALS 34–35 (Joel B. Eisen et al. eds., 4th ed. 2015). Technology played the critical role in centralization of other industries as well. *See* Benkler, *supra* note 4, at 563 ("the development of high volume, high cost mechanized printing presses and the telegraph changed the enterprise of the press from a local, small circulation medium . . . to a mass scale demand management system.").

31. BRANDON OWENS, GEN. ELECTRIC, THE RISE OF DISTRIBUTED POWER 14 (2014).

32. Various definitions of "distributed energy resources" exist, but California's is typical and includes "distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies." Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769, Cal. Publ. Utils. Comm'n, Rulemaking 14-08-013, at 3 n.B (Aug. 14, 2014).

33. CONG. BUDGET OFF., PROSPECTS FOR DISTRIBUTED ELECTRICITY GENERATION 1 (2003). A recent article in The Economist offered a similar definition: "producing electricity in small quantities near the point of use, rather than in large amounts in a few places." *Devolving Power*, THE ECONOMIST (Mar. 8, 2014), http://www.economist.com/news/business/21598668-big-batteries-threaten-big-power-stationsand-utilities-profits-devolving-power.

represents about 1 percent of installed generation capacity in the United States, although the percentage is much higher in other countries.[34] Those rates are only expected to climb.[35]

Distributed generation can include photovoltaic (PV) panels, small wind turbines, fuel cells, and biomass generators (among other technologies).[36] Of these, solar has been identified as the "most disruptive" to electricity markets due to its widespread adoption and its potential to compete with conventional generation.[37] Indeed, rooftop solar panels are becoming a common feature of both urban and rural landscapes.[38]

A related but distinct concept is distributed energy storage. The inability to store energy efficiently has long been a defining feature and significant structural impediment of the electricity grid.[39] The dearth of effective storage technologies necessitates that electric supply and demand be kept perpetually in balance, in real time. Although storage technologies have lagged behind generation technologies for a century, there are finally promising signs that storage is becoming more feasible. While larger, utility-owned storage installations have received the most attention to date, smaller, customer-owned systems are increasingly popular.[40] Behind-the-meter storage enables customers to avoid peak electricity charges and, where programs exist, to

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34. In Germany, distributed generation represents at least 20 percent—and perhaps as much as 48 percent—of installed capacity. *See* THE ECONOMIST, *supra* note 33; Helmut Edelmann, *Distributed Generation Hits the Big Numbers*, 15 Utils. Unbundled 34, 34 (2013). The U.K. figures are lower but still stand at approximately 11 percent of total generating capacity. CARBON CONNECT, DISTRIBUTED GENERATION: FROM CINDERELLA TO CENTRE STAGE 6 (2012).

35. The independent research firm Morningstar predicts that distributed generation will represent nearly a third of new U.S. capacity by 2017, though that figure seems ambitious. THE ECONOMIST, *supra* note 33.

36. AM. PUB. POWER ASS'N, DISTRIBUTED GENERATION: AN OVERVIEW OF RECENT POLICY AND MARKET DEVELOPMENTS 3 (2013); CONG. BUDGET OFF., *supra* note 33, at 5.

37. THE ECONOMIST, *supra* note 33. California already has high rates of rooftop solar, *see* Go Solar California, California Solar Statistics, https://www.californiasolarstatistics.ca.gov/reports/monthly_stats/ (last visited Aug. 16, 2016) as do New York, Massachusetts and Arizona. SOLAR ENERGY INDUS. ASS'N, SOLAR MARKET INSIGHT REPORT 2015 Q2, at 2 (2015). Solar represents more than 90 percent of installed distributed generation in the United States. AM. PUB. POWER ASS'N, *supra* note 36, at 3.

38. As of the end of November 2015, California had over 3000 megawatts of distributed solar generating capacity installed. *California Has Nearly Half of the Nation's Solar Electricity Generating Capacity*, U.S. ENERGY INFO. ADMINISTRATION (last updated Feb. 5, 2016), http://www.eia.gov/todayinenergy/detail.cfm?id=24852. Nationwide, almost three gigawatts of rooftop solar power—the equivalent of about four to five conventional power plants—were added in 2012 and 2013. Mark Chediak et al., *Utilities Feeling Rooftop Solar Heat Start Fighting Back*, BLOOMBERG (Dec. 25, 2013, 10:43 PM), http://www.bloomberg.com/news/articles/2013-12-26/utilities-feeling-rooftop-solar-heat-start-fighting-back.

39. *See* PAUL DENHOLM ET AL., NAT'L RENEWABLE ENERGY LAB., THE ROLE OF ENERGY STORAGE WITH RENEWABLE ELECTRICITY GENERATION 6–8 (2010) (explaining that high cost has limited the deployment of grid-scale energy storage technologies).

40. Last year, Tesla began offering a home battery system for a few thousand dollars. Demand has far outstripped supply. Kirsten Korosec, *Elon Musk: Demand for Tesla's Home Battery is 'Crazy off the Hook,'* FORTUNE (May 6, 2015, 8:54 PM), http://fortune.com/2015/05/06/elon-musk-tesla-home-battery/.

provide important ancillary services to the grid.[41] These ancillary services, such as frequency regulation,[42] are functions performed "in support of the basic services of generating capacity, energy supply, and power delivery."[43]

Finally, vehicle-to-grid (V2G) technology promises to further expand customers' roles in the energy marketplace.[44] This technology allows hybrid and electric plug-in vehicles to connect directly to the grid. V2G car batteries may be used as grid storage devices, facilitating demand response or making power available to the grid as needed.[45] Hybrid vehicles can also be used to provide backup power to the customer, a phenomenon the New York Times called "power to the people."[46]

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41. *See* Prepared Direct Testimony of Cynthia Fang, Chapter 1, On Behalf of San Diego Gas & Elec. Co., Application of San Diego Gas & Elec. Co. (U 902 E) for Auth. to Update Marginal Costs, Cost Allocation, & Elec. Rate Design, C24–C25 (July 1, 2015) (describing San Diego Gas & Electric's new rate program for customers willing to make their batteries available to the grid at specified times). Because prices for electricity at times of peak usage (as during the middle of a hot summer day) are significantly higher, customers who can rely on their own stored energy during those times can avoid peak prices.

42. The U.S. electricity grid operates at a frequency of 60 hertz. Fluctuations between power supply and demand can disrupt that frequency, requiring grid operators to draw on fast-responding grid resources (such as storage) to correct the imbalance.

43. BRENDAN J. KIRBY, OAK RIDGE NAT'L LAB., FREQUENCY REGULATION BASICS AND TRENDS 1 (2004). The California Energy Commission is optimistic about the potential for customers to use battery systems "to participate in power markets by providing grid services . . . ." PUB. INTEREST ENERGY RES. PROGRAM, 2020 STRATEGIC ANALYSIS OF ENERGY STORAGE IN CALIFORNIA 7 (2011). Retail customers can also take advantage of wholesale markets for frequency regulation services. FERC's Order 755 provides an extra incentive for them to do so by compensating fast-responding regulation sources like batteries or flywheels more generously than sources that come online more slowly. *See Frequency Regulation Compensation in the Organized Wholesale Power Markets*, 137 F.E.R.C. ¶ 61,064 at PP 35, 66–67 (2011). In Order 784, FERC also required all transmission-owning utilities to consider the speed and accuracy of ancillary services resources in making dispatch decisions. *Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies*, 144 F.E.R.C. ¶ 61,056 at P 5 (2013). Order 784 also made it easier for energy storage resources to obtain market-based rate authority (the ability to sell power at market rates in competitive wholesale marketplaces) and simplified accounting procedures that facilitate deployment of energy storage services. *Id.* at PP. 2–5.

44. For academic treatments of V2G technology, see Matthew Hutton & Thomas Hutton, *Legal and Regulatory Impediments to Vehicle-to-Grid Aggregation*, 36 WM. & MARY ENVTL. L. & POL'Y REV. 337 (2012) (concluding that impediments are unlikely to stand in the way of adoption of V2G programs)*;* Bryan Lamble, *Of Nesting Dolls and Trojan Horses: A Survey of Legal and Policy Issues Attendant to Vehicle-to-Grid Battery Electric Vehicles*, 86 CHI.-KENT L. REV. 193 (2011) (describing promise and pitfalls of this technology).

45. Several pilot projects are underway. The University of Delaware partnered with NRG Energy on a pilot project called eV2g that became an official resource to PJM, the regional transmission organization in the mid-Atlantic region. Press Release, Office of Governor Markell, In First, Electric Vehicle-to-Grid Technology Sells Power to PJM Power Grid (Apr. 26, 2013). Pacific Gas & Electric (PG&E) and Tesla Motors are partnering on a similar project. *PG&E and Tesla Motors Co-Pilot Vehicle-to-Grid Research*, PR NEWSWIRE, (Sept. 12, 2007, 1:00 AM), http://www.prnewswire.com/news-releases/pge-and-tesla-motors-co-pilot-vehicle-to-grid-research-58005827.html. The Department of Defense plans to develop an electric vehicle fleet that will supply power to local grids. Nick Simeone, *DOD Electric Vehicles Will Supply Power to Local Grids*, DEP'T OF DEF. NEWS, (Jan. 10, 2013), http://archive.defense.gov/News/NewsArticle.aspx?ID=118971.

46. Jim Motavalli, *Power to the People: Run Your House on a Prius*, N.Y. TIMES (Sept. 2, 2007), http://www.nytimes.com/2007/09/02/automobiles/02POWER.html?_r=1.

Consumers are also becoming more active on the demand side of the market equation. First, consumers are participating in energy efficiency and energy conservation programs. A simple definition of energy efficiency is "using less energy to provide the same service," while energy conservation means "reducing or going without a service to save energy."[47] Both types of programs have been encouraged at the federal level since the oil embargos in the 1970s led to rising electricity prices.[48] Throughout this period, individual utilities instituted their own conservation and efficiency programs.[49]

Customers can participate even more actively in energy markets through demand response programs. Demand response is a reduction in demand in response to a price signal from the grid.[50] There are demand response programs at both the retail level, where they are typically run by the local utility, and at the wholesale level, where they are run by wholesale market administrators.[51]

At the retail level, demand response programs fall into one of two categories. First, utilities might offer dynamic pricing schemes that make consumption at peak times more costly. Second, utilities might pay customers for reducing electricity consumption at certain times.[52] However, many utilities do not offer either option.[53]

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47. *What's Energy Efficiency?,* LAWRENCE BERKELEY NAT'L LAB., http://eetd.lbl.gov/ee/ee-1.html (last visited May 7, 2016).

48. Robert K. Dixon et al., *U.S. Energy Conservation and Efficiency Policies: Challenges and Opportunities*, 38 ENERGY POL'Y 6398, 6398 (2010). At the federal level, these measures were encouraged through provisions in the Energy Policy and Conservation Act of 1975. The Energy Policy Act of 1992 and the Energy Independence and Security Act of 2007 expanded on these mandates. However, federal involvement has been inconsistent, with the federal government showing the greatest interest when oil and gas prices are high. *Id.* at 6401.

49. Home energy management systems and smart metering devices are essential to these programs and are also key drivers of consumer empowerment. Smart meters can record electricity consumption in short-term intervals and communicate that information to the customer and the local utility. They make it possible for consumers to understand and control their own energy consumption, to participate in demand response programs, and to enable automated appliances that make conservation simpler. *See* SMART ENERGY DEMAND COALITION, METERING AND INFORMATION: SMART METERS AND THEIR CENTRAL ROLE IN CONSUMER EMPOWERMENT 1, http://sedc-coalition.eu/wp-content /uploads/2012/02/SEDC-Smart-Meter-Position-Paper.pdf (last accessed May 7, 2016).

50. The Department of Energy defines demand response as "[c]hanges in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized." U.S. DEP'T OF ENERGY, BENEFITS OF DEMAND RESPONSE IN ELECTRICITY MARKETS AND RECOMMENDATIONS FOR ACHIEVING THEM 6 (2006). FERC's definition is the same. FED. ENERGY REGULATORY. COMM'N, 2008 ASSESSMENT OF DEMAND RESPONSE AND ADVANCED METERING, at C-2 (2008).

51. For a more detailed discussion of demand response programs and FERC's efforts to regulate them, see Jacobs, *supra* note 3, at 895 (2015).

52. California's public utilities commission has proposed that the state's three large investor-owned utilities be permitted to recover costs of bringing more customers into demand response programs. Decision Approving Recovery of Costs to Implement an Initial Level of Demand Response Direct Participation, at 2 (Cal. Pub. Utils. Comm'n Feb. 20, 2015) (prop. decision).

53. A 2009 survey of the thirty load-serving utilities in the Southwest Power Pool found that fewer than half offered any kind of dynamic pricing or demand response program. RANJIT BHARVIRKAR

At the wholesale level, demand response programs are more widespread. Retail customers are typically allowed to participate in any of the demand response programs offered by their regional market administrator. For example, PJM, the market administrator for the mid-Atlantic region, offers two types of demand response. First, PJM offers emergency demand response, where customers agree to be on-call to reduce electricity demand (also called a customer's electrical "load") if the system comes under unanticipated stress. The customers are paid a monthly rate to be available, and participation is mandatory if they are called upon.[54] Second, customers may participate in so-called "economic" demand response programs, which are triggered when prices are especially high. Under these programs, customers may choose whether or not to participate and are only compensated based on the actual decrease in their electrical load.[55] In addition, PJM offers ancillary services programs. Under these programs, customers agree to reduce their electricity load by smaller amounts, but to respond more rapidly in order to counter sudden fluctuations of grid frequency or restore balance quickly.[56]

As noted above, prosumers can use the services of middlemen to participate in energy programs. In the demand response context, these companies are called "aggregators" because they aggregate many small demand response commitments and bid them as a package into retail or wholesale electricity markets. Aggregation can be useful, since some markets require minimum bids that far exceed average residential usage, even during peak summer hours.[57] Aggregation can also help compensate for nonperformance by some customers, since most demand response programs allow over-participation by the aggregator's other customers to make up the shortfall.[58] While demand response aggregators eliminate the need for

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ET AL., LAWRENCE BERKELEY NAT'L LAB., RETAIL DEMAND RESPONSE IN SOUTHWEST POWER POOL 9, 17 (2009).

54. *See Retail Electricity Consumer Opportunities for Demand Response in PJM's Wholesale Markets*, PJM, http://www.pjm.com/~/media/markets-ops/dsr/end-use-customer-fact-sheet.ashx, at 2–3 (last visited May 7, 2016).

55. *See id.*

56. *See id.*

57. For example, the New York independent system operator requires that participants be able to shed a minimum of 100 kilowatts of electrical load for the duration of system emergencies. N.Y. INDEP. SYS. OPERATOR, EMERGENCY DEMAND RESPONSE PROGRAM MANUAL 2.2 (version 7.2, 2016), http://www.nyiso.com/public/webdocs/markets_operations/documents/Manuals_and_Guides/Manuals/Operations/edrp_mnl.pdf. Residential usage is typically well under 10 kilowatts per hour, which means that these resources would still fall short of the minimum even if they were to draw no power from the grid. *See, e.g.*, Barry Fischer, *Hot and Heavy Energy Usage: How the Demand and Price For Electricity Skyrocketed on a 100° Day*, OPOWER: OPOWER BLOG (Sept. 5, 2012), http://blog.opower.com/2012/09/hot-and-heavy-energy-usage-how-the-demand-and-price-for-electricity-skyrocketed-on-a-100-day/.

58. *See Wholesale Competition in Regions with Organized Electric Markets*, 125 F.E.R.C. ¶ 61,071 at P 154 (2008) (finding that allowing aggregators to act as intermediaries for small retail loads reduces barriers to demand response, increases competition, helps reduce consumer prices, and enhances reliability).

individual customers to enroll directly in utility or wholesale market programs, customers are still actively engaged in the enterprise of reducing load when called upon to do so and are therefore acting as prosumers rather than passive consumers.

Consumers participating in energy efficiency and especially demand response programs are often behaving more like producers than consumers. They provide services that the market needs in exchange for compensation. Like customers with distributed generation or distributed storage, these customers participate in both the supply and demand sides of the energy market. They are, therefore, challenging traditional paradigms in energy law, and their growing presence requires shifting the way we think about energy customers in particular and energy governance more generally.

III. DOCTRINAL AND PROCEDURAL PUZZLES CREATED BY THE ENERGY PROSUMER

The rise of the prosumer creates both doctrinal and procedural puzzles for energy law and the energy regulatory system. First, prosumers are neither pure consumers nor pure producers, and the attempt to classify them as one or the other has created jurisdictional puzzles. Second, while prosumer activity may in some cases improve pricing for all consumers, it may also result in distributional inequities. Finally, as prosumers emerge as a separate stakeholder category, their viewpoints should be represented in policymaking processes. While there is some evidence of prosumer participation in regulatory proceedings, individual prosumers, especially residential prosumers, are unlikely to be able to exert any true influence. Various organizations currently claim to speak on behalf of prosumers. However, there are reasons to be skeptical that these organizations serve as adequate proxies for prosumer interests.

A. Jurisdictional Puzzles

Conflating traditional consumers and prosumers can lead to a lack of doctrinal clarity when analyzing jurisdictional questions in energy law. The FPA established the existing jurisdictional boundaries in electricity regulation. As the Supreme Court is fond of noting, the FPA drew a "bright line" between federal and state jurisdiction over sales of electricity based upon the nature of the sale.[59] The federal government was given jurisdiction over sales of electricity for resale (or wholesale sales) in interstate commerce, while state regulators maintained their traditional jurisdiction over retail sales.[60] This

59. *See* Fed. Power Comm'n v. S. Cal. Edison, 376 U.S. 205, 215-16 (1964) ("[C]ongress meant to draw a bright line easily ascertained, between state and federal jurisdiction.").

60. Federal Power Act § 201, 16 U.S.C. § 824 (2012). The Supreme Court, in Pub. Utils. Comm'n of R.I. v. Attleboro Steam & Elec. Co., 273 U.S. 83 (1927), created the so-called "Attleboro gap,"

division of authority has been maintained over the past eighty years, although the line between state and federal authority has become increasingly less "bright" due to on-the-ground developments not foreseen by Congress in 1935.[61] Two recent innovations, net metering and demand response, have caused particular consternation. For each of these activities, the answer to the question of whether they are retail or wholesale hinges on whether the customers engaging in them are behaving passively, as traditional consumers, or actively, as prosumers.

1. The Net Metering Fiction

The first puzzle arises from prosumer sales of distributed generation back to the electricity grid and, specifically, from the use of net metering policies to govern such transactions. Net metering arose as a way of incentivizing the installation of distributed generation. Under net metering programs, prosumers are permitted to transmit excess energy generated by on-site systems back to the grid and receive a credit on their electricity bill for the amount provided.[62] Effectively, then, prosumers are compensated at the retail rate for electricity they sell to the grid. This rate is often significantly higher than what a utility would pay to purchase wholesale electricity from another source.[63]

The simplest statement of the jurisdictional problem is that prosumers whose self-generated electricity will flow back to the grid should technically be regarded as subject to federal jurisdiction under the FPA. As noted above, the FPA gives FERC jurisdiction over wholesale sales of energy in interstate commerce, which, in today's interconnected marketplace, typically means any sale for resale.[64] Energy generated on-site that exceeds a prosumer's requirements and flows back onto the grid becomes available for sale to another customer. It is thus technically a "sale for resale" that brings the prosumer within FERC jurisdiction.[65] For several reasons, however, subjecting these

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holding that states lacked authority to regulate interstate sales of electricity. The FPA was enacted to fill the gap. FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 767 (2016).

61. For a more thorough discussion, see Jacobs, *supra* note 3, at 891–94.

62. The Energy Policy Act of 2005 defines net metering as "service to an electric consumer under which electric energy generated by the electric consumer from an on-site generating facility and delivered to local distribution facilities may be used to offset electric energy provided by the electric utility to the consumer during the billing period." 16 U.S.C. § 2621.

63. For an argument that the net metering rate overcompensates customers for their electricity, see Benjamin Hanna, *FERC Net Metering Decisions Keep States in the Dark*, 42 B.C. ENVTL. AFF. L. REV. 133, 139 (2015).

64. *See* Fed. Power Comm'n v. Fla. Power & Light Co., 404 U.S. 453 (1972) (approving FERC's conclusion that an actor will be deemed to have transmitted energy in interstate commerce if it supplies energy into a system that sends any energy out of state). Given the interconnection of electricity grids in every state except for Texas, Hawaii, and Alaska, it is a fair presumption that the interstate commerce requirement is satisfied when an entity makes a sale for resale.

65. For an argument that FERC has erred in asserting jurisdiction over wholesale power sales of distributed generation for local consumption, see Frank R. Lindh & Thomas W. Bone Jr., *State Jurisdiction Over Distributed Generators*, 34 ENERGY L.J. 499 (2013).

prosumers to FERC jurisdiction does not make sense. First, FERC jurisdiction has the potential to trigger record keeping and filing requirements that would be burdensome for many prosumers (and especially for residential and small commercial prosumers).[66] In addition, FERC would be in the business of setting rates for compensation of distributed generation prosumers in myriad local jurisdictions nationwide. This is a task more efficiently and effectively performed by state utility commissions with knowledge of local facts and circumstances.

FERC has adopted a semantic solution to this problem. It has simply concluded that no "sale" has occurred unless a customer makes a *net* sale of energy back to the utility at the end of a billing period. FERC officially sanctioned this presumption in its *MidAmerican Energy Co.* decision, which concerned Iowa's net metering policy but implicitly blessed similar policies in at least twenty other states.[67]

In *MidAmerican*, FERC upheld an order by the Iowa Utilities Board directing a local utility to accept excess wind power produced by customers with small turbines and to credit those customers for the power.[68] By requiring the utility to give the customers a credit on their bill for the amount of energy that flowed back to the grid, the petitioners argued that the Iowa Board was setting the price for that energy. This, they concluded, was improper, since FERC, and not state regulators, had jurisdiction to set rates for these "sales for resale."[69]

FERC, however, disclaimed jurisdiction, finding that not "every flow of power constitutes a sale."[70] In this case, FERC determined that no rates for electricity sales were being set, as the utility only "paid" for net negative

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66. Under the FPA, any wholesale sale of electric energy in interstate commerce makes the seller a "public utility" subject to a variety of regulations under federal law. 16 U.S.C. §§ 824(e), 824(d). Most of these requirements may be waived, but only if each prosumer is certified as a "qualifying small power production facility" pursuant to 18 C.F.R. § 292.203 (2016). 18 C.F.R. §§ 292.601–602 (listing exemptions).

67. *Order Denying Request for Declaratory Order, MidAmerican Energy Co.*, 94 F.E.R.C. ¶ 61,340, at pp. 62,262–63 (2001). Some have argued that because the *MidAmerican* decision is adjudicatory rather than a general rulemaking, it provides insufficient certainty for other actors regarding jurisdiction over net metering programs. *See* Hanna, *supra* note 63, at 145. However, an agency's authority to create general policy via individual adjudications as well as through rulemaking is undisputed. SEC v. Chenery Corp., 332 U.S. 194, 202 (1947) (finding that forcing an agency to choose between rulemaking and adjudication for the formulation of general policy would "make the administrative process inflexible and incapable of dealing with many of the specialized problems which arise.").

68. 94 F.E.R.C. ¶ 61,340, at p. 62,261 n.3 (2001).

69. *Id*. at p. 62,263 n.7. The petitioners also raised a second, related problem. If the energy flowing back to the grid were regarded as a "sale," the rate for that energy should be set at the utility's avoided costs (or the price the utility would have paid to obtain that energy elsewhere) under the Public Utility Regulatory Policies Act of 1978 (PURPA). However, because FERC determined that no sale takes place unless there is a net sale at the end of the billing period, this argument too was unsuccessful. *Id.*

70. *Id.* at p. 62,263.

energy at the end of the billing period.[71] Therefore, only if there had been a net surplus of energy flowing from the customer to the utility at the end of the billing period would a true "sale"—and in this case, a sale for resale—have taken place.[72]

The net metering fiction helps to preserve the myth of the pure energy consumer.[73] The fiction is good policy because of the aforementioned costs of applying federal jurisdiction to net metering. However, in an ideal world, a legislative solution specifying state jurisdiction in this area would lend clarity to the status of prosumer activity. The fiction, by ignoring the reality that distributed generation prosumers are both purchasing and selling commodities and services in the electricity marketplace, minimizes the contribution of these new actors. Recognizing that contribution is the first step in analyzing whether the retail rate is the proper price to pay for electricity generated behind the meter. As will be discussed in more detail in subpart III.B, the answer to the pricing question requires more granular consideration of the value of the service provided and the grid resources that support such sales. The approach adopted by FERC in *MidAmerican* obscures that debate.

2. *The Demand Response Conundrum*

The confusion over whether certain retail customers are consumers or producers also animates a key jurisdictional disagreement between FERC and the states over demand response programs. This dispute goes to the very heart of the jurisdictional divide in the FPA. To understand the nature of the disagreement, it is necessary to know that the FPA, in addition to creating federal authority over wholesale electricity sales, also extended federal authority over "any rule, regulation, practice or contract affecting" wholesale rates.[74] This provision is consistent with the general principle that states control retail markets for electricity while FERC controls wholesale markets.

In 2008, FERC required in Order 719 that retail electricity customers be allowed to bid demand response commitments into wholesale markets through middlemen called aggregators.[75] Then, in 2011, FERC required wholesale

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71. *Id*. at p. 62,262. The case left open the question of what constitutes a reasonable netting period, holding only that the monthly billing cycle in this case qualified.

72. *Id*. at p. 62,263. *See also Declaratory Order, Sun Edison LLC*, 129 F.E.R.C. ¶ 61,146 at P 61,152 (2009) (using the same logic to find that a solar services company that owned and operated panels on customer rooftops made no "sale" to a utility unless a net transfer to the utility occurred at the end of a billing period).

73. The fiction becomes even more elaborate under "virtual net metering" schemes like California's, where multiple meters may be combined and netted out to produce the illusion that no sales to the utility are taking place. *See Virtual Net Metering*, CAL. PUB. UTILS. COMM'N, http://www.cpuc.ca.gov/General.aspx?id=5408 (last visited May 7, 2016).

74. 16 U.S.C. §§ 824d(a), 824e(a) (2012).

75. *Wholesale Competition in Regions with Organized Electric Markets*, 125 F.E.R.C. ¶ 61,071 at PP 53, 154 (2008). The order contained a caveat: state and local regulators could prohibit, by law or regulation, their own retail customers from participating in wholesale markets. *Id.*

market administrators to pay demand response prosumers the same rate for each unit of consumption they forego as generators are paid for each unit of electricity they produce.[76] This order, Order 745, was immediately challenged by traditional generators who stood to lose wholesale market share to demand response prosumers.[77] The challengers argued that FERC lacked jurisdiction under the FPA to promulgate the pricing rule because demand response "is a non-jurisdictional, retail non-purchase over which [the] Commission has no jurisdiction under Section 201(b) of the FPA."[78] FERC disagreed, finding that demand response in organized wholesale markets had a "direct effect on wholesale prices," thus bringing it within FERC jurisdiction.[79]

In this debate, much turns on how demand response, a service the drafters of the FPA never envisioned, is characterized. As described above, demand response consists of agreements by end-use customers to reduce electricity consumption in response to a price signal from the grid. Confusion is unsurprising, since the behavior in question—reducing consumption—does not fit neatly into either of the jurisdictional categories created by the FPA (retail or wholesale sales). Even FERC has been inconsistent in its descriptions of demand response: it initially characterized demand response as an actual sale of electric energy, but quickly backtracked.[80]

The two dominant understandings of demand response illustrate the confusion about the role of the modern energy prosumer. These opposing views were crystallized in the D.C. Circuit panel opinion in *EPSA v. FERC*, which vacated Order 745 by a two to one vote as impermissible regulation of the retail

76. *Demand Response Compensation in Organized Wholesale Markets*, 134 F.E.R.C. ¶ 61,187 at P 2 (2011). Again, FERC included a qualifier. Demand response resources would only be paid the market rate for their reductions where the demand response contributions were considered to be cost effective, as determined by a specified "net benefits" test. *Id.* at P 3.

77. *See* Joint Request for Rehearing of the Electric Power Supply Association, the American Public Power Association, the Electric Power Generation Association and the National Rural Electric Cooperative Association, at 2, Demand Response Compensation in Organized Wholesale Markets (2011) (Docket No. RM10-17-001), www.epsa.org/forms/uploadFiles/1C4F1000001C7.filename. FINAL_reh_g_of_DR_rule_on_jurisdictional_issues_(2).pdf (noting that the petitioners "are united by their grave concerns that the Commission has disregarded essential and fundamental statutory limits on the proper exercise of its jurisdiction.").

78. *Id.* at 3.

79. 125 F.E.R.C. ¶ 61,071 at P 10.

80. *See Removing Obstacles to Increased Electric Generation and Natural Gas Supply in the Western United States*, 94 FERC ¶ 61,272, at p. 61,972 (2001) (characterizing demand response transactions as sales for resale of energy). FERC's understanding of demand response has evolved in the interim, and it conceded in the *EPSA* litigation that "demand response is not a wholesale sale of energy; in fact, it is not a sale at all." Elec. Power Supply Ass'n v. FERC, 753 F.3d 216, 221 (D.C. Cir 2014), *rev'd*, 136 S. Ct. 760 (2016); 134 F.E.R.C. ¶ 61,187 at P 64 ("[T]he Commission does not view demand response as a resale of energy back into the energy market."). For an overview of the various jurisdictional theories supporting the Commission's position, see Jon Wellinghoff & David L. Morenoff, *Recognizing the Importance of Demand Response: The Second Half of the Wholesale Market Equation*, 28 ENERGY L.J. 389 (2007).

market.[81] The majority characterized demand response as involving "*retail* customers, their decision whether to purchase *at retail*, and the levels of *retail* electricity consumption."[82] The opinion found that there were two ways to induce customers to purchase less electricity: raise electricity prices or offer them an incentive not to consume. Because FERC could not do the former without intruding upon state authority, the majority reasoned, it could not do the latter.[83]

Essentially, the majority treated retail demand response resources as traditional consumers rather than prosumers. According to this view, energy customers have only one decision to make: whether or not to purchase a good or service. If everything the consumer does must be viewed through this lens, it makes sense to describe demand response as a decision to purchase less electricity. Thus, the majority found that demand response customers could not be wholesale market participants since they "'participate' in wholesale markets only by declining to act."[84]

However, energy market actors who offer demand response services are better understood as prosumers, since they both consume energy and produce grid services. While Senior Judge Edwards' dissent does not rely on the consumer/prosumer distinction explicitly, its repeated reference to demand response providers as "resources" implies their role as producers.[85] Because demand response seems to straddle areas of both FERC and state jurisdiction, there is no simple textual answer available to break the tie. As the dissent in *EPSA v. FERC* properly recognized, in cases of statutory ambiguity, a reasonable agency interpretation will prevail.[86] Because FERC had not clearly infringed on state authority over retail sales, and because demand response in wholesale markets falls within FERC jurisdiction over practices that "directly affect" those markets, the dissent would have upheld the rule.[87]

The failure to understand that consumers behave as producers in some scenarios led the panel majority to an erroneous conclusion about the scope of FERC's jurisdiction. The persistent disagreement about whether prosumers should be treated as consumers or producers when they provide demand

81. The panel's opinion, authored by Judge Brown and joined by Senior Judge Silberman, applying *Chevron v. NRDC,* 467 U.S. 837 (1984), found that FERC's interpretation of the FPA failed at *Chevron* Step 1, meaning that it was inconsistent with an unambiguous statutory provision. The opinion also found that, even if the statute were ambiguous, FERC's interpretation was so unreasonable as to fail *Chevron* Step 2. For good measure, the panel also found that, even if FERC had authority to set rates for demand response in wholesale markets, the rate it set would still be invalidated as arbitrary and capricious under 5 U.S.C. § 706(2)(A) (2012). Elec. Power Supply Ass'n v. FERC, 753 F.3d 216, 224 (D.C. Cir 2014) *rev'd*, 136 S. Ct. 760 (2016).

82. *Elec. Power Supply Ass'n*, 753 F.3d at 223 (emphases in original).

83. *Id.*

84. *Id.* at 221.

85. *Id.*, *passim*. As explained above in Part II, *supra*, demand response resources provide important capacity and ancillary services to the electricity grid.

86. *Id*. at 236 (citing Chevron v. NRDC, 467 U.S. 837 (1984)).

87. *Id.*

response services in wholesale markets was evident in the parties' briefs to the Supreme Court. EPSA argued that FERC had "sought to interfere with state and local regulation of retail transactions by redefining certain *retail customers'* decisions not to purchase energy at retail" as "equivalent to producing electric energy for sale at wholesale."[88] The government, by contrast, described participants in wholesale demand response markets as "resource[s]" and "market participant[s]," thereby placing them in the producer, as opposed to the consumer, camp.[89]

The Supreme Court reversed. Justice Kagan's majority opinion appeared to understand that this case concerned a new energy market actor—the prosumer—and that this new actor made traditional categories in the FPA more difficult to apply. Nomenclature is important, and the opinion referred to "demand response bidders" and "demand response providers" rather than "customers" or "consumers."[90] Rather than finding ambiguity in the FPA, however, the majority concluded that the plain meaning of the Act's text assigned exclusive jurisdiction over wholesale market pricing, including demand response pricing, to the federal government.[91]

B. Distributional Puzzles

Prosumers also create policy puzzles for regulators. The dominant puzzle concerns where to strike the balance between incentivizing prosumer contributions to the grid and ensuring that their participation does not unfairly shift costs onto traditional consumers. With respect to distributed generation, there are concerns that traditional customers are subsidizing prosumers' shares of fixed grid costs. In other cases, prosumer and traditional consumer interests might be aligned (sales of demand response in wholesale markets often fall into this category). In Order 745, FERC required that the wholesale price for demand response be set at a level equal to the price generators are paid for electricity.[92] FERC justified the order, in part, by citing the net benefits that would redound to all consumers in the form of lower wholesale prices and greater reliability.[93] However, the rule still raised questions of a different kind of distributional inequity—between demand response "prosumers" and traditional generators.

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88. Opening Brief of Petitioners Electric Power Supply Association, American Public Power Association, National Rural Electric Cooperative Association, Old Dominion Electric Cooperative and Edison Electric Institute at 3–4, Elec. Power Supply Ass'n v. FERC, 753 F.3d 216 (D.C. Cir. 2014) (No. 11-1486) (emphasis added). The term "retail customer" appears no fewer than six times on page four of the brief. *Id.*

89. Brief for Respondent Federal Energy Regulatory Commission at 28, Elec. Power Supply Ass'n v. FERC, 753 F.3d 216 (D.C. Cir. 2014) (No. 11-1486).

90. *See, e.g.*, FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 774 (2016).

91. *Id*. at 782.

92. *See Demand Response Compensation in Organized Wholesale Markets*, 134 F.E.R.C. ¶ 61,187 at P 2 (2011).

93. *See Elec. Power Supply Ass'n*, 136 S. Ct. at 762.

1. Pricing Distributed Generation: The Problem of Cross-Subsidization

State regulators have increasingly offered incentives for customer self-generation. However, they have struggled with setting the correct price for power that these prosumers sell back to the grid. The primary concern here is cross-subsidization, the idea that traditional consumers may be paying higher prices to subsidize payments to prosumers. As New York regulators acknowledged in adopting a plan to remake the state's electricity system, "the trend toward affordability of self-generation threatens to create an unacceptable gap between those who can choose to leave the grid and those who cannot . . . ."[94]

As previously noted, most states offer distributed generation prosumers some version of a net metering program.[95] Under net metering, prosumers receive a credit on their electricity bill for the amount of energy they produce that flows back onto the grid. In essence, they are compensated at the full retail rate for any energy they produce that exceeds their own needs. While this rate provides generous compensation to prosumers, monetary incentives were considered necessary to overcome cost barriers early in the development of distributed generation systems.

Recently, however, with the rapid expansion of distributed generation, utilities, along with interest groups representing traditional producers and sometimes, traditional consumers, have begun to seek state public utility commission review of net metering schemes.[96] One concern is that these rates may create distributional inequities in the form of cross-subsidization. Cross-subsidization concerns arise primarily from the problem of allocating a utility's fixed costs, which are those costs that remain constant notwithstanding the level of electricity consumed in the short term. They can include the cost of debt and equity, infrastructure maintenance, and payroll charges.[97] In a typical

94. Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 2, 25 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101) (placing special emphasis on growing solar PV installations that "could place an inequitable burden on customers that are not able to own or install PV").

95. *See* Solar Energy Indus. Ass'n, *Net Metering*, http://www.seia.org/policy/distributed-solar/net-metering (last visited July 3, 2016) (identifying net metering programs in forty-three states and the District of Columbia).

96. In California, for example, the public utilities commission elected to retain the basic net metering structure but to incorporate additional fees for solar customers to help pay for fixed grid costs. *See* Decision Adopting Successor to Net Energy Metering Tariff, 2–3 (Cal. Pub. Utils. Comm'n Jan. 28, 2016) (Rulemaking 14-07-002). By contrast, in Nevada, state regulators elected to lower compensation rates for net metering while increasing fixed charges. Application of Nev. Power Co. d/b/a NV Energy for Approval of a Cost-of-Service Study and Net Metering Tariffs, ¶¶ 329–33 (Pub. Utils. Comm'n of Nev. Feb. 16, 2016) (No. 15-07041). For a discussion of the political dynamics of these proceedings, see Ari Peskoe, *Wired for Competition: Perspectives on the Conflict Between Rooftop Solar and Electric Distribution Utilities* at Part III.B (on file with author).

97. *See* NAT'L ASS'N OF REGULATORY UTIL. COMM'RS, DECOUPLING FOR ELECTRIC & GAS UTILITIES: FREQUENTLY ASKED QUESTIONS 2 n.1 (2007), http://pubs.naruc.org/pub/536EF203-2354-D714-51DC-D6E578C43238. In a recent report, Lisa Wood and Robert Borlick identified a set of benefits that these prosumers receive from the grid and established a methodology for calculating them.

utility pricing scheme, these costs are recovered through some combination of fixed charges and usage-based (or "volumetric") charges (the charge per kilowatt-hour of electricity). Under such a scheme, as prosumers consume fewer kilowatt-hours, they may no longer be paying what some would consider their equal share of fixed costs.[98] Those costs will be allocated among the utility's remaining (traditional) consumers.[99]

This cross-subsidization problem has sometimes been discussed in the context of the so-called utility "death spiral." In a death spiral scenario, price increases transferred to remaining traditional consumers cause some of those customers to "exit" the grid themselves through self-generation. Their departure, in turn, results in an increase in costs shouldered by those left behind, prompting further departures. Some have argued that this pattern will ultimately leave the utility without sufficient customers to recover its fixed costs.[100] Others argue that this apocalyptic scenario is unlikely to occur, at least in the near term.[101]

Even if concerns about the death spiral are overblown, which seems likely, the cross-subsidization problem is real. These concerns are particularly pronounced in states with ambitious distributed generation targets. In Hawaii, where the public utility commission aims to triple the existing amount of rooftop solar by 2030, there are worries that fixed-cost shifts between solar customers and those without solar will increase.[102] Similarly, researchers at

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LISA WOOD & ROBERT BORLICK, VALUE OF THE GRID TO DG CUSTOMERS 2–3 (2013). The authors pointed to fixed costs associated with transmission, distribution, and generation capacity, as well as the costs of ancillary and balancing services as the primary costs to which distributed generation customers should contribute. *Id.*

98. This problem is particularly pronounced in utilities in California, where most revenue is collected via usage-based charges. *See* Severin Borenstein, *What's so Great about Fixed Charges*, ENERGY INST. AT HAAS (Nov. 3, 2014), https://energyathaas.wordpress.com/2014/11/03/whats-so-great-about-fixed-charges/.

99. STEVE KIHM & JOE KRAMER, ENERGY CTR. OF WIS., THIRD-PARTY DISTRIBUTED GENERATION: ISSUES AND CHALLENGES FOR POLICYMAKERS 2 (2014). Some of these costs are actually avoided by the utility (for example, the fuel costs saved by not producing extra units of electricity), while others may not be. *Id.*

100. For an article describing the threat of the "death spiral" and its potential to transform the utility business model, see Elisabeth Graffy & Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*, 35 ENERGY L.J. 1, 31 (2014).

101. *See* David Raskin, *Getting Distributed Generation Right: A Response to "Does Disruptive Competition Mean a Death Spiral for Electric Utilities?",* 35 ENERGY L.J. 263, 266 (2014) (predicting, however, that distributed generation will present fairness issues due to cross-subsidization). A new report sponsored by the Department of Energy concludes that coupling distributed generation with the adoption of time of use rates will mitigate the potential for a "death spiral." NAÏM R. DARGHOUTH ET AL., NET METERING AND MARKET FEEDBACK LOOPS: EXPLORING THE IMPACT OF RETAIL RATE DESIGN ON DISTRIBUTED PV DEPLOYMENT 20–21 (2015). *See also* Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 San Diego J. Climate & Energy L. 115, 121-25 (2015) (surveying efforts to slow or halt the "death spiral").

102. Haw. Elec. Co., *Hawaiian Electric Companies Propose Plan to Sustainably Increase Rooftop Solar* (Jan. 20, 2015), https://www.hawaiianelectric.com/hawaiian-electric-companies-propose-plan-to-sustainably-increase-rooftop-solar. However, Hawaii's Public Utilities Commission voted late last year to end its net metering program for new customers, electing instead to compensate solar customers at a

Stanford's Hoover Institution concluded that California's existing rate design "means that rising [utility] costs in the residential sector are set to fall on a narrow base of customers whose incomes and consumption exceed rate protection but who do not install rooftop PV panels."[103] These cross-subsidies present special concerns, according to the report, because of the income profiles of those installing distributed generation. "A wealthier-than-average home-owning [Investor Owned Utility] customer," the report suggests, "can use [net energy metering] to shift from being a net-subsidizer of residential retail costs to a net-subsidy beneficiary."[104]

Some utilities have already taken steps to recover fixed costs from prosumers in their service area. Last year, Arizona's largest electric utility filed a request with the Arizona Corporation Commission to charge distributed solar customers $50–100 for grid power or else reduce the rate for any power that prosumers sell back to the grid.[105] The Arizona Commission approved a monthly interim adjustment charge of $0.70 per kilowatt of installed solar capacity,[106] but plans to review the issue in a new proceeding to calculate the costs and benefits of distributed solar.[107]

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fixed rate. Haw. Elec. Co., *Public Utilities Commission Approves New Rooftop Solar Programs* (Oct. 13, 2015), https://www.hawaiianelectric.com/public-utilities-commission-approves-new-rooftop-solar-programs.

103. JEREMY CARL ET AL., HOOVER INST. AT STANFORD UNIV., RENEWABLE AND DISTRIBUTED POWER IN CALIFORNIA 16 (2013).

104. *Id.* at 18. California has made several modifications to its programs to address these potential disparities. *See* Decision Adopting Successor to Net Energy Metering Tariff, 2–3 (Cal. Pub. Utils. Comm'n Jan. 28, 2016) (Rulemaking 14-07-002) (imposing minimum bill and other charges on net energy metering customers and requiring that they subscribe to time-of-use rates that would value electricity differently at different times of day). New York has also acknowledged the demographic dimension of cost-shifting. A new regulatory framework adopted by the state's public service commission notes the concern that there will be an "unacceptable gap in the quality and price of electric service" between "businesses and more affluent residential customers," who will reap the benefits of distributed energy resources, and "lower income customers," who will not. Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 28 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101).

105. The utility, Arizona Public Service Company, later withdrew its request after the Commission agreed to conduct a full value-of-solar investigation. Herman K. Trabish, *Arizona Gears Up for Full Cost-Benefit Solar Value Proceeding,* UTILITYDIVE (Nov. 2, 2015), http://www.utilitydive.com/news/arizona-gears-up-for-full-cost-benefit-solar-value-proceeding/408375/; *see also* William Pentland, *Escalating Fear of Disintermediation Fuels Utility Backlash Against Distributed Energy*, FORBES (Jul. 16, 2013, 2:11 PM), http://www.forbes.com/sites/williampentland/2013/07/16/escalating-fear-of-disintermediation-fuels-utility-backlash-against-distributed-energy/#b38dd69617d1.

106. *In re* Ariz. Pub. Serv. Co.'s Application for Approval of Net Metering Cost Shift Solution, 29 (Ariz. Corp. Comm'n Dec. 3, 2013) (Docket No. E-01345A-13-0248).

107. Memorandum from Steven M. Olea, Director, Utilities Division, on the Request for a New Docket - Value and Cost of Redistributed Generation (Including Net Metering) to Docket Control (Jan. 24, 2014), http://images.edocket.azcc.gov/docketpdf/0000150979.pdf. While solar supporters and utilities seemed determined to resolve this issue at the ballot box via competing initiatives, Arizona's governor brokered a deal in May that would send the matter to mediation. Herman K. Trabish, *Inside the Deal That Averted a Net Metering Ballot Showdown in Arizona*, UTILITYDIVE (May 3, 2016), http://www.utilitydive.com/news/inside-the-deal-that-averted-a-net-metering-ballot-showdown-in-arizona/418392/.

Other states have opted for a blunter approach. In a series of decisions in 2014, the Wisconsin Public Service Commission allowed new fixed charges for *all* utility customers, in some cases amounting to a more than 80 percent increase in that portion of customers' bills.[108] The rate increase was clearly aimed at distributed generation prosumers, with one Commission order citing an obligation to "customers who do not want to or who cannot afford to own generation to make sure these customers are not subsidizing the costs for those who choose to and are able to own their own generation."[109]

Unfortunately, the Wisconsin Commission's decision had the perverse consequence of making some traditional consumers noticeably worse off. In an attempt to make traditional consumers whole, the fixed charge increases were offset by a reduction in volumetric, per kilowatt-hour charges. However, this adjustment did little to undo the punitive nature of the fixed charge increase and was of little consolation to lower-consumption, traditional customers, who also tend to be lower income.[110] Shifting more charges to fixed costs may have special benefits for utilities, in that it reduces their risk exposure, but it may worsen any distributional inequities by forcing low-income, low-consumption utility customers to bear a disproportionate share of the utility's fixed costs.[111] Despite the controversy surrounding Wisconsin's program, other states are considering similar moves.[112]

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108. Other utilities are proposing a more targeted approach. The Intermountain Rural Electric Association in Colorado approved a new demand charge for solar customers based only on their monthly peak demand, and has noted that the move is in response to its concern about shifting costs from its growing solar customer base to non-solar customers. Cathy Proctor, *Colorado Power Co-Op OK's New Charge Aimed at Solar Power Customers*, DENVER BUS. J. (Oct. 7, 2015 9:45 AM), http://www.bizjournals.com/denver/blog/earth_to_power/2015/10/irea-approves-new-electricity-charge-aimed-at.html.

109. Application of Wis. Pub. Serv. Corp. for Auth. to Adjust Elec. & Natural Gas Rates, 44 (Pub. Serv. Comm'n of Wis. Dec. 18, 2014) (Docket 6690-UR-123).

110. See Jeffrey Tomich, *Wisconsin Fixed-charge Decision a Sign of More to Come*, MIDWEST ENERGY NEWS (Nov. 11, 2014), http://midwestenergynews.com/2014/11/11/wisconsin-fixed-charge-decision-a-sign-of-more-to-come/. The Wisconsin Commission's response to this point, raised in comments by the Citizens Utility Board on the proposed increases, was merely to posit that low-income customers do not necessarily have the lowest usage profiles and suggest that, in any case, "the total dollar bill impact of these changes is relatively small." Application of Wis. Pub. Serv. Corp. for Auth. to Adjust Elec. & Natural Gas Rates, 46 (Pub. Serv. Comm'n of Wis. Dec. 18, 2014) (Docket 6690-UR-123).

111. A further problem with this approach is that it discourages energy savings, since volumetric charges are lowered and fixed charges apply regardless of consumption level.

112. The Missouri Public Service Commission is currently considering two proposals to increase the fixed cost component of customer bills. Karen Uhlenhuth, *As in Wisconsin, Missouri Utilities Seek to Raise Fixed Charges*, MIDWEST ENERGY NEWS (Jan. 6, 2015), http://midwestenergynews.com/2015/01/06/as-in-wisconsin-missouri-utilities-seek-to-raise-fixed-charges/. At least one such proposal would also include an increase in volumetric charges. *Id.* For an overview of related state policy debates, see Nate Larsen, *Distributed Generation Rate Reform Around the U.S.*, GREEN ENERGY INST., LEWIS & CLARK L. SCH. (Oct. 1, 2014), https://law.lclark.edu/live/news/28070-distributed-generation-rate-reform-around-the-us. California has proposed a less problematic alternative: a minimum monthly charge. Utilities will be permitted to implement such a minimum monthly charge as opposed to a fixed cost adder. *See* Jeff St. John, *Breaking: California Reaches Compromise on Utility Residential Rate*

Complicating the picture further, the system effects of distributed generation may be directly or indirectly beneficial to traditional consumers.[113] Distributed generation has the potential to reduce peak loads, thus lowering electricity costs system wide. Similarly, distributed generation can improve the quality and reliability of power by providing ancillary services such as voltage support and reactive power.[114] In addition, by providing localized power sources, distributed generation can reduce the vulnerability of the electricity grid to outages and disruptions.[115]

Recognizing these advantages, some states have sought to address the costs and benefits of distributed generation in a more holistic manner. Minnesota, for example, has developed a "value of solar tariff" for distributed solar prosumers.[116] The Minnesota Public Utilities Commission was charged by statute with developing a methodology to "account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value."[117] Any such rate, the statute continued, must address distributional equities by "includ[ing] a mechanism to allow recovery of the cost to serve customers receiving the alternative tariff rate."[118]

In its order pursuant to the aforementioned statute, Minnesota's Commission emphasized the distributional concerns motivating its efforts, noting that "[a] correctly calculated Value of Solar should compensate solar PV customers in a way that does not advantage or disadvantage them relative to other customers or other forms of generation."[119] One goal of the value of solar methodology, as articulated by the chair of the Minnesota Commission, was "to separate [incentive programs] from the rate" and "to assure that customers who are not solar participants were not bearing costs for those who were."[120] If the

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Reform, GREENTECH MEDIA (July 3, 2015), http://www.greentechmedia.com/articles/read/Breaking-California-Reaches-Compromise-on-Utility-Residential-Rate-Reform.

113. Amory Lovins has documented more than 200 benefits of distributed generation, many of which operate to the advantage of all system users rather than prosumers alone. AMORY LOVINS ET AL., SMALL IS PROFITABLE 108 (2002).

114. DEPT. OF ENERGY, THE POTENTIAL BENEFITS OF DISTRIBUTED GENERATION AND RATE-RELATED ISSUES THAT MAY IMPEDE THEIR EXPANSION, at iii (2007).

115. *Id.*

116. According to the Chair of the Commission, the methodology was generated through a "very open stakeholder process, where the engineers, from the utilities, from the renewable energy sector, the national labs and others, came together to help inform that conversation and develop a methodology." Beverly Jones Heydinger, Chairman, Minn. Pub. Utils. Comm'n, Panel III Discussion Before the Public Utilities Commission of Colorado on Consideration of Retail Renewable Distributed Generation and Net Metering, Docket No. 14M-0235E, at 7 (Dec. 1, 2014) (transcript available at https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_fil=G_351042&p_session_id=).

117. MINN. STAT. § 216B.164 (2013).

118. *Id.*

119. *In re* Establishing a Distributed Solar Value Methodology under Minn. Stat. § 216B.164, subd. 10(e) and (f), Order Approving Solar Value Methodology, 1 (Minn. Pub. Utils. Comm'n Apr. 1, 2014) (Docket No. E-999/M-14-65) [hereinafter MPUC VOS Order].

120. Heydinger, *supra* note 116, at 41.

value is calculated correctly,[121] it will offer distributed solar prosumers a price for their generated electricity that reflects the benefits it provides to the grid, without providing a subsidy paid for by traditional consumers.[122]

2. *Pricing Demand Response*

In other electricity pricing arenas, prosumer and traditional consumer interests appear to be aligned. One such case is rate setting in wholesale demand response markets. Pricing for these services has been a contentious issue, with opponents of more generous rates invoking distributional arguments. As discussed above, customers seeking compensation for their commitments to reduce electricity usage might sell those commitments in one of two places—retail markets or wholesale markets. From the prosumer's perspective, there are two drawbacks to retail market participation. First, not all local utilities offer demand response programs, and many of those that do focus program offerings on larger commercial and industrial, as opposed to residential, customers.[123] Second, retail market compensation for demand response is uneven and is almost always lower than wholesale market compensation.[124]

By contrast, all organized wholesale markets must provide an opportunity for retail customers to participate in demand response programs.[125] Wholesale

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121. The final methodology incorporates the value of benefits ranging from avoided fuel and plant costs, avoided transmission and distribution costs, and avoided environmental costs. MPUC VOS Order, *supra* note 119, at 7. The Order did not, however, include the value of distributed solar as a socioeconomic driver, explaining that this component was too difficult to price. Heydinger, *supra* note 116, at 32. The integration costs of solar energy are subtracted from its total value. MPUC VOS Order, *supra* note 119, at 7.

122. Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 28 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101) ("the rate designs . . . will need to reflect: the value of the grid service to customers with [distributed energy resources] . . . and the value that [distributed energy resources] can provide to the grid.").

123. *See* BHARVIRKAR, *supra* note 53, at 9 (finding that fewer than half of load-serving utilities in the Southwest Power Pool offered demand response programs). In 2008, 72 percent of available demand response programs in the Midwestern Independent System Operator coordinating region were for large commercial and industrial customers only. RANJIT BHARVIRKAR ET AL., LAWRENCE BERKELEY NAT'L LAB., COORDINATION OF RETAIL DEMAND RESPONSE WITH MIDWEST ISO WHOLESALE MARKETS 11 (2008).

124. Even in areas of the country with better-developed retail demand response programs, such as California, utility retail demand response compensation can be as low as fifty cents per kilowatt-hour not consumed. *Demand Response Programs Overview*, S. CAL. EDISON, https://www.sce.com/wps/wcm/connect/8a509cd9-bfa1-4c07-9817-ac86156b2f1b/25231_SCE_DR_Broch_WCAG-R5.pdf? MOD =AJPERES, at 4 (last visited July 4, 2016). In areas where no additional incentive is provided for the reduction of electricity usage, customers still save the price of the electricity itself by electing to conserve. However, because retail electricity prices are still maintained at artificially low levels in many areas of the country due to rate caps, and are not allowed to fluctuate with the actual cost of that electricity, prices alone often provide an inadequate incentive to reduce usage.

125. *Wholesale Competition in Regions with Organized Electric Markets*, 125 F.E.R.C. ¶ 61,071 at P 3 (2008) (requiring that organized wholesale markets allow bids from aggregators of retail customer demand response). While there is uncertainty surrounding the decision's applicability pending review of

markets are a decidedly more lucrative arena than their retail counterparts for demand response prosumers. This is because, in Order 745, FERC determined that prosumers selling demand response into organized wholesale markets should be compensated at the same level as generation resources.[126] In other words, demand response prosumers would receive the same price per megawatt of power foregone as traditional generation resources would receive for each megawatt of power produced and inputted onto the grid. That amount is determined by the market price in a given location, otherwise known as the locational marginal price (LMP), and can range from less than fifty dollars per megawatt-hour during off-peak times to hundreds of dollars at times of peak usage, when demand response is typically most needed.[127]

Advocates of the LMP approach for wholesale demand response, including a majority of FERC commissioners, made three primary arguments, all of which were based on demand response's ability to help balance supply and demand in wholesale markets. First, supporters argued that, by eliminating energy shortages, demand response kept the wholesale price of energy much lower at times of peak usage.[128] Relatedly, they argued that demand response, by competing with traditional generation resources, prevented those generators from exercising market power that could drive up the wholesale price of energy.[129] Third, they claimed that, by helping to ensure that demand does not exceed supply, demand response resources supported the reliability of the electricity grid.[130]

If these claims are correct, then in the demand response context, traditional consumers' interests may be aligned with those of prosumers. All of these effects could operate to the benefit of traditional electricity consumers by keeping electricity prices low and by keeping the lights on. Multiple studies

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the order by the Supreme Court next term, FERC has required at least one Independent System Operator, PJM Interconnection, to include demand response in its upcoming capacity auction. *Order Denying Request for Clarification, Granting in Part Request for Rehearing, Granting in Part Complaint, And Directing Compliance Filing*, 152 F.E.R.C. ¶ 61,064 at PP 33, 41 (2015).

126. Energy markets stand in contrast to capacity markets, where commitments to provide energy rather than the energy itself are sold. Demand response resources may participate in both markets, and although the D.C. Circuit's opinion in Elec. Power Supply Ass'n v. FERC, 753 F.3d 216, 218, 225 (2014) considered only jurisdiction and pricing in energy markets, the logic of its holding likely extends to capacity markets as well.

127. Individual regional transmission organizations and independent system operators produce real-time maps of the LMP in their service territories. *Wholesale Power Price Maps Reflect Real-Time Constraints on Transmission of Electricity*, U.S. ENERGY INFO. ADMINISTRATION (last updated July 24, 2014), http://www.eia.gov/todayinenergy/detail.cfm?id=3150.

128. *Demand Response Compensation in Organized Wholesale Markets*, 134 F.E.R.C. ¶ 61,187 at P 10 (2011).

129. *Id.*

130. *Id.* Reliability is the touchstone of our electricity system, since both the economic and noneconomic costs of outages can be staggering. *See, e.g.*, KRISTINA HAMACHI LACOMMARE & JOSEPH H. ETO, LAWRENCE BERKELEY NAT'L LAB., UNDERSTANDING THE COST OF POWER INTERRUPTIONS TO U.S. ELECTRICITY CONSUMERS, at xii (2004) (estimating annual outage costs in the United States at $79 billion).

support this finding by concluding that the social welfare gains resulting from electric load curtailment exceed any subsidies to demand response resources.[131]

But the LMP approach, and the likely increase in demand response resources bid into wholesale markets as a result, are not neutral from a distributional perspective. The extra cost of paying demand response prosumers the LMP for their reductions must be recouped somewhere. FERC has attempted to distribute the costs of demand response among those benefitting from its provision: wholesale market customers (primarily electric utilities, competitive power providers, and electricity marketers) in the areas where wholesale prices were lowered as a result of demand response participation.[132] FERC included a safety valve in its final rule, requiring payment of the LMP to demand response resources only when "the overall benefit of the reduced LMP that results from dispatching demand response resources exceeds the cost of dispatching and paying LMP to those resources."[133]

Given this safety valve, advocates suggest that wholesale demand response simply increases the size of the "pie," with everyone, or at least all consumers and prosumers, better off than if no demand response were allowed in wholesale markets. However, others take a less rosy view. The primary criticism of equal compensation for demand response resources in wholesale markets is that it results in a windfall for those prosumers.[134] That windfall, the argument goes, is produced at the expense of both traditional retail consumers and traditional generators.

According to critics, the correct price for demand response in wholesale markets is the LMP *minus* the retail cost of each megawatt-hour of electricity that the prosumer is not consuming (typically represented as "G"). Supporters of the LMP minus G method argue that the consumer already saves the retail cost of a unit of energy by declining to consume it. Those savings should therefore be subtracted from the price the customer receives in order to provide the correct economic incentive to reduce consumption.[135] However, a majority

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131. *See* Rahul Walawalkar et al., *An Economic Welfare Analysis of Demand Response in the PJM Electricity Market*, 36 ENERGY POL'Y 3692, 3699 (2008) (analyzing the economic properties of the economic demand-response program and finding that the social welfare gains exceed the total annual subsidy payments).

132. 134 F.E.R.C. ¶ 61,187 at PP 99–102.

133. *Id.* at P 3.

134. *See* FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 773 (2016).

135. *See* Brief of Robert L. Borlick et al. as Amici Curiae in Support of Respondents at 4, FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760 (2016) (No. 14-840); *see also* William W. Hogan, HARV. UNIV. JOHN F. KENNEDY SCH. OF GOV'T, DEMAND RESPONSE PRICING IN ORGANIZED WHOLESALE MARKETS 5 (2010); *see also* Richard J. Pierce, Jr., *A Primer on Demand Response and a Critique of FERC Order 745*, 3 GEO. WASH. J. ENERGY & ENVTL. L. 102, 104–05 (2012).

Some commentators, notably Professor Richard Pierce, have acknowledged that the full benefits of demand response might be higher than price alone can reflect. This is because demand response, which displaces carbon-producing sources of electricity, may have significant positive environmental externalities. But Pierce cautions that incorporating a social cost of carbon analysis into demand response pricing formulas, for instance, might be prohibitively complicated. Richard Pierce, *A Primer on Demand Response and a Critique of FERC Order 745*, J. ENERGY & ENVTL. L. 102, 106-07 (2012);

of FERC commissioners rejected the LMP minus G approach, finding that LMP more accurately reflected the marginal value of demand response.[136]

If critics are correct, and demand response resources are overcompensated under FERC's pricing formula, the ultimate cost to traditional consumers may be higher than anticipated. Even if traditional consumers ultimately benefit from lower wholesale prices, they may bear additional fixed costs as a result of prosumer participation in both retail and wholesale demand response programs. This state of affairs is worsened if demand response prosumers signal that they plan to consume more energy than they actually require.[137] They could then sell a commitment not to use this surplus energy into the wholesale energy market and be compensated accordingly. In the meantime, the local utility would already have made the necessary investments to supply the prosumer's purported needs. This could lead to uneconomic investments in new generation and transmission capacity, all of which would be subsidized by the utility's ratepayers as a whole.

When the D.C. Circuit invalidated FERC's pricing rule in *EPSA v. FERC*,[138] the majority relegated the pricing discussion to the penultimate paragraphs of the opinion. Relying primarily on the arguments made by Commissioner Moeller in his dissent from Order 745, the panel declined to "delve . . . into the dispute among experts," but found that "the potential windfall to demand response resources seem[ed] troubling" and that the Commission had not adequately explained why the LMP scheme resulted in "just compensation."[139]

The Supreme Court, however, upheld FERC's election of LMP as reasonable.[140] Unlike the D.C. Circuit, it emphasized the narrow scope of its review of FERC action, especially in a technical area like ratemaking.[141] Here, the Court was satisfied with FERC's response to concerns about overcompensation of demand response resources.[142] While debates about overcompensation will undoubtedly continue, the legality of the wholesale market rate structure at least has now been confirmed.

see also 134 F.E.R.C. ¶ 61,187 at P 33 (citing the comments of the Environmental Defense Fund and the American Clean Skies Foundation).

136. *Demand Response Compensation in Organized Wholesale Markets*, 137 F.E.R.C ¶ 61,215 at P 63 (2011).

137. *See* Brief for Respondents Midwest Load-Serving Entities at 11, FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760 (2016) (No. 14-840) (noting that load-serving entities will be forced to procure "generation capacity that will turn out to have been unnecessary whenever the customer chooses to submit a demand response bid into the wholesale energy market and that bid is accepted").

138. Elec. Power Supply Ass'n v. FERC, 753 F.3d 216, 225 (D.C. Cir. 2014).

139. *Id.*

140. *Elec. Power Supply Ass'n*, 136 S.Ct. at 764–65.

141. *Id.* at 782.

142. *Id.* at 783.

C. Democracy Puzzles

If prosumers are to be regulated fairly, they, like regulated industry and traditional consumers, must have a voice in the regulatory process. Prosumer participation in policy formation is desirable for three primary reasons. All are widely recognized justifications for inclusiveness in administrative processes generally.[143]

The first reason is democratic in its pedigree. Some commentators have taken the position that administrative governance can be justified only or primarily through stakeholder participation.[144] In particular, proponents of a civic republican understanding of the administrative state argue that internal administrative rules and structures, as well as doctrines governing external review of administrative decisions, should be calibrated to enable deliberative decision making within the agency.[145] According to this understanding of democratic legitimacy, internal agency processes are fair only insofar as they permit participation by all stakeholders.[146] Citizens can oversee and engage with regulatory policy making by, for example, participating in the notice and comment process on regulations, speaking at agency hearings, and negotiating directly with administrative personnel. A more inclusive decision-making process has the additional advantage of making it harder for industry groups to "capture" their regulators.[147]

For the bureaucracy to function as a democracy in microcosm, however, all affected stakeholders must have a voice in the process. Indeed, one of the pillars of civic republicanism is its rejection of competitive pluralism in favor of inclusive, consensus-based decision making.[148] As Professor Mark Seidenfeld has noted, for such a process to succeed, "[r]epresentatives of all interests potentially affected by a government action must have meaningful

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143. Professor Jacob Gersen captured the need for inclusiveness succinctly when he explained that "notice and comment rulemaking serves both technocratic and democratic aims." Jacob E. Gersen, *Legislative Rules Revisited*, 74 U. CHI. L. REV. 1705, 1714 (2007).

144. *See, e.g.,* Cass Sunstein, *Interest Groups in American Public Law*, 38 STAN. L. REV. 29, 67–68 (1985).

145. *See* Seidenfeld, *supra* note 10, at 1547. *See also* Gersen, *supra* note 143, at 1714 ("Indeed, rulemaking is taken by some to replicate a variant of the deliberative exchange to which Congress might aspire.").

146. *See* Seidenfeld, *supra* note 10, at 1514 ("Modern civic republicans view the Constitution as an attempt to ensure that government decisions are a product of deliberation that respects and reflects the values of all members of society.").

147. On the problem of capture generally, see Gary Becker, *A Theory of Competition Among Pressure Groups for Political Influence*, 98 Q. J. ECON. 371 (1983); George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971). According to the classic statement of the problem, the quantity and design of government regulation are heavily influenced by regulated industry. *Id.* at 3. James Landis noted this problem in his report on regulatory agencies to President-elect Kennedy when he warned that agencies had adopted an "industry orientation" in response to constant pressures from regulated firms. JAMES M. LANDIS, REPORT ON REGULATORY AGENCIES TO THE PRESIDENT-ELECT 51 (1960).

148. *See* Seidenfeld, *supra* note 10, at 1514.

opportunities to engage in discussion about the action."[149] To the extent that prosumers are not part of the regulatory dialogue at FERC and at state public utility commissions, important interests are not being represented.

A more instrumental reason for valuing participation by a diverse group of stakeholders, including prosumers, is to ensure buy-in and reduce the chance of *ex post* challenges to agency decisions (which are expensive in terms of time and other agency resources). This desire to avoid delay and expense was one of the primary justifications for the creation of negotiated rule-making procedures, in which stakeholders interact with regulators early in the rule-making process to share information, resolve disputes, and reach consensus on a proposed rule.[150]

The third reason to include prosumers in administrative decision making is similarly instrumental, although its immediate concern is substantive rather than procedural. It is that stakeholder input and inclusive deliberation produce higher quality decisions. Stakeholders bring new perspectives on a problem and often provide better information than the agency could collect on its own.[151]

There are several reasons to think that prosumer representation in regulatory proceedings might fall short of the ideal. While a few prosumers are large companies with considerable political heft, most are individuals or small companies who are unlikely, on an individual basis, to influence key decision makers.[152] While it is possible that such individuals could achieve greater

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149. *Id.* at 1530.

150. *See, e.g.*, Lawrence Susskind & Gerard McMahon, *The Theory and Practice of Negotiated Rulemaking*, 3 YALE J. ON REG. 133, 136-37 (1985).

151. For a sampling of the literature on this point, see Marc B. Mihaly, *Citizen Participation in the Making of Environmental Decisions: Evolving Obstacles and Potential Solutions Through Partnership with Experts and Agents*, 27 PACE ENVTL. L. REV. 151, 157 (2010) ("Public participation . . . provides new and valuable factual, theoretical or legal input to these technocratic decision-makers, input which they could not obtain through the exercise of their own expertise."); Stephanie Tai, *Three Asymmetries of Informed Environmental Decisionmaking*, 78 TEMP. L. REV. 659, 678–82 (2005) (noting that the public might provide scientific information to the agency and/or might use participatory mechanisms to prod the agencies to conduct additional research).

152. Agencies may be less receptive to comments from individuals. Then-Professor, now California Supreme Court Justice Mariano-Florentino Cuéllar discovered, for example, that in a PATRIOT Act rulemaking involving the exchange of information between financial institutions and law enforcement, over 70 percent of comments on the draft proposal came from individuals concerned about civil liberties, but the agency addressed only comments from businesses and their representatives in the final rule. Mariano-Florentino Cuéllar, *Notice, Comment and the Regulatory State: A Case Study from the USA PATRIOT Act*, 28 ADMIN. & REG. L. NEWS 3, 4 (2003).

While the advent of e-rulemaking may have streamlined the comment submission process and resulted in an increased volume of comments from individuals, these are often perfunctory or boilerplate "mass comments" solicited by public interest organizations that are given little attention by those responsible for drafting regulations. *See* Nina A. Mendelson, *Rulemaking, Democracy, and Torrents of E-Mail,* 79 GEO. WASH. L. REV. 1343, 1371 (2011) (noting that agencies are unlikely to be responsive to "policy" as opposed to "technical" comments from individuals and expressing concern about the implications of this observation for democratic responsiveness); Cynthia R. Farina et al., *Rulemaking vs. Democracy: Judging and Nudging Public Participation that Counts*, 2 MICH. J. ENV'T. & ADMIN. L. 123, 131 (2012) (suggesting that agencies are unlikely to give much attention to mass comments because they are assumed to suffer from defects in reasoning).

influence by pooling their resources, individual interest in particular regulatory outcomes is often not great enough to justify the costs of organized representation.[153] This is likely to be true for most prosumers, since their activities in energy markets are almost always subsidiary to their primary occupations and interests. For residential customers who generate their own electricity or offer demand response services, personal and professional pursuits are likely to take precedence over participation in regulatory processes. Even for larger participants such as universities and hospitals, distributed generation or demand response program participation is likely to be undertaken only if it can be done without a significant investment in time and personnel. Harvard University participates in demand response programs sponsored by ISO-New England[154] and employs a sustainability and energy management staff. However, these employees are responsible for internal program management rather than more resource-intensive external policy affairs. While the largest prosumers that already employ a policy staff may be able to designate a public representative for energy issues, most prosumers will lack the resources and the will to engage in the policy-making process either on their own or as part of an organization.

Notwithstanding these predictions and qualifications, actual experience has demonstrated that some individual prosumers, even smaller prosumers, are engaging in the regulatory process, especially at the state level. In its Value of Solar proceeding, Minnesota received comments from approximately six residential and small commercial prosumers.[155] Of the remaining seventeen commenters (seven of whom filed joint comments), four were utilities, five were renewable energy companies, one was a government agency, and the remainder were nonprofit organizations promoting environmental, renewable energy, and scientific interests.[156] Prosumers also appeared to be represented, at least informally, in Arizona's net metering debate.[157]

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153. *See, e.g.*, Richard B. Stewart, *The Reformation of American Administrative Law* 88 HARV. L. REV. 1669, 1686 (1975) ("[T]he personal stake in agency policy of an individual member of an organized interest, such as a consumer, is normally too small to justify such representation."). The problem of organization is compounded by the free-rider effect, since the benefits of regulatory influence will accrue to nongroup members (if membership is voluntary). *Id.*

154. *See* Jay Fitzgerald, *Conservation Program Eases Power Grid Strain*, BOSTON GLOBE (Jul. 23, 2013), http://www.bostonglobe.com/business/2013/07/22/demand-response-takes-pressure-off-power-grid /b5gZ6ENPYjmr4KWq4LZpdN/story.html.

155. MPUC VOS Order, *supra* note 119, at 2–3. One of the commenters was an individual who seemed to support policies that would benefit prosumers but who did not self-identify as a prosumer. *Id.*

156. The relatively small number of commenters overall can be explained, in part, by the filing of joint comments in some cases and, in part, by the compressed schedule during which commenting took place as a result of statutory deadlines for adoption of the methodology. *See id.*

157. One commissioner reported "a little carnival going on in the parking lot of the Commission building. We had demonstrators following Commissioners, for a series of months, with little signs that said, 'Don't Tax the Sun,' lots of advertisements . . . it really was a full-fledged campaign . . ." Colorado Transcript Panel III, Susan Bitter-Smith at 11–12, MPUC VOS Order, 2–3 (Minn. Pub. Utils. Comm'n Apr. 1, 2014) (Docket No. E-999/M-14-65) (on file with author).

Other, more attenuated entities have also purported to represent prosumer interests. These entities include businesses that provide the goods on which prosumers rely, businesses that operate as "middlemen," environmental interest groups, classic consumer groups, and government consumer counsel offices. To date, such groups have had notable successes in furthering policies that are beneficial to prosumers. Whether these groups can provide reliably zealous, unbiased representation of prosumer interests on an ongoing basis, however, is uncertain. This is especially true given that organized utility and power producer interests have begun to push back on prosumer-friendly policies such as net metering and even renewable portfolio standards, which many such interests see as threats to their business models.[158]

The first candidates for prosumer representation are representatives from renewable energy companies and middlemen such as solar services companies and demand response aggregators. These entities participate regularly in regulatory proceedings and, increasingly, have a vested interest in the success of the prosumer economy. It is true that industry, even the renewables industry, is driven largely by profit, while prosumers themselves may have a variety of behavioral motivations including economics, autonomy concerns, and environmentalism. However, these disparate motives need not be of concern unless they cause the industry groups' goals to diverge from those of prosumers.[159]

More troubling is the fact that industry groups have a variety of distinct legislative and regulatory aims, including product subsidies, checks on the fossil fuel industry, and overseas tariffs, to name just a few. These interests must be balanced against each other, and those that overlap with prosumer goals may at times give way to others that do not overlap, due to the need to conserve political capital. Furthermore, when it comes to enforcement policy, middlemen would likely prefer that any liability for noncompliance with utility or wholesale market programs fall on prosumers themselves while prosumers might prefer that responsibility rest with the middleman. In addition, prosumers have a clear interest in ensuring full disclosure by middlemen of market rules, while middlemen may seek to streamline or gloss over such information in order to sign up greater numbers of prosumers. At the very least, the nature of the relationship between middlemen and prosumers requires deeper

158. On states revisiting net metering standards, *see supra* Part III.B.1. On renewable energy standards, consider the state of Ohio, which froze its renewable energy standard for two years in June 2014. H.R. 310, 130th Gen. Assemb. (Ohio 2014).

159. For an argument that solar services companies are imperfect representatives of solar prosumer interests, see Surrebuttal Testimony of Ashley C. Brown, Arizona Public Service Company's Notice of Filing Surrebuttal Testimony, In re Application of Uns Electric, Inc. for the Establishment of Just and Reasonable Rates and Charges Designed to Realize a Reasonable Rate of Return on the Fair Value of the Properties of Uns Electric, Inc. Devoted to its Operations throughout the State of Arizona, and for Related Approvals, Docket No. E-04204A-15-0142, at 9 (Ariz. Corp. Comm'n Feb. 23, 2016) (arguing that solar customers and solar companies are not aligned because solar customers' goals are typically not technology-specific).

theorization. To the extent that these middlemen purport to speak for prosumers in the regulatory arena, those claims should be scrutinized so that the nature of the overlap between middleman and prosumer interests can be determined.

Another promising avenue for prosumer representation by proxy comes from environmental interest groups. Organizations such as the Environmental Defense Fund, the Sierra Club, the Natural Resources Defense Council, and others have shifted at least part of their attention in recent years to energy law in general and electricity generation in particular.[160] This shift in emphasis responds to a growing recognition of the connection, described below in subpart IV.B.1, between power generation and negative environmental externalities like greenhouse gas production. These organizations are well organized and have become sophisticated participants in policy-making processes. They are thus well equipped to ensure that platforms of interest to prosumers are promoted. One notable caveat exists, however. These organizations are driven by a relatively narrow set of interests, all centering on environmental protection. To the extent that prosumers have a more varied set of motivations that might sometimes trump environmental considerations, these groups, too, will be imperfect proxies.[161]

Next, prosumers might be represented by nongovernmental consumer groups. A variety of consumer organizations exist both in this country and worldwide.[162] These organizations, however, typically represent the interests of classic consumers rather than prosumers. For example, CECA Solutions, formerly the Consumer Energy Council of America, represents energy consumer interests through policy analysis, policy development, and information provision.[163] The description of consumer expectations on their home page is evidence of their focus: they believe consumers expect energy to be "affordable and predictable," "produced in a way that is environmentally sound," and "reliable, high quality . . . safe and secure."[164] While many of these goals are consistent with greater prosumer participation in energy markets, prosumers themselves have a more diverse set of interests and goals. Some of these goals, including higher compensation for prosumer goods and services, may be incompatible with traditional consumer interests such as lower

160. *See, e.g.*, Michael Grunwald, *Inside the War on Coal*, POLITICO (May 26, 2015, 11:45 PM), http://www.politico.com/agenda/story/2015/05/inside-war-on-coal-000002 (describing the Sierra Club's Beyond Coal campaign).

161. Prosumers' motivations might include saving money on electricity bills, greater autonomy from the grid, or a desire to keep up with the neighbors.

162. *See* NAT'L ASS'N OF REGULATORY UTIL. COMM'RS, THE ROLE OF CONSUMER ORGANIZATIONS IN ELECTRICITY SECTOR POLICIES AND ISSUES (2006). Of fifty-two global consumer groups studied in a report by the National Association of Regulatory Utility Commissioners, 71 percent represented the general public, 18 percent represented environmental groups, 8 percent represented trade groups, and the remainder represented either chambers of commerce or academic institutions. *Id.* at 4.

163. CECA Solutions, *About CECA Solutions*, http://www.cecarf.org/index.php/about/ (last visited July 3, 2016).

164. CECA Solutions, *America's Consumers Have a Multitude of Expectations*, http://www.cecarf.org/ (last visited July 28, 2015).

prices.[165] It should be noted, however, that some consumer organizations are evolving along with the energy economy and are increasingly concerned with prosumer issues. The New York Energy Consumers Council, for example, strives to create and improve demand response programs as well as opportunities for the sale of on-site generation.[166]

A final possibility is either to rely on existing government consumer-counsel offices for prosumer representation or to create separate government offices or bureaus to represent the interests of prosumers specifically. This is a less viable strategy at the federal level since, unlike state public utility commissions, FERC has no institutionalized representative for consumer interests. A federal consumer representative was created as part of the Public Utility Regulatory Policies Act of 1978, but the position was never funded.[167] Subsequent legislative efforts to establish such an office were made as recently as 2003 and 2010, but the legislative vehicles for each were never enacted.[168]

In some states, however, public consumer counsel offices have represented prosumer interests. Iowa's Consumer Advocate, for example, has supported distributed generation incentives.[169] Indeed, there may be much to recommend assigning such representation to Consumer Advocates. Authorizing these offices to represent the interests of consumers more broadly allows them to provide a more significant counterweight to industry interests. But advocacy of prosumer perspectives can create conflicts of interest for such offices, which were created to represent the interests of traditional utility customers.[170] These offices have historically focused on issues such as keeping the quality of utility service high while keeping consumer prices low. Even thoughtful consumer advocates such as Iowa's have experienced the tension in representing both prosumer and consumer interests, with any conflict resolved in favor of classic consumers. For example, in a 2014 distributed generation docket, the Iowa Consumer Advocate supported distributed generation payments while also recommending that time of use rates be adopted for net-metered customers to

165. *See infra* Part III.

166. New York Energy Consumers Council, *What Is the NYECC?*, http://nyecc.com/ (last visited July 20, 2015) (noting that while, historically, the organization has been focused on saving customers money, more recently it has pursued a more diverse set of goals).

167. *See* 16 U.S.C. § 825q-1 (2012) (establishing the Office of Public Participation).

168. The two bills were the Energy Policy Act of 2003, which was passed by both houses of Congress but died in conference, and the American Clean Energy and Security Act, otherwise known as the Waxman-Markey climate bill, which passed the House of Representatives but was defeated in the Senate.

169. *See* Recommendation to Solicit Additional Responses Regarding Net Metering and Interconnection of Distributed Generation and Schedule a Workshop for Distributed Generation Checklist 179–80 (IOWA UTILS. BD. Aug. 14, 2014) (Docket No. NOI-2014-0001).

170. The Connecticut Office of Consumer Counsel's mission statement is typical of consumer counsel mission statements generally, providing that the Office "is authorized to participate on behalf of consumer interests in all administrative and judicial forums and in any matters in which the interests of consumers with respect to public utility matters may be involved." Off. of Consumer Couns., *About Us*, STATE OF CONN., http://www.ct.gov/occ/cwp/view.asp?a=1419&q=260490 (last visited July 3, 2016).

avoid cross-subsidization.[171] The Advocate further recommended that prosumers pay for the costs of interconnecting to the grid.[172] Similarly, comments by state consumer counsel offices in FERC's Order 745 rule making, while generally supportive of demand response in organized wholesale markets, flagged concerns about possible costs and burdens on traditional retail customers.[173] The reticence of some consumer advocates to embrace prosumer stances such as net metering is understandable given the distributional questions, described in the previous section,[174] which can arise between prosumers and traditional consumers. That said, it seems clear that these groups have not and will not advocate on behalf of prosumers when prosumer interests are at odds with those of traditional consumers.

The effectiveness of proxy representation is likely to be tested further as prosumer-friendly policies come under increasing attack from utilities and traditional power producers. In addition to the specific concerns discussed above, there are reasons to be less than sanguine about the ability of proxies to compete with utilities and traditional power producers in regulatory and legislative processes. Ultimately, the evolution of prosumer interest groups is a promising avenue. It is no solution—or at least not a complete solution—to merely increase the volume of prosumer participation in regulatory processes, for example, by educating prosumers about opportunities to engage with regulators. This is because agencies often discount unsophisticated input or input containing arguments based on policy rather than law or hard data.[175]

Meaningful representation of prosumer interests may therefore require that prosumers overcome collective action problems to form prosumer interest groups that can study issues in greater depth and generate thoughtful, well-supported positions. Over time, as they become increasingly sophisticated regulatory stakeholders, they can become full-fledged participants in democratic processes.

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171. Recommendation to Solicit Additional Responses Regarding Net Metering and Interconnection of Distributed Generation and Schedule a Workshop for Distributed Generation Checklist at 179–80 (IOWA UTILS. BD.).

172. *Id.* at 44.

173. *See, e.g.*, Comments of the Office of the People's Counsel of the District of Columbia, *Demand Response Compensation in Organized Wholesale Markets*, Docket No. RM10-17-000 ("Order 745 Docket") ("D.C. OPC seeks to ensure D.C. retail ratepayers are not unfairly saddled with wholesale energy market payment obligations relating to demand response providers."); Post-Conference Comments of the New York State Consumer Protection Board, Order 745 Docket (urging FERC to take societal benefits of demand response into account but urging that full LMP be paid only when net benefits to consumers are positive).

174. *See supra* Part III.B.

175. For support for this proposition in the notice and comment context, *see* Mariano-Florentino Cuéllar, *Rethinking Regulatory Democracy*, 57 ADMIN. L. REV. 411, 451–52 (2005) (quoting agency lawyers as reporting that the most useful comments were those that contained more sophisticated knowledge and insights).

IV. THE NORMATIVE DIMENSIONS OF PROSUMPTION

Notwithstanding the challenges outlined in the previous Part, prosumption is worth supporting. This is because prosumption is consonant with the basic values that undergird our system of electricity regulation. This is especially true when modern updates to that value structure are taken into account.

In other policy areas, classic paradigms may be adequate to evaluate and govern changing circumstances. For example, Yochai Benkler argues persuasively that increased decentralization and consumer participation in communications markets can further the traditional purposes of communications regulation.[176] As Benkler notes, democracy and the "marketplace of ideas" have been dominant goals in communications regulation, not least because of the animating ideals of the First Amendment.[177] He therefore champions more active customer participation in media production as "a better way to serve the goals that have long justified structural media regulation."[178]

By contrast, the goals furthered by energy prosumption are not exclusively those historically animating electricity regulation. Traditionally, electricity regulation sought to balance the twin aims of reliable service and low prices.[179] Like the provision of other basic services such as water, affordable, universal access to electricity has been seen as a duty owed by the government to its citizens. While some public entities have taken on this responsibility directly, others have delegated the task to private utilities.[180] Ensuring the health of these private utilities was thus, from the earliest days of regulation, a vital subsidiary goal—a necessary means to the primary goal of consistent, universal electricity access at affordable prices.

Over time, as the electricity system stabilized, other policy goals have joined the original dyad. This Part argues for the recognition of a new "bundle" of normative commitments in the field. While prosumption might be defended by reference to traditional regulatory goals alone, the phenomenon is even more consistent with this updated set of values.

176. Benkler, *supra* note 4, at 565 (remarking that the Supreme Court "has steadily developed an understanding that decentralization of information production is a policy that serves values central to the First Amendment.").

177. *Id.* at 567.

178. *Id.*

179. The California Public Utilities Commission's statement that it seeks to ensure "the provision of safe, reliable utility service and infrastructure at reasonable rates" is representative of state commissions generally. CAL. PUB. UTILS. COMM'N, California Public Utilities Commission, http://www.cpuc.ca.gov/ (last visited Jan. 20, 2016).

180. Utilities generally fall into one of three categories: large, investor-owned utilities (responsible for about 73 percent of electricity sales), smaller publicly owned utilities (16 percent), or member-owned cooperative utilities (11 percent). Nat'l Rural Elec. Coop. Ass'n, *Co-op Facts & Figures*, http://www.nreca.coop/about-electric-cooperatives/co-op-facts-figures/ (last visited Jan. 20, 2016).

A. Prosumption and Traditional Electricity Law Norms

Concern about the reliability of electricity service has been one of the primary drivers of traditional electricity policy. Reliability is a relentless focus of regulators because of its implications for public health, safety, and the economy.[181] Traditionally, vertically integrated utilities accepted responsibility for providing reliable service in exchange for monopoly service territories.[182] Ultimately, however, federal agencies and state public utility commissions are responsible for reliability.[183]

One of the most significant problems for electricity reliability is the need, discussed above, to maintain balance between electricity supply and demand at all times so that grid frequency remains constant.[184] Prosumption can make this balance more difficult to achieve. First, new sources of energy such as wind and solar, which are increasingly adopted by prosumers, create novel reliability problems for the grid because these resources are intermittent: the sun does not shine regularly, nor does the wind blow on command. Second, as smaller sources of distributed generation proliferate, they run the risk of overwhelming distribution grids by creating voltage fluctuations and other systemic problems.[185]

Despite these challenges, with system upgrades and increased institutional knowledge, prosumption may ultimately be a boon for reliability. The North American Electric Reliability Corporation, the organization responsible for generating reliability standards for the nation, predicts that negative reliability effects from distributed energy resources can be mitigated and that certain types of distributed resources, for example demand response and energy storage, may "improve bulk system reliability if managed properly."[186] When

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181. NYISO, *Value of Reliability*, https://home.nyiso.com/value-of-reliability/ (last visited Aug. 7, 2016).

182. *See* EISEN ET AL., *supra* note 30 at 59 (summarizing the common law principles affecting public utilities).

183. The obligation to ensure reliable service in wholesale power markets is a primary source of FERC's jurisdiction. 16 U.S.C. § 824o (2012) (establishing FERC jurisdiction over an electric reliability organization for purposes of establishing reliability standards for the bulk power market). States also make this a focus of public obligations. *See, e.g.*, CAL. PUB. UTILS. CODE § 399 (West 2006) ("The Legislature finds and declares that safe, reliable electric service is of utmost importance to the citizens of this state, and its economy.").

184. Various entities are responsible for maintaining balance on the grid. This function is performed by organized wholesale markets (Independent System Operators and Regional Transmission Organizations) or by regional balancing authorities operating within larger coordinating bodies. All of these entities are responsible for coordinating supply and demand in real time.

185. *See* Clark W. Gellings, *As the Role of the Distributor Changes, So Will the Need for New Technology*, *in* DISTRIBUTED GENERATION AND ITS IMPACT FOR THE UTILITY INDUSTRY 113–16 (Fereidoon P. Sioshansi ed., 2014) (explaining that high voltage and grid fluctuations in particular can disturb the effective operation of customer and distribution equipment).

186. N. AM. ELEC. RELIABILITY CORP., SPECIAL REPORT: POTENTIAL BULK SYSTEM RELIABILITY IMPACTS OF DISTRIBUTED RESOURCES 1-2 (2011). The report recommends improving forecasting as well as visibility and controllability of distributed generation, installing more protective system hardware, and coordinating system restoration after problems arise. *Id.* at 6-7.

properly integrated, demand response can improve system reliability by allowing authorities to adjust demand as well as supply during times of strain, thereby restoring balance to the grid. Storage accomplishes a similar goal, but with the added benefit, when paired with distributed generation, of mitigating that generation's variability.[187]

Distributed energy resources can provide even more valuable reliability benefits at the individual or community level. A report commissioned by the National Renewable Energy Laboratory observed enhanced customer reliability from the combined use of PV solar systems and energy storage systems.[188] Customers were able to rely on the combined technologies to meet their electricity demand during grid outage events by "islanding"—disconnecting themselves from the grid and providing for their own electricity needs until the grid crisis had passed.[189] Indeed, ensuring access to a reliable source of power is one of the reasons many prosumers elect to self-supply in the first instance.[190]

The second vital norm underlying traditional energy law and policy is that electricity should be available to consumers at reasonable rates. The FPA and state public utility codes codify this norm, noting that rates charged by utility companies for electricity service must be "just and reasonable."[191] That language is meant to protect consumers from high electricity rates as well as to provide utilities with a reasonable return on their investment (in order to ensure their continued viability and, therefore, the continued availability of reliable electricity).[192]

Prosumption's price effects are mixed. New administrative programs to better incorporate increased distributed energy resources and demand-side management will not be costless. Depending on how rapidly utility rate structures evolve, utilities might also see lost revenues as customers generate their own energy, sell self-generated energy back to the utility, and purchase less energy as a result of demand management.[193] As discussed above in

187. *See, e.g.*, ELEC. POWER RESEARCH INSTITUTE, ELECTRICITY ENERGY STORAGE TECHNOLOGY OPTIONS: A WHITE PAPER PRIMER ON APPLICATIONS, COSTS, AND BENEFITS 9 (2010).

188. D. MANZ ET AL., ENHANCED RELIABILITY OF PHOTOVOLTAIC SYSTEMS WITH ENERGY STORAGE AND CONTROLS 43 (2008).

189. *Id.*

190. Especially for commercial customers, like hospitals, with special needs for reliable power, installing on-site generation can be an important insurance policy. *See* DEPT. OF ENERGY, *supra* note 114 at i.

191. *See* 16 U.S.C. § 824d (2012) ("all rates and charges made, demanded, or received by any public utility . . . shall be just and reasonable . . . ."). State examples are too numerous to list. For a sample, see ALASKA STAT. § 42.05.381 (2007) ("All rates demanded or received by a public utility . . . shall be just and reasonable . . . ."); KAN. STAT. ANN. § 66-101b (West 2016) ("Every electric public utility governed by this act shall be required . . . to establish just and reasonable rates . . . ."); S.C. CODE ANN. § 58-27-810 (2015) ("Every rate made, demanded or received by any electrical utility or by any two or more electrical utilities jointly shall be just and reasonable.").

192. *See* EISEN ET AL., *supra* note 30, at 456.

193. TIM WOOLF ET AL., BENEFIT-COST ANALYSIS FOR DISTRIBUTED ENERGY RESOURCES 9 (2014). For a more in-depth discussion of rate design, see *supra* Part III.B.

subpart III.B, utilities might pass some or all of the costs of distributed energy resources on to traditional consumers.

It is likely, however, that savings will outweigh these costs, especially in the longer term. The Congressional Budget Office has found that distributed energy resources have "the potential to . . . reduce the cost of electricity" for consumers.[194] This is, in part, because prosumer-operated distributed resources can reduce the need to construct new transmission and distribution infrastructure (or delay the need to replace existing infrastructure).[195] Less energy travelling over long distances also reduces line losses—the loss of energy that naturally occurs during transmission.[196] Prosumers who participate in demand response programs can, in the aggregate, exert an even more direct effect on energy prices. Prices for electricity in organized wholesale markets are set based on supply and demand. The market clearing price for power will be much higher when demand peaks and fewer plants are available to supply that demand. By mitigating demand, demand response can reduce this imbalance, lowering wholesale prices.[197]

B. Prosumption and Modern Electricity Law Norms

It is clear, then, that many of the potential benefits of prosumption support energy law's traditional goals. Mounting a normative defense of prosumption becomes even easier, however, when modern amendments to traditional energy law values are considered. This subpart suggests that the field has seen increased emphasis on preventing environmental externalities and on increasing industry competition. These norms and the support they offer for a prosumer energy economy are explored in turn.

1. Environmental Norms

The first additions to the canon are environmental norms. While environmental regulation of energy actors is not new,[198] energy and

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194. CONG. BUDGET OFF., *supra* note 33, at ix.

195. *See* Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 20 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101).

196. New York estimates that line loss savings from conversion to a more distributed energy system are $200-400 million per year. *Id*.

197. DEPT. OF ENERGY, *supra* note 114 at 3-5. New York anticipates savings of $1.2 to $1.7 billion per year from peak load management alone. N.Y. STATE ENERGY PLANNING BD., THE ENERGY LEAD: 2015 NEW YORK STATE ENERGY PLAN 20 (2015). Additional savings come from avoidance of congestion costs, extra charges added to the cost of electricity to encourage dispatch of additional energy to relieve constraints. *Id.* at 3–8.

198. Since the 1960s, regulation of pollutants by state and federal governments has focused, at least in part, on power plants and fuel extraction (both of which are major sources of air and water pollution). *See* EISEN ET AL., *supra* note 30, at 6–7 (describing five overlapping eras of energy law).

environmental law have grown more integrated in recent years.[199] Some scholars have suggested that this convergence has been propelled by climate change.[200] Others have explained it as necessary to reduce our nation's dependence on oil.[201]

While it is tempting to describe the relationship between the two fields as a merger of sorts, it is more accurate to say that the targets of law and regulation in each are increasingly overlapping.[202] It should be noted, however, that efforts to confront climate change have merely accentuated an existing phenomenon in environmental law: much environmental regulation targets or affects power plants because traditional fossil fuel-fired power plants are a significant source of many types of pollutants. On the energy regulatory side, statutes and regulations increasingly require energy regulators to take environmental considerations into account when siting facilities, engaging in resource planning, or restructuring energy systems.[203] The overlap between the fields has been seen both as a coordination challenge, as well as an opportunity to foster a clean-energy economy that will improve environmental quality.[204]

At a structural level, Connecticut and Massachusetts have each merged their energy and environmental regulatory agencies. Connecticut's new agency, the Connecticut Department of Energy & Environmental Protection, is designed to "[i]ntegrate energy and environmental policies and programs in a more systematic, proactive and coherent manner to provide a better structure for decision-making and to build a sustainable and prosperous economic

199. As Professor Alexandra Klass has noted, organizations including law firms, academic centers, and bar organizations have also begun to link the two fields. Alexandra B. Klass, *Climate Change and the Convergence of Environmental and Energy Law*, 24 FORDHAM ENVTL. L. REV. 180, 187–88 (2013) (collecting sources).

200. *Id.* at 181–82, 188 (explaining this convergence, in part, by noting that environmental law is incapable of responding to the challenges posed by climate change without reference to energy systems); Amy J. Wildermuth, *The Next Step: The Integration of Energy Law and Environmental* Law, 31 UTAH ENVTL. L. REV. 369, 369 (2011).

201. *See* Lincoln L. Davies, *Alternative Energy and the Energy-Environment Disconnect,* 46 IDAHO L. REV. 473, 477 (2010).

202. *Id.* (explaining the increasing overlap by noting that "today, environmental law impacts energy decisions, just as energy decisions shape environmental outcomes").

203. More broadly, Professors Michael Dworkin, David Farnsworth, and Jason Rich noted more than ten years ago that statutes then-existing imposed duties on public utility regulators to consider environmental harms or at least *permitted* those harms to be taken into account. Michael Dworkin et al., *The Environmental Duties of Public Utility Commissions*, 18 PACE ENVTL. L. REV. 325 (2001) (cataloging this phenomenon state by state). The article focuses on a variety of statutes, including those concerning general authority and obligations; those related to certification, siting and compliance; state "NEPA" statutes (those requiring environmental impact statements for certain types of government action); statutes concerning resource planning, conservation programs, and environmental externalities; and restructuring provisions. *Id.* at 327. For a more modern example, consider Colorado's Clean Air, Clean Jobs Act, which requires utilities in the state to submit plans to comply with state and federal environmental standards for coal-fired power plants. COLO. REV. STAT. ANN. §§ 40-3.2-201–40-6-111 (2010).

204. *See* N.Y. STATE ENERGY PLANNING BD., *supra* note 197 at 7 ("Energy is the invisible engine of our economy—and a clean, resilient, and affordable energy system is critical to achieving our objectives").

future."[205] Even federal agencies, which have long operated in a more siloed manner, are better coordinating energy and environmental strategy.[206]

What can this increasing overlap teach us about the relationship between energy and environmental law? For energy law, it suggests that environmental considerations are becoming part of the normative canon. Energy regulators are becoming more familiar with environmental considerations as a result of their interactions, whether formal or informal, with their environmental counterparts. And as environmental statutes and regulations increasingly affect components of the energy grid, utilities and other energy decision makers must take the purposes and requirements of those statutes into account. Thus, even if agency organic statutes in energy law continue to emphasize the traditional norms of reliability and low prices, it is clear that environmental considerations are newly animating choices by regulators and system actors.

Prosumption is largely supportive of environmental goals. Until recently, most of the distributed generation in the United States used traditional fuel sources such as natural gas, coal, gasoline, and diesel.[207] But while conventional technologies such as steam turbines, combustion turbines, internal combustion engines, and microturbines can all serve as distributed resources,[208] renewable resources are a more promising source of growth because of their health and environmental benefits.[209] These resources can replace traditional fossil fuel-fired, centralized power generation. Demand-side management, too, has clear environmental benefits. By avoiding the need to generate additional electricity, demand reductions reduce reliance on the fossil fuel-fired power

205. State of Connecticut, Department of Energy & Environmental Protection, *About Us*, http://www.ct.gov/deep/cwp/view.asp?a=2690&q=322476&deepNav_GID=1511 (last visited July 21, 2015); *see also* State of Massachusetts, Executive Office of Energy and Environmental Affairs, *About EEA*, http://www.mass.gov/eea/about-eea.html (last visited July 4, 2016) ("Our commitment to protecting our environment now recognizes the importance of energy").

206. *See* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (Final Rule) ("Clean Power Plan"), 80 Fed. Reg. 64,662, 64,707 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60) (describing EPA consultation with the Department of Energy and FERC in developing its Plan). Note, however, that there has been criticism of the EPA, in part by sitting FERC Commissioners, of the timing and extent of the EPA's outreach efforts. FERC Commissioner Tony Clark, in particular, believes that interactions between the two agencies have been too low-level and that higher-level discussions must take place in order to secure a more formal role for FERC in implementation of the Clean Power Plan. Rod Kuckro, *FERC's Tony Clark Wants Formal Agency Role in EPA's Clean Power Plan*, ENERGYWIRE (Dec. 5, 2014), http://www.eenews.net/stories/1060009991.

207. As of 2003, emergency backup generators using gasoline or diesel and combined heat and power generators using natural gas, coal, or biomass made up 95 percent of all customer-owned generation. CONG. BUDGET OFF., *supra* note 33, at x.

208. *Id.* at 7–8.

209. Professors Hannah Wiseman and Garrick Pursley have argued convincingly that distributed renewables are "essential" in "establishing a stable nationwide energy infrastructure powered substantially by renewable resources," which in turn is important because of the negative environmental externalities created by burning fossil fuels. Pursley & Wiseman, *supra* note 27, at 879–80. The EPA, too, has praised distributed generation for its potential to mitigate climate change impacts. *See* EPA, ON-SITE RENEWABLE ENERGY GENERATION: A GUIDE TO DEVELOPING AND IMPLEMENTING GREENHOUSE GAS REDUCTION PROGRAMS at v (2014).

plants that still produce more than 60 percent of our power.[210] Therefore, if properly managed, distributed-energy resources can have significant positive environmental effects.

2. Competition Norms

Another new energy regulatory norm has emerged since the 1980s: competition. According to the deregulatory philosophy that has increasingly dominated energy markets, the old model of strictly regulated monopolies in the energy space is no longer necessary to ensure reliable supply and low prices. Competition, so the argument goes, can accomplish the same task while avoiding regulatory inefficiencies.[211] While this preference for free markets has philosophical roots in the deregulatory preferences of the Reagan administration,[212] it has persisted and has been judged by many to be a success.[213]

This transformation has taken place, for the most part, in the last two decades.[214] Competitive markets emerged first at the federal level, with government regulators separating generation of electricity from its transmission—in order to allow for more, varied sources of generation—and regulating transmission operators as common carriers.[215] This meant that competition in the generation and sale of electricity could develop. Some states followed suit,[216] unbundling generation from distribution and creating an open market for the purchase of electricity, in which customers could select their supplier rather than relying on the local utility.

Market competition has since become a dominant value underlying regulation of electricity markets.[217] Indeed, FERC sees promoting competition in wholesale markets as "integral" to its ability to fulfill "its statutory mandate

210. *See* U.S. Energy Information Administration, *What is U.S. Electricity Generation by Energy Source?*, http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3 (last visited July 20, 2015).

211. *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, 75 F.E.R.C. ¶ 61,080, at p. 1 (1996).

212. *See* David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 772 (2008) (describing moves toward deregulation by both the Reagan and Thatcher administrations).

213. *Compare* Joseph P. Tomain, *The Past and Future of Electricity Regulation*, 32 ENVTL. L. 435 (2002) (applauding restructuring and competition generally, although noting the importance of maintaining monopolistic, regulated transmission networks), *with* David B. Spence, *supra* note 212, at 776–77 (concluding that competitive energy market performance has been mixed and that lower prices have not materialized).

214. For an overview of the transition to competitive markets, see EISEN ET AL., *supra* note 30, at 11–14.

215. *See* 75 F.E.R.C. ¶ 61,080, at p. 115.

216. California's restructuring efforts were notoriously abortive, with the state backtracking after the energy crisis of 2000–2001.

217. Note that competition is best described as a second-order norm in energy markets (a means rather than an end) since it is ultimately designed to achieve first-order goals such as low rates and nondiscrimination at lower regulatory cost.

to ensure supplies of electric energy at just, reasonable and not unduly discriminatory or preferential rates."[218]

Prosumers enhance competition in electricity markets. Rather than relying on a handful of large, centralized power plants to supply energy to utilities and customers, markets that include distributed resources offer power from a much larger number of sources. New York has prioritized the development of distributed energy resources as a "form of competition," since these resources compete "with the standard methods of supplying *and* delivering power."[219]

Demand response resources also increase competition by increasing options for market operators when demand exceeds supply. Instead of choosing from a more limited pool of supply-side resources, these operators may choose *either* to increase supply *or* to reduce demand. FERC's Order 719, which expanded access to wholesale energy markets for demand response prosumers, found that allowing small retail customers to bid demand response into wholesale markets would increase competition by "expand[ing] the amount of resources available to the market."[220] Similarly, Order 745 justified its higher compensation for demand response resources by noting the downward pressure that this increased competition would put on wholesale market prices during times of grid stress.[221]

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Prosumption is thus not only consistent with the traditional goals of the electricity regulatory system—low prices and reliable service—but with more modern additions to that system's underlying norms: environmental protection and market competition.

V. REGULATING PROSUMPTION

How significant a role will prosumers play in the electricity economy of the future? The answer, while dependent to some extent on external factors, will be heavily influenced by regulatory choices. As Yochai Benkler noted in the context of communications law, the relationship between on-the-ground

218. *Wholesale Competition in Regions with Organized Electric Markets*, 125 F.E.R.C. ¶ 64,100 at P 1 (2008).

219. Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 19 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101).

220. 125 F.E.R.C. ¶ 64,100 at P 154 (finding that permitting aggregators to bid demand response into wholesale markets on behalf of retail customers increases competition in those markets).

221. *Demand Response Compensation in Organized Wholesale Markets*, 134 F.E.R.C. ¶ 61,187 at P 7 (2011) ("As the Commission recognized in Order No. 719, active participation by customers in the form of demand response in organized wholesale energy markets helps to increase competition in those markets.").

developments and regulatory decisions is not unidirectional.[222] Regulatory choices can affect, if not dictate, the evolutionary direction of a field.[223]

The first subpart, below, summarizes existing approaches to the regulation of prosumer activities. These regulatory measures are predominately state-by-state, lending an experimentalist character to prosumer regulation. As argued in the second subpart, experimentation has yet to yield definitive answers about the precise form a prosumer future should take, and it is appropriate to continue a more decentralized, experimentalist approach at this time. However, assuming that we take seriously Part IV's conclusion that some level of prosumption is consonant with modern electricity law's prevailing norms, it is possible to draw some preliminary conclusions about the desirable attributes of a future prosumer-friendly electricity policy. The final subpart sets out some of these elements.

A. Existing Regulatory Approaches

Due to the federal government's lack of jurisdiction over retail electricity, policies that affect energy prosumption have, to date, been predominantly state-by-state. This subpart will examine various regulatory efforts that have impacted prosumption, including mandates, incentives, environmental policies, and structural reform.

1. Mandates

Mandates are a classic form of environmental regulation and are found in the energy and prosumption spaces as well.[224] Perhaps best known among the mandates are state renewable generation targets (often called renewable portfolio standards). These require that utilities source a given percentage of their electricity from renewable sources by a certain date. Twenty-nine states and the District of Columbia have some form of a renewable portfolio standard, while eight additional states have voluntary targets.[225] Renewable portfolio standards are likely to increase prosumption because they encourage utilities to purchase customer-generated renewable energy to meet the standards. Several

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222. *See* Benkler, *supra* note 4, at 562–63.

223. *See* W. Nicholson Price II, *Making Do in Making Drugs: Innovation Policy and Pharmaceutical Manufacturing*, 55 B.C. L. REV. 491, 496, 498 n.53 (2014) (suggesting that the FDA can deliberately shape incentives to innovate in the field and collecting sources on the effect of regulation on innovation).

224. Note that the mandates offered as examples here do not all discriminate between customer- and utility-owned resources.

225. Nat'l Conference of State Legislatures, *State Renewable Portfolio Standards and Goals*, http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx (last visited Jan. 15, 2016). Some states, like California, couple renewable portfolio standards with requirements that utilities meet demand through energy efficiency and conservation first, followed by renewable generation, before turning to fossil fuel-fired generation. Decision Approving Modified Bundled Procurement Plans, Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans (Cal. Pub. Utils. Comm'n Jan. 12, 2012) (Rulemaking 10-05-006).

states have special carve-outs in their renewable portfolio standards requiring that a certain percentage of the overall target be sourced from distributed generation.[226] Others impose separate energy efficiency targets on utilities.[227] Finally, at least one state (Pennsylvania) has imposed a mandate on electric distribution companies to reduce peak electrical load, which encourages both energy efficiency and demand response.[228]

Some states have adopted even more targeted programs. California has issued a series of legislative and regulatory mandates that promise to increase prosumption in the state. On the distributed generation side, California has required its three largest investor-owned utilities to craft plans identifying distributed resource potential and explaining how the utilities will incorporate distributed resources in their territories.[229] New homes in California must also be prosumption-ready: the state's Long Term Energy Efficiency Strategic Plan calls for all new residential construction to generate as much energy as it consumes by 2020.[230] In addition, the California Public Utilities Commission has required the state's three large investor-owned utilities to create 1.3 gigawatts of energy storage by 2024.[231] Hawaii has also imposed various mandates on utilities, including requirements that utilities integrate demand response into their electricity portfolios[232] and allow customers to interconnect

226. *See* Nat'l Renewable Energy Lab., *Renewable Portfolio Standards*, http://www.nrel.gov/tech_deployment/state_local_governments/basics_portfolio_standards.html (last visited July 21, 2015) (including map of states with policies that include solar or distributed generation provisions as of March 2013).

227. Twenty-five states currently have energy efficiency resource standards for utilities or third-party program administrators. Am. Council for an Energy-Efficient Econ., *State Energy Efficiency Resource Standards (EERS)*, http://aceee.org/sites/default/files/eers-052016.pdf (last visited Jan. 18, 2016).

228. OPTIMAL ENERGY, INC., PENNSYLVANIA 2013–2018 ENERGY EFFICIENT GOALS 2 (2008) (requiring a total peak demand reduction of 4.5 percent by May 2011).

229. CAL. PUB. UTILS. CODE § 769 (West 2015) (requiring that distributed resources plans be submitted by July 1, 2015). While some of this demand will be met through utility-scale distributed generation, much will also come from customer-owned systems, including distributed renewable resources, energy efficiency, energy storage, electric vehicles, and demand response. *See* PG&E, ELECTRIC DISTRIBUTION RESOURCES PLAN 2 n.1 (2015). PG&E has also specifically acknowledged a goal of allowing customers "to achieve greater value from their energy technology investments." *Id.* at 8.

230. CAL. PUB. UTILS. COMM'N, CA ENERGY EFFICIENCY STRATEGIC PLAN 14 (2011). The plan includes a similar goal with respect to commercial construction by 2030. *Id.* at 28. These goals are implemented through building code mandates. *Id.* at 29.

231. Order Instituting Rulemaking to Consider Policy and Implementation Refinements to the Energy Storage Procurement Framework and Design Program (D.13-10-040, D.14-10-045) and Related Action Plan of the California Energy Storage Roadmap (Cal. Pub. Utils. Comm'n Oct. 17, 2013) (Rulemaking 15-033-011). Again, while this order will undoubtedly encourage some utility-scale projects, it will also incentivize consumer storage.

232. Decision and Order, *In re* Pub. Utils. Comm'n Regarding Integrated Res. Planning. (Haw. Pub. Comm'n Apr. 28, 2014).

distributed generation to the grid unless the interconnection would affect "circuit or system level security and reliability."[233]

2. Incentives

Short of actual mandates, subsidies and other incentives may encourage customers to become more active participants in the generation and management of energy.[234] California is encouraging prosumption by making advanced energy storage systems eligible for its Self-Generation Incentive Program rebates.[235] In an even more innovative step, San Diego Gas & Electric, an investor-owned utility in southern California, is proposing a new rate structure that would reward the installation of behind-the-meter batteries. If owners of the batteries permit the utilities to draw on stored energy during pre-arranged peak periods, they will receive a lower, preferential rate for electricity.[236]

Currently, all demand response programs targeted at individual prosumers take the form of incentives (although utility mandates exist).[237] Wholesale markets offer price incentives to encourage prosumer participation, as do some state-level utilities.[238] When it comes to energy efficiency, while some policies are in the form of mandates (for example, energy efficiency requirements in building codes), numerous incentives exist as well. These incentives often take the form of tax credits, rebates, or savings. For example, Xcel Energy offers

233. Letter of General Agreement Between Randy Iwase, Chair, Public Utilities Commission of the State of Hawaii, and Alan Oshima, President and CEO, Hawaiian Electric Co, Inc. (Feb. 27, 2015), http://puc.hawaii.gov/wp-content/uploads/2015/03/NewRelease.20150227.pdf (last visited July 28, 2015).

234. A report by the National Renewable Energy Laboratory found a positive correlation between the existence of incentives such as net metering and renewable portfolio standards and the level of installed distributed solar PV. D. STEWARD ET AL., NAT'L RENEWABLE ENERGY LAB., THE EFFECTIVENESS OF STATE-LEVEL POLICIES ON SOLAR MARKET DEVELOPMENT IN DIFFERENT STATE CONTEXTS 29 (2014).

235. *See* CPUC, 2014 SELF-GENERATION INCENTIVE PROGRAM HANDBOOK 32, 44 (2014). These systems, also known as "behind-the-meter energy storage systems," can operate as a complement to distributed-generation technologies. PUBLIC INTEREST ENERGY RESEARCH PROGRAM, 2020 STRATEGIC ANALYSIS OF ENERGY STORAGE IN CALIFORNIA 7 (2011). They enable customers to avoid peak electricity charges and, where programs exist, to provide important ancillary services to the grid.

236. Prepared Direct Testimony of Cynthia Fang, Chapter 1, On Behalf of San Diego Gas & Elec. Co., Application of San Diego Gas & Elec. Co. (U 902 E) for Auth. to Update Marginal Costs, Cost Allocation, & Elec. Rate Design, C24–C25 (July 1, 2015).

237. New York's public service commission has required all utilities to offer demand response programs to customers by July 2016. Order Adopting Dynamic Load Management Filings with Modifications, Case 14-E-0423 et al. (June 18, 2015).

238. *See Demand Response Compensation in Organized Wholesale Markets*, 134 F.E.R.C. ¶ 61,187 at P 2 (2011) (requiring that demand response resources in wholesale markets be paid the LMP for their services); DSIRE, *Database of State Incentives for Renewables & Efficiency*, http://www.dsireusa.org/ (last visited July 17, 2015) (including a state-by-state list of demand response programs).

customers in Colorado rebates to partly cover the costs of energy efficiency upgrades in new and existing structures.[239]

With respect to distributed generation, a myriad of state-level subsidy and rebate programs encourage customers to become prosumers. These programs reduce the cost of installing renewable technologies.[240] Pricing programs like net energy metering also encourage more prosumption by compensating customers for energy sold back to the grid at a generous rate.[241] Vermont employs a different incentive, called a feed-in tariff, which permits homeowners with solar panels to enter into long-term contracts with utilities guaranteeing a specific rate for their excess energy.[242] These long-term contracts provide the certainty needed to encourage capital investment.[243]

Some policies create incentives by removing barriers to becoming a prosumer. Currently, more than thirty states and some municipalities have laws protecting access to sunshine for solar panel owners, potential owners, or users.[244] As an example, Boulder, Colorado's solar access laws require the inclusion of a hypothetical "solar fence" around protected buildings and prohibit new construction from shading adjacent lots beyond that zone.[245] Data sharing rules also make prosumption less onerous. These rules require utilities to publish information about the distribution network so that customers are

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239. Xcel Energy, *Residential Energy Efficiency*, https://www.xcelenergy.com/programs_and_rebates/residential_programs_and_rebates/home_energy_efficiency (last visited July 16, 2015).

240. For a list of current state incentives, see DSIRE, Database of State Incentives for Renewables & Efficiency, http://www.dsireusa.org/ (last visited July 17, 2015).

241. Under net energy metering programs, prosumers are effectively compensated at the retail rate for the excess electricity they generate. For a list of net metering programs by state, *see* U.S. Dept. of Energy, *Energy Efficiency & Renewable Energy, Net Metering Programs by State*, http://apps3.eere.energy.gov/greenpower/resources/maps/netmetering_ map.shtml (last visited July 17, 2015).

242. VT. STAT. ANN. tit. 30, § 8005a (2015).

243. While feed-in-tariffs are rare in the United States, they are popular in Europe and have been credited with driving the distributed generation revolution in several European countries. *See, e.g.*, KARLYNN CORY ET AL., NAT'L RENEWABLE ENERGY LAB., FEED-IN TARIFF POLICY: DESIGN, IMPLEMENTATION, AND RPS POLICY INTERACTIONS 1 (2009), http://www.nrel.gov/docs/fy09osti/45549.pdf (noting that feed-in tariffs are credited for the success of both German and Spanish renewable energy markets and suggesting that they might be more cost-effective than renewable portfolio standards); Wilson H. Rickerson et al., *If the Shoe FITs: Using Feed-in Tariffs to Meet U.S. Renewable Electricity Targets*, 20 ELECTRICITY J. 73 (2007) (crediting feed-in tariffs with driving "explosive renewable energy capacity growth in Europe during the past 15 years"); *but see* Steffen Jenner et al., Assessing The Strength and Effectiveness of Renewable Electricity Feed-In Tariffs in European Union Countries, 52 ENERGY POL'Y 385 (2013) (noting that the effectiveness of feed-in-tariffs in driving wind and solar power development in Europe is less clear than other studies have suggested and depends on policy design of individual programs). Spain offers a cautionary tale, since its tariff levels proved too generous, stimulating artificial market growth but quickly exhausting available funds. *See* Paul Voosen, *Spain's Solar Market Crash Offers a Cautionary Tale About Feed-In Tariffs*, N.Y. TIMES (Aug. 18, 2009), http://www.nytimes.com/gwire/2009/08/18/18greenwire-spains-solar-market-crash-offers-a-cautionary-88308.html?pagewanted=all.

244. COLLEEN MCCANN KETTLES, A COMPREHENSIVE REVIEW OF SOLAR ACCESS LAW IN THE UNITED STATES 6 (2008), http://www.solarabcs.org/about/publications/reports/solar-access/pdfs/Solaraccess-full.pdf (last accessed July 16, 2015).

245. BOULDER REV. CODE, ch. 9-9-17.

aware of where the best opportunities for prosumption exist.[246] Finally, on the procedural side, local governments can encourage the installation of on-site generation by lowering application costs.[247]

3. Environmental Regulation

Environmental regulation is a special form of indirect incentive that affects prosumer decisions. Environmental regulation that makes power generation from centralized plants—typically large fossil fuel-fired plants—more costly creates an incentive for utilities to obtain more of their energy from cleaner sources. These may include large nuclear or hydroelectric plants, utility-scale renewable sources, or distributed resources. Thus, while environmental policies may not directly encourage prosumption, they make renewable distributed generation, as well as energy efficiency, demand response, and energy storage, more economically competitive. Examples of such policies are greenhouse gas caps, like the one imposed by California's Global Warming Solutions Act, and more traditional limitations on air emissions under the federal Clean Air Act.[248]

The Environmental Protection Agency's (EPA's) Clean Power Plan is another environmental regulation likely to have a significant effect on prosumption. Promulgated under section 111(d) of the Clean Air Act, the Plan creates carbon pollution standards for existing power plants.[249] It requires those plants to meet standards based on the "best system of emissions reduction" that has been adequately demonstrated.[250] The EPA has determined that the "best system" for reducing carbon pollution from existing power plants is a combination of three "building block" approaches.[251] The Plan therefore sets individual state targets based on what reductions the EPA believes plants in those states can achieve using the "building blocks."[252] While the final Plan did

246. California has required its large investor-owned utilities to disclose technical information that would reveal distributed energy resource opportunities. *See* Jeff St. John, *California Utilities on Data Sharing: Yes, No, and Let's Talk About It*, GREENTECH MEDIA (July 9, 2015), http://www.greentechmedia.com/articles/read/california-utilities-on-data-sharing-yes-no-and-lets-talk-about-it.

247. *See, e.g.*, David Garrick, *Red Tape Cut for Home Solar*, SAN DIEGO UNION-TRIBUNE (July 23, 2014), http://www.sandiegouniontribune.com/news/2015/jul/23/solar-home-install-law-cheap-streamline/ (describing San Diego's new ordinance streamlining the rooftop solar application process and facilitating appeals of application denials).

248. *See* California Global Warming Solutions Act of 2006, CAL. HEALTH & SAFETY CODE § 25.5 (2015). Clean Air Act regulations are too numerous to cite individually and appear throughout Title 40, Subchapter C of the U.S. Code. 42 U.S.C. § 7401–7671q (2012).

249. Clean Power Plan, 80 Fed. Reg. 64,662, 64,665, 64,715 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).

250. *Id.* at 64,709.

251. *Id.* The building blocks are, first, making fossil fuel-fired power plants more efficient, second, increasing the use of lower-emitting natural gas plants, and, third, substituting renewable resources for fossil fuel-fired generation. *Id.*

252. For an interactive map of targets by state, see Ctr. for Climate & Energy Sols., Carbon Pollution Standards Map, http://www.c2es.org/federal/executive/epa/carbon-pollution-standards-map (last visited Jan. 18, 2016).

not consider distributed generation or demand-side management in calculating state targets,[253] states may use both technologies to comply with those targets.[254] Because demand-side management is relatively inexpensive in comparison to other avenues of compliance, encouraging prosumers to participate in energy efficiency and demand response programs will likely be an appealing option for states seeking to meet Clean Power Plan goals.[255]

4. Structural Reform

One state, New York, is considering fundamental changes to the structure of its electric power markets. The state's Reforming the Energy Vision strategy envisions a shift from a centralized, hub-and-spoke power production model to one incorporating distributed generation and demand-side management.[256] If the plan is adopted in its current form, utilities will eventually operate distributed system platforms, intelligent network platforms that perform integrated distribution system planning and coordinate grid and market operations.[257] One of the key goals of this model is to facilitate the development of distributed energy resources and to enable customers "to be active participants" in energy markets rather than passive recipients.[258] Although the process is collaborative, ultimately, New York's plan will be implemented through mandated system restructuring rather than relying primarily on incentives to alter behavior.[259]

Structural reform might also involve shifting regulatory responsibility to a new entity. For prosumers or potential prosumers frustrated by the slow pace of

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253. Clean Power Plan, 80 Fed. Reg. 64,662, 64,726 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).

254. *Id.* at 64,664, 64673-74, 64,810. *See also* Jeff Hopkins, *Modeling EPA's Clean Power Plan: Insights for Cost-Effective Implementation*, CTR. FOR CLIMATE & ENERGY SOLS. 2, 16 (2015), http://www.c2es.org/publications/modeling-epas-clean-power-plan-insights-cost-effective-implementation (last accessed August 1, 2015).

255. A Navigant Research report found that demand response could reduce carbon emissions from power plants by up to 2 percent. Brett Feldman, *Can Demand Response Help States Comply with the EPA's Clean Power Plan?* NAVIGANT RESEARCH BLOG (April 24, 2015), https://www.navigantresearch.com/blog/can-demand-response-help-states-comply-with-the-epas-clean-power-plan.

256. *See* Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, 2–3 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (Case 14-M-0101). Other states, including Hawaii, Massachusetts, Minnesota, and Colorado are exploring approaches similar to New York's.

257. *Id.* at 31.

258. *Id.* at 11. Indeed, the plan seeks, among other things, to increase "customer empowerment." *Id.* at 3 (Feb. 26, 2015). The Plan identifies distributed energy resource operators as both customers and partners of traditional grid service. *Id.* at 41. As partners, customers will be compensated for the value of the services they provide to the grid. *Id.* Utility ownership of distributed energy resources "will be the exception rather than the rule." *Id.* at 66. And utilities will only be permitted to provide distributed energy resources if competitive markets have failed to provide that service in a cost-effective manner (with limited exceptions). *Id.* at 68-69.

259. The state's Public Service Commission is implementing Reforming the Energy Vision in two tracks: the first focuses on developing distributed resource markets, while the second tackles reform of utility ratemaking practices. *Id.* at 5.

change at the federal and state levels, one increasingly appealing option is to explore public, localized regulation of the electricity sector. This approach, called municipalization, is particularly intriguing because of the parallels between it and the decentralization movement in energy market participation and energy governance.

Seeking to capitalize on innovation in decentralized generation and demand-side management, the city of Boulder, Colorado is currently attempting to municipalize its electricity system. Boulder hopes to "create the 'utility of the future,'"[260] which would support the city's goals of "democratization, decentralization and decarbonization of its power supply."[261] At least the first two of these goals are directly related to prosumption. Boulder hopes to "increase citizen participation in democratic decision making regarding their use of electricity" and "decentralize their energy source[s] through expanded distributed generation."[262] The process is complex, however, and Boulder has run into concerted opposition from the investor-owned utility currently serving the city.[263] If successful, however, Boulder may serve as a test case for other localities hoping to municipalize in order to increase prosumption and further environmental ends.[264]

Local leaders in Hawaii, too, are exploring the option of forming an electric cooperative or municipal utility to replace their local investor-owned utility.[265] Animating residents' desire for change are, first, the fear that the existing utility is not sufficiently sympathetic to distributed solar and, second, the prospect that a cooperative or municipal utility would be more willing to accommodate growing numbers of solar prosumers.[266]

260. In the Matter of the Application of the City of Boulder, Colorado for Approval of the Proposed Transfer of Assets from Public Service Company of Colorado to the City and Associated Authorizations and Relief, Verified Application of the City of Boulder, Colorado at 2 (July 7, 2015).

261. *Id.* at 5.

262. *Id.* at 9.

263. The investor-owned utility, Xcel Energy, has challenged Boulder's authority to condemn assets located outside the city limits that serve residents in unincorporated Boulder County without state public utility commission approval. Public Service Company of Colorado, Verified Petition for Declaratory Orders, Proceeding No. 13D-0498E (May 9, 2013). Xcel Energy has also challenged the Boulder ordinance approving municipalization directly. Complaint, Public Service Co. of Colorado v. City of Boulder (Dist Ct. Boulder Cnty. 2014). The utility has also sought review of Boulder's desired condemnation of a high-voltage transmission line by FERC. Petition for Declaratory Order of Public Service Company of Colorado, Docket No. EL14-97-000 (Aug. 26, 2014).

264. Cities including Minneapolis and Santa Fe have recently considered municipalizing their electric distribution system, though neither city has active plans.

265. The Hawaii Island Energy Cooperative has urged the state public utilities commission to consider a cooperative as an alternative to an investor-owned utility. *See* Press Release, Hawaiian Island Energy Cooperative (July 20, 2015) (on file with author).

266. Herman K. Trabish, *Inside Hawaii Activists' Push to Ditch HECO and Transform the Utility Business Model*, UTILITYDIVE (May 28, 2015), http://www.utilitydive.com/news/inside-hawaii-activists-push-to-ditch-heco-and-transform-the-utility-busin/399492/. Although the local utility, HECO, is now permitting new distributed solar after a lengthy moratorium, residents' fears have been exacerbated by a proposed merger between HECO and NextEra Energy, a large mainland energy company. *Id.*

While municipalization can have significant downsides—among them concerns about cost, reliability problems, and legal challenges[267]—it is a way for prosumers and other citizens to achieve greater control over electricity grid decisions. Without minimizing its drawbacks, it is safe to conclude that municipalization has significant potential to democratize electricity decision making and enhance prosumer participation in energy governance and policy formation.[268]

B. Experimentation in Electricity Policy

Prosumption today is a product of the rich ecosystem of policies described in the previous subpart. The success of such "all of the above" strategies in driving change is nothing new. Professors James Liebman and Charles Sabel have explained education reform as a "fusion of a top-down national movement for standards and bottom-up initiatives."[269] Other new governance scholars also emphasize the opportunities for synergies between centralized, top-down regulation and more decentralized governance strategies.[270]

Because of their heterogeneity and decentralization, policies to promote prosumption to date have the flavor of democratic experimentalism. Democratic experimentalism has been lauded as an alternative to "comprehensively rational" policy making (attempts to address all contingencies in one, overarching policy that will solve the problem at issue). The basic justification for experimental policies is that we lack sufficient experience in the area to draw firm conclusions about optimal policy design.[271]

Professor Charles Lindblom offered the seminal defense of experimentalism's precursor, incrementalism. Lindblom referred to incrementalism as "muddling through."[272] He emphasized that some problems

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267. *See* REBECCA JOHNSON, MUNICIPAL ELECTRIC UTILITIES: ANALYSIS AND CASE STUDIES 4-5 (2006), http://fivestarconsultants.com/Grad_Projects_files/Municipal%20Electric%20Utilities.pdf (outlining pros and cons of municipalization); Suedeen G. Kelly, *Municipalization of Electricity: The Allure of Lower Rates for Bright Lights in Big Cities*, 37 NAT. RESOURCES J. 43, 43, 53–57 (1997). Additional questions have been raised about federal constitutional limitations on municipalization. Shelley Ross Saxer, *Eminent Domain, Municipalization, and the Dormant Commerce Clause*, 38 U.C. DAVIS L. REV. 1505 (2005).

268. *See* Kathryn C. Browning, *Electric Municipalization in the City of Boulder: Successful Greening or Path to Bankruptcy?* 35–36, *CMC Senior Theses*, Paper 562. http://scholarship.claremont.edu/cmc_theses/562 (2013) (arguing that municipal utilities are more responsive to the public because they serve a smaller number of customers).

269. James S. Liebman & Charles F. Sabel, *The Fragile Promise of Provisionality*, 28 N.Y.U. REV. L. & SOC. CHANGE 369, 370 (2003).

270. Orly Lobel, *The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought*, 89 MINN. L. REV. 342, 344 (2004).

271. Defenders of democratic experimentalism note that some problems appear intractable because we simply do not know which path will best resolve them. Liebman and Sabel, *supra* note 269, at 381 (opining that democratic experimentalism is the right "strategy for citizens and courts to pursue where there is no clear strategy for doing what practically and constitutionally needs to be done.").

272. Charles Lindblom, *The Science of "Muddling Through*," 19 PUB. ADMIN. REV. 79, 80 (1959) (noting that comprehensive resolution of all but the simplest problems requires "intellectual capacities

were simply too complex to foresee all possible effects of a given policy choice.[273] Professor Colin Diver extended Lindblom's incrementalist paradigm, proposing more specific scenarios in which incrementalism might be preferable to comprehensive rationality. Diver found that incrementalism was typically appropriate in the first years of a new policy initiative.[274]

There are several reasons to think that a decentralized, incremental, or experimentalist approach to encouraging prosumption is desirable at this time. First, prosumption involves complex and rapidly developing technology. As early as 1981,[275] Diver specifically cited nonnuclear energy production as a prime candidate for incremental policy making because of the considerable technological uncertainty in the field.[276] If anything, that technological complexity has only increased with the advent of prosumers and distributed energy resources. In addition, Diver noted that regulation of public utilities, while originally a suitable candidate for more comprehensive regulation, was, by the 1980s, a better candidate for incrementalism because of the unstable nature of the industry.[277] Electric industry "instability" is perhaps as pronounced today as at any time since the restructuring in the late 1980s and 1990s due to the integration of distributed energy resources. Thus, incrementalism or experimentalism in utility regulation generally, and in regulation of prosumers specifically, is a much more appealing strategy than comprehensive rationality.

Even for those who believe it is time for a more coordinated, centralized policy when it comes to prosumers and distributed energy resources, an incrementalist or experimentalist approach might still be viewed as an acceptable second-best. This is because experimental policies may be deployable even in an atmosphere of partisan legislative gridlock, where synoptic policy making is impossible.[278] Because it is currently difficult to secure agreement on environmental and energy policies in Congress, a more experimentalist approach to prosumption regulation might be justified, even for

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and sources of information that men simply do not possess"). Lindblom recommends problem solving via "a method of successive limited comparisons." *Id.* at 81 (emphasis removed). This involves clarifying and adapting both objectives and policies as steps are taken and effects are measured. *Id.*

273. *Id.*

274. Colin Diver, *Policymaking Paradigms in Administrative Law*, 95 HARV. L. REV. 393, 431 (1981). Diver cautioned, however, that a more comprehensive approach was better suited to areas where policy mistakes might result in irreparable harm—in which case incremental adjustments would be fruitless—or where policy choices might harm groups powerless to participate in future policy adjustments. *Id.* Relatedly, Professor Allen Rostron has criticized the use of incremental policymaking to regulate firearms, noting that, in this area, incremental policies risk creating significant public backlash that can undermine the broader regulatory project. Allen Rostron, *Incrementalism, Comprehensive Rationality, and the Future of Gun Control*, 67 MD. L. REV. 511, 514 (2008).

275. Diver, *supra* note 274, at 431.

276. *Id*. at 433.

277. *Id.* at 431.

278. Liebman & Sabel, *supra* note 269, at 380 (ascribing such an understanding to Mark Tushnet).

those who believe it would be ideal to implement a comprehensive, overarching strategy given greater political consensus.

One caveat is in order. While the existing decentralized approach to prosumption policy making resembles an incrementalist or experimentalist approach in practice, there is no single policy maker or group of policy makers that has selected and implemented either of those approaches.[279] Instead, we have a landscape of policies that approximates what a centralized policy maker might select under conditions of uncertainty about goals and pathways. To reap the full benefits of an incrementalist or experimentalist approach, greater centralization, or at least increased coordination, is necessary.[280] Such coordination would allow for modifications that respond to some of the critiques of experimentalist approaches. Professor David Super has suggested two program components essential to good experimentalist policy. First, a consensus around interim aims must exist before a decentralized, experimentalist regime can be effective.[281] Second, reliable metrics to measure policy effectiveness must be generated.[282] Diver makes a related point: policy makers must be willing and able to dedicate adequate resources over time to adjust to new information and changing circumstances.[283] A centralized, coordinated strategy, then, would help ensure better policy, even in the current experimentalist landscape.

In order to best capitalize on the policy experimentation surrounding prosumption, then, the federal government or some other trusted broker should first establish a common set of goals for prosumption policy. The success or failure of the various policies in this area might then be better evaluated on an ongoing basis for their consistency with those goals. Of course, goals should be modified in light of the information that policy experiments yield. Actors implementing the various policies should make adjustments based on this feedback.[284] There might also be a role for the federal government, and in

279. In the Energy Policy Act of 2005, Congress noted that "[i]t is the policy of the United States to encourage States to coordinate, on a regional basis, State energy policies to provide reliable and affordable demand response services to the public." 16 U.S.C. § 2642 (2012). Congress committed the federal government to work with the states to identify and address barriers to demand response, including by providing technological assistance, and required state regulatory authorities to "consider" establishing demand response programs. § 2622(b), 2642. Federal legislative statements such as these come the closest to formal adoption of an experimentalist approach.

280. *See* Brandon L. Garrett & James S. Liebman, *Experimentalist Equal Protection*, 22 YALE L. & POL'Y REV. 261, 290 (2004) ("The gist of experimentalism . . . is the definition by the 'center' of an important public problem and the center's setting of rough improvement goals and incentives for improvement.").

281. David Super, *Laboratories of Destitution: Democratic Experimentalism and the Failure of Antipoverty Law*, 157 U. PA. L. REV. 541, 553-554 (2008). Martha Minow has also raised these concerns in the context of education reform. *See* Martha Minow, *School Reform Outside Laboratory Conditions*, 28 N.Y.U. REV. L. & SOC. CHANGE 333, 334, 338 (2003).

282. Super, *supra* note 281, at 556.

283. Diver, *supra* note 274, at 430–31.

284. The option for policy adjustments might be preserved by making statutes and regulations flexible enough to allow adaptation, or at least amendment of some kind. Professor Zachary Gubler has

particular, the national laboratories, in helping to derive metrics to measure the effectiveness of particular prosumer policies. Individual federal agencies, states, and localities could then adapt these metrics to evaluate the success or failure of their various programs.

The experimentalist state of prosumption sheds new light on the puzzles presented in Part II. As I have written elsewhere, a first-best resolution of at least some of these puzzles might entail a legislative solution.[285] While experimentation with different forms and levels of prosumption is ongoing, however, the various stop-gaps, fictions, and trials that FERC and state regulators have developed to deal with prosumption quandaries may be not only adequate, but desirable. A first-best solution to the jurisdictional puzzles presented above, for example, would likely involve a reworking of the FPA. Those revisions might leave the basic allocation of authority between state and federal regulators unmodified, but specify which regulator has authority over net metering arrangements, on the one hand, and demand response in wholesale markets, on the other. Or, we might imagine a wholesale redesign of the Act's jurisdictional boundaries, allocating greater authority over electric power to the federal government.[286] Each of these approaches comes with complexities and problems of its own and would thus need to be undertaken only after careful planning and projection. It may be, however, that when it comes to prosumption and its related behaviors, we have not yet achieved a sufficient enough understanding of the technologies and policies involved to institute a comprehensive legislative solution. That said, more information is not always valuable, and at some point, legislators must grasp the nettle.[287] But prosumption technologies are, if not in their infancy, at least in their adolescence, and the implications of more widespread prosumption for the electricity grid and for electricity governance are still uncertain. At this stage in prosumption's development, therefore, prudence may be prescribed.

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proposed the increased use of "experimental rules"—rules subject to sunset provisions where the primary aim is to generate data to inform an agency's decision about whether to issue a permanent rule, modify the rule, or embrace the status quo. Zachary J. Gubler, *Experimental Rules*, 55 B.C. L. REV. 129, 130–31 (2014). Glicksman and Shapiro have also emphasized the importance of back-end adjustments in incremental or experimental problem solving. Robert L. Glicksman & Sidney A. Shapiro, *Improving Regulation Through Incremental Adjustment*, 52 U. KAN. L. REV. 1179 (2004) ("One important advantage of proceeding in this manner is that regulatory policy is adjusted in light of its actual impact, as compared to the significant guesswork that is required to use front-end analysis.").

285. *See* Jacobs, *supra* note 3, at 940–42.

286. *But see* Amy Stein, *The Tipping Point of Federalism*, 45 CONN. L. REV. 217 (2012) (explaining that federalization, even where warranted by traditional justifications of centralized governance, can be delayed where there are adequate opportunities for federal agencies to participate in existing regimes).

287. *See* David Super, *Against Flexibility*, 96 CORNELL L. REV. 1375, 1380 (2011) (noting that while information may become more plentiful over time, decisional resources may become scarcer).

C. Elements of a Prosumer Electricity Policy

At some point, perhaps in the not too distant future, we will have a better sense of whether and how increased prosumption will further key energy law goals, and at what cost. We will also have a better sense of what types of prosumption are most beneficial, and how best to minimize prosumption's downsides. Finally, we will have more information about how to integrate prosumption and prosumers into an effective governance regime. Then we may turn from experimentalist strategies to more comprehensive policy making. That is also the point at which we may reach what Professor Amy Stein has called "the tipping point of federalism," in which the federal government assumes primary responsibility for legislating in a given area.[288]

While the future of prosumption is impossible to predict with any certainty, possible scenarios fall into three broad categories. First, the future might look very much like today. Utilities would still play the central role in procuring and delivering electricity to end-use customers, with distributed generation playing only a marginal role. Demand response and energy efficiency programs would exist, but not on any significant scale. In this future, the prosumer role would be minimal. Second, we might see a marked increase in distributed generation, demand response, and energy efficiency, but with traditional utilities remaining the dominant industry force. In such a world, prosumers would play a meaningful but supporting role, while utility-scale renewables would dominate the market, and the focus would remain on electricity supply rather than demand. Finally, we might see comprehensive restructuring of electricity markets and systems at the distribution level. Traditional utilities might be reinvented, prosumers might become the primary source of generation, and demand management could achieve parity with supply management.

Regulatory experimentation must be given time to work, and it would be premature at this juncture to draw firm conclusions about ideal system design for a prosumer economy. Nevertheless, essential elements of such a system can be identified given the norms underlying modern electricity regulation. An increased focus on competition in wholesale and some retail markets cuts in favor of special incentives to encourage prosumer activity. This activity would compete with traditional generators, offering utilities and consumers greater choice and mitigating generator market power. From a competition perspective, therefore, affirmative incentives for prosumer activity are desirable, as is mitigation of barriers to prosumer participation (such as the streamlining of interconnection applications for new distributed generation).

Environmental norms also suggest a larger role for demand-side management as well as clean distributed generation. In many ways, environmental norms could be satisfied equally well by utility-scale renewable

288. *See* Stein, *supra* note 286.

generation as by distributed renewable generation. One factor weighing sharply in favor of distributed renewable generation, however, is land use. Utility-scale projects require large tracts of land to be devoted to new installations (with attendant ecosystem impacts). By contrast, distributed renewable generation can be developed in existing built environments.[289]

While competition and environmental norms favor increased development of certain types of distributed generation, as well as more energy efficiency and demand response, these goals must still be balanced against traditional electricity law values. Traditional values require that prosumer activity be encouraged only to the extent that such activity will not interfere with system reliability and will not lead to large rate increases for traditional consumers. This will require that utilities and regulators continue to proceed cautiously in integrating distributed generation and demand-side management. To that end, caps on the total amount of distributed generation on a distribution circuit may be prudent, so long as those caps are revisited regularly. Caps give system operators time to ensure that increasing distributed power will not overwhelm system capabilities. Care should be taken, however, that these caps are not static and that they are raised as systems adapt to a distributed energy environment. With respect to demand response and energy efficiency, operators must be able to plan in advance for demand fluctuations. Longer-term capacity auctions such as those used in several wholesale markets are a good way to make commitments of demand-side management more predictable.[290]

With respect to rates, greater transparency in pricing distributed generation and demand response is desirable. With more accurate pricing of prosumer services, cross-subsidization and cost-shifting will be less of a concern. Value of solar tariff proceedings like Minnesota's provide a more granular utility-specific look at the costs and benefits of solar installations than do traditional net metering tariffs.[291] Screening mechanisms like FERC's net benefits test for demand response might also be appropriate to ensure that the system benefits of increased prosumption outweigh the costs.[292] One caveat is that costs of prosumer activities are often simpler to calculate than benefits and typically manifest in the short term, while benefits take longer to realize. Longer-term planning, with numbers revisited regularly, should therefore be part of any cost-benefit calculation related to prosumer activities.

289. For some of the impacts of large renewable generation facilities on wildlife see Alexandra B. Klass, *Energy and Animals: A History of Conflict*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 159, 182–95 (2012).

290. In capacity markets, grid operators procure commitments to provide electricity in advance, thus ensuring the availability of power as needed. *See* Andrew H. Meyer, *Federal Regulatory Barriers to Grid-Deployed Energy Storage*, 39 COLUM. J. ENVTL. L. 479, 521–22 (2014).

291. Austin, Texas implemented the first value-of-solar pricing mechanism. *See* Karl R. Rabago et al., *Designing Austin Energy's Solar Tariff Using a Distributed PV Value Calculator (*2012) (on file with author).

292. *See supra* subpart III.A.2.

Finally, with respect to the democratic values identified in subpart III.C, regulators and utilities should engage in outreach and education to stimulate more meaningful prosumer participation in regulatory processes. State and federal regulators may wish to take the further step of creating government offices to represent prosumers specifically. A more modest step would simply be to educate regulators about the importance of obtaining the prosumer perspective in any regulatory proceeding that would affect prosumer interests.

Within these broader outlines, a wide array of policy environments would be consistent with modern energy law norms. Which regulatory schemes ultimately emerge as winners will depend on the success or failure of the various experiments now taking place at both the federal and state levels. For now, however, heterogeneity should be encouraged, not stifled.

CONCLUSION

Life moves quickly, regulation less so. This Article has documented the emergence of a new category of energy actor, which it has christened the energy "prosumer," and has explained some of the challenges existing regulatory schemes have faced in accommodating these new stakeholders. It has also defended prosumption as consonant with a modern understanding of the norms underlying our energy regulatory system.

Which of the energy futures outlined in Part V is to emerge will depend on the outcome of the policy experiments currently taking place at the federal, state, and local levels. The federal government may have a role in guiding this experimentation, but prosumption will have to prove its value before policies mandating its broader adoption are implemented.

Continued experimentation will require both motivated prosumers and political leadership. Professor David Spence has frequently highlighted the disconnect between the economic desirability of energy policy reform and such reform's political feasibility.[293] To overcome opposition to prosumption, especially that mounted by well-funded interest groups, political champions will likely be necessary. Such champions have driven many of the key experiments in prosumption to date. Consider former FERC Commissioner Jon Wellinghoff's full-throated support for demand response participation in wholesale markets, for example,[294] or New York Governor Andrew Cuomo's push for a redesign of the state's electricity system to emphasize distributed energy resources.[295]

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293. *See, e.g.*, Spence, *supra* note 5, at 1608 (pointing out that the complexity of energy regulation makes the issue less salient to voters and, therefore, to politicians); David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 810-11 (2008) (noting that while regulators are often focused on efficiency, politicians remain more concerned about high consumer prices).

294. *See* Jacobs, *supra* note 3, at 900 n.66.

295. *See, e.g.*, GOVERNOR ANDREW M. CUOMO, 2015 OPPORTUNITY AGENDA 132 ("Let history show that New York chose to take action, to lead, and to be a part of the solution rather than the problem.").

It is also possible that experimentation itself might create the conditions for a prosumption tipping point. First, experimentation might change the economics of prosumption. As the utilities and federal, state, and local governments experiment with incentive programs and mandates, they encourage the rise of a new marketplace in prosumer technologies. This rise, in turn, ideally leads to greater competition between companies providing technologies and services, greater innovation by those companies, and, consequently, reduced costs. The hope is that these lower costs will make what were once government-subsidized technologies and services self-sustaining in the marketplace. Second, experimentation and subsidies can lead to the creation or strengthening of interest groups that become entrenched.[296] These interest groups become part of the political ecosystem and strong advocates for the continuation of prosumption policies. For example, manufacturers and installers of home solar systems have a vested interest in the success and expansion of prosumption, as do demand response aggregators. Thus, as Professor Eric Biber has argued in the context of climate change, experimentalism may be a successful strategy for prosumption because "a comprehensive solution may only be achievable once intermediate policy steps have cultivated a friendly political landscape by building up supportive interest groups."[297]

These phenomena can limit the success of experimentation in that they bias future developments in favor of the experimental phenomenon rather than the status quo. However, they do not necessarily outweigh the benefits of decentralized experimentation in the first instance. If the status of experiments is evaluated periodically according to a verifiable metric, as suggested above in response to David Super's concerns, experiments will be permitted to continue no longer than necessary to assess a policy's viability. Ideally, any failed policy experiments will be halted before interest group entrenchment can occur.

While the shift to a more distributed energy economy may occur over years or even decades, policy makers would do well to acknowledge the distinctiveness of prosumers in managing that transition. By recognizing a new category of energy system actor, the prosumer, policy makers can weigh more explicitly the benefits and costs, in terms of the goals of the electricity system, of encouraging greater participation by these actors. They can also more squarely confront the distributional tradeoffs created by prosumer participation and ensure that prosumers have a voice in regulatory processes. Ultimately, sound energy policy involves the weighing of competing goals and objectives. As the D.C. Circuit held in a 1982 case, "the regulatory schemes that [FERC] administers involve a subtle and a difficult balancing of producer and consumer

296. *See* Eric Biber, *Cultivating a Green Political Landscape: Lessons for Climate Change Policy from the Defeat of California's Proposition 23*, 66 VAND. L. REV. 399 (2013) (suggesting that the Proposition 23 campaign strengthened renewable energy and energy efficiency interest groups).

297. *Id.* at 402.

interests."[298] With the emergence of the energy prosumer, that balancing act promises to become more difficult still.

298. S. Cal. Edison Co. v. FERC, 686 F.2d 43, 46 n.4 (D.C. Cir. 1982).