CLEAN ELECTRIFICATION

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To combat climate change, many leading states have adopted the aim of creating a "participatory" grid. In this new model, electricity is priced based on time of consumption and carbon content, and consumers are encouraged to adjust their behavior and adopt new technologies to maintain affordable electricity. Although a more participatory grid is an important component of lowering greenhouse gas emissions, it also raises a new problem of clean energy justice: utilities and consumer advocates claim that such policies unjustly benefit the rich at the expense of the poor, given the type of consumer best able to participate in the grid. These arguments pitting clean energy against equity often prove persuasive to energy regulators considering whether to adopt or maintain clean energy policies.

But these arguments fail to seriously engage the question of how energy law's historical equity norms should be interpreted and applied in the era of climate change. This Article concludes that there are legitimate and underappreciated equity concerns with the participatory grid, given that participation in the grid is likely to stratify along income lines. However, these equity concerns do not justify slowing progress on climate change, given the extreme inequities raised by that problem itself. Fortunately, however, there is a longstanding tradition of attention to equity concerns within electricity law that paves a way forward. Throughout the twentieth-century project of

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electrification, electricity law focused on expanding the range of Americans able to access affordable electricity. Twenty-first century regulators, in contrast, plan to require consumers to participate *in the grid in order to maintain affordable power. This new vision requires a new instantiation of electricity law's long-standing equity commitment: a project of "clean electrification," which seeks to expand participation in emerging clean energy marketplaces to all Americans.*

INTRODUCTION

Since the 1990s, the environmental justice movement has persuasively argued that environmentalism suffers from a class and race problem, given the ways in which environmental laws appear to concentrate environmental harms in low-income and minority communities.[1] Responding to this critique, environmentalists and politicians have more recently celebrated the potential for clean energy policies to benefit low-income and minority communities by providing secure, well-paying jobs.[2] Some such jobs are materializing, particularly in the booming field of rooftop solar energy,[3] but with unfortunate side effects: the suite of policies boosting green jobs also creates a new genre of environmental justice challenges,[4] which this Article terms "clean energy justice."

The clean energy justice concerns addressed here focus on the inequitable effects of clean energy policies, which may often disproportionately benefit the wealthy while leaving remaining

1. *See* Richard J. Lazarus, *Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787, 790 (1993); LUKE W. COLE & SHEILA R. FOSTER, FROM THE GROUND UP: ENVIRONMENTAL RACISM AND THE RISE OF THE ENVIRONMENTAL JUSTICE MOVEMENT 31–32 (2001). For a recent prominent example, see John Eligon, *A Question of Environmental Racism in Flint*, N.Y. TIMES (Jan. 21, 2016), http://www.nytimes.com/2016/01/22/us/a-question-of-environmental-racism-in-flint.html?_r=0 [https://perma.cc/MS22-3Q43].

2. In THE END OF ENERGY, Michael Graetz quotes President Obama as promising "[m]illions of new jobs. Jobs that pay well" as a result of clean energy policies. MICHAEL GRAETZ, THE END OF ENERGY 167 (2011); *See also* VAN JONES WITH ARIANE CONRAD, THE GREEN COLLAR ECONOMY: HOW ONE SOLUTION CAN FIX OUR TWO BIGGEST PROBLEMS 10–11 (2008); Michael Bastasch, *Hillary Mimics Obama and Promises "Millions of Green Jobs,"* DAILY CALLER (June 15, 2015), http://dailycaller.com/2015/06/15/hillary-mimics-obama-and-promises-millions-of-green-jobs/ [https://perma.cc/KC9P-VDKC]. *But see* Michelle Chen, *Where Have All the Green Jobs Gone?*, THE NATION (Apr. 22, 2014), https://www.thenation.com/article/where-have-all-green-jobs-gone/ [https://perma.cc/27AV-RRAF] (chronicling the disappointment of many in the labor movement as green jobs have failed to provide large-scale, long-term employment solutions). Graetz advocates "[a] hefty dose of skepticism" about the green jobs rhetoric. *Supra* at 169.

3. *See* Cristina Maza, *Solar Power: The Next Energy Jobs Juggernaut?*, CHRISTIAN SCI. MONITOR (Jan. 14, 2016), http://www.csmonitor.com/Environment/Energy/2016/0114/Solar-power-the-next-energy-jobs-juggernaut [https://perma.cc/DYK9-Y7VR] ("[O]ne out of every 83 new jobs created economy-wide in 2015 was in the solar industry.").

4. In contrast to the traditional environmental justice focus on concentration of environmental harms in low-income communities, the focus of clean energy justice is on the concentrated accrual of environmental, economic, and participatory benefits to more affluent Americans, while others are left behind.

energy consumers to shoulder outsized costs.[5] Take, for example, the case of Arizona, one of forty-four states to adopt "net metering," a policy that lets those who install solar panels run their electricity meters backwards when they make more power than they can use.[6] Net metering has helped make solar panels the "next granite countertop," a desired accessory for affluent homebuyers.[7] But the fact that net metering lowers these consumers' bills means that those without solar panels pay proportionally more to support the electricity grid's upkeep. A 2013 television spot aired in opposition to the policy draws upon this fact. The spot features a worried mother, with two children at the table behind her completing homework, who looks into the camera and explains: "Fairness—it's something we value in Arizona. At a time when so many are struggling to pay their bills, it just doesn't make sense to force hard-working families to cover the costs for people who choose to add solar panels."[8] In response to this campaign, Arizona regulators voted to impose additional monthly charges on solar customers and thereby slowed the growth of renewable energy in the state.[9]

Was Arizona right to slow a successful clean energy program partly on the ground that affluent customers participated in greater numbers? State regulators and energy law scholars have recently begun to devote considerable attention to this question. Regulatory proceedings in dozens of

5. By defining the concerns I address here as "clean energy justice" concerns, I do not mean to limit the emerging field of clean energy justice to these distributive challenges alone, although I believe them to be a central problem of the field. Clean energy justice might also include concerns over any disproportionate impacts of siting "clean energy" facilities, questions of how to best empower low-income and minority communities to choose how and when to participate in clean energy, and a range of other concerns about the ways that clean energy touches (or fails to touch) low-income and minority communities.

6. *See* ARIZ. ADMIN. CODE. § R14-2-1811 (2016); WILSON RICKERSON ET AL., INT'L ENERGY AGENCY (IEA), RESIDENTIAL PROSUMERS—DRIVERS AND POLICY OPTIONS 77 (2014).

7. Justin Doom, *Solar Panel Is Next Granite Countertop for Homebuilders*, BLOOMBERG (Sept. 11, 2013, 10:13 AM), http://www.bloomberg.com/news/articles/2013-09-10/solar-panel-is-next-granite-countertop-for-homebuilders [https://perma.cc/H2VF-HFMR].

8. Prosper.org, *A Fair Solar Future*, YOUTUBE (Aug. 23, 2013), https://www.youtube.com/watch?v=kpgXhQXgKGE [https://perma.cc/A79B-D8SA].

9. *See* Arizona Public Service Company's Application for Approval of Net Metering Cost Shift Solution, 310 P.U.R.4th 121 (Ariz. Corp. Comm'n 2013) [hereinafter AZ Net Metering Decision]; Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115, 121 (2015).

states are considering the distributive effects of existing or proposed clean energy policies.[10] At the same time, scholars have disputed the legitimacy of distributive concerns,[11] discussed the need to balance affordability and environmental concerns within public utility law,[12] called for greater investment into renewable energy and energy efficiency in low-income and minority communities,[13] and more generally questioned the durability of electricity law's current structure in a clean energy future.[14]

To date, however, no one has offered sustained engagement with the questions of how electricity law has historically coped with distributional concerns, and how clean energy policies challenge the field's long-standing practices in this regard. Perhaps the failure to engage deeply with the distributive justice arguments against clean energy stems from their sources. Utilities and libertarian advocacy groups advance the majority of these claims, raising questions about their underlying motivations.[15] But the source of these

10. *See infra* Part III.

11. Rule, *supra* note 9, at 116 (cataloguing utility campaigns against net metering and questioning their use of "notoriously fuzzy" fairness arguments).

12. Jonas J. Monast & Sarah K. Adair, *A Triple Bottom Line for Electric Utility Regulation: Aligning State-Level Energy, Environmental, and Consumer Protection Goals*, 38 COLUM. J. ENVTL. L. 1, 3–4 (2013).

13. *See* Deborah N. Behles, *From Dirty to Green: Increasing Energy Efficiency and Renewable Energy in Environmental Justice Communities*, 58 VILL. L. REV. 25, 25 (2013) (arguing for increased "development of renewable energy and energy efficiency in environmental justice communities" as a matter of policy); Vien Troung, *Addressing Poverty and Pollution: California's SB 535 Greenhouse Gas Reduction Fund*, 49 HARV. C.R.-C.L. L. REV. 493, 496 (2014) (describing effort to bring California's cap-and-trade revenues to low-income communities).

14. *See generally* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614 (2014); Joel B. Eisen, *An Open Access Distribution Tariff: Removing Barriers to Innovation on the Smart Grid*, 61 UCLA L. REV. 1712 (2014); *see also* Elisabeth Graffy & Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*, 35 ENERGY L.J. 1, 2 (2014); Michael P. Vandenbergh & Jim Rossi, *Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction*, 65 VAND. L. REV. 1527, 1530 (2012) (describing how utilities' business model presents a barrier to reducing demand); Elias L. Quinn & Adam L. Reed, *Envisioning the Smart Grid: Network Architecture, Information Control, and the Public Policy Balancing Act*, 81 U. COLO. L. REV. 833, 839–41 (2010) (describing the tensions that exist between regulated utilities and the smart grid agenda).

15. *See* Suzanne Goldenberg & Ed Pilkington, *ALEC Calls for Penalties on "Freerider" Homeowners in Assault on Clean Energy*, GUARDIAN (Dec. 4, 2013), https://www.theguardian.com/world/2013/dec/04/alec-freerider-homeowners-assault-clean-energy [https://perma.cc/9KYP-MQBY] (explaining how "[a]n alliance of corporations and conservative activists is mobilizing to penalise

arguments must be analytically separated from the question of their legitimacy.

This Article evaluates the distributive justice arguments against clean energy on their merits. It argues that there are real reasons to be concerned that many of our most popular clean energy policies will collectively help to create a new rift in America: one class that employs increasingly sophisticated gadgets to manage its energy use, save money, and gain an attendant sense of participation in collective problem-solving; and a second class that cannot afford such technologies and pays mounting electricity bills caused by the need to decarbonize the grid.[16] But although it affirms the legitimacy of this challenge, the Article calls into question the cabined nature of the present debate over clean energy's distributive consequences.

Mainstream arguments highlight the immediate economic inequities of clean energy policies, charging that such disparities provide reason for halting the policies.[17] But the idea that one could stem these inequities through slowing clean energy policies is rendered problematic by the complex inequities of climate change itself. Climate change will harm the poor first, worst, and longest—the poor of today, the poor of tomorrow, and the poor both domestically and internationally.[18] To halt clean energy policies on distributive justice grounds is thus a more complicated equity tradeoff than many advocates would have regulators believe.

This Article argues that electricity law provides a framework for a more nuanced approach to the question of how to manage clean energy's justice challenges. Distributive justice concerns emerge in electricity law via long-standing debates over what role "equity" should play within the field.[19]

homeowners who install their own solar panels"); *see* Editorial, *The Koch Attack on Solar Energy*, N.Y. TIMES, (Apr. 27, 2014), http://www.nytimes.com/2014/04/27/opinion/sunday/the-koch-attack-on-solar-energy.html?_r=0 [https://perma.cc/8252-LSB6] (documenting Koch Industries' prominent role in challenges to state clean energy policies).

16. "Decarbonization" is the elimination of carbon emissions—the chief cause of climate change—from electricity production. Methods of decarbonization are discussed *infra* Part I.F.

17. Part III *infra* discusses four clean energy policies under particular assault on equity grounds: net metering, dynamic pricing, electric vehicle subsidies, and energy storage.

18. *See infra* Part III.A.

19. For this reason, throughout this Article I refer to the challenges raised

Over time, electricity law has toggled between, and drawn from, theories of both equity and efficiency. One line of argument, emphasizing equity—or "fairness"[20]—asserts that a central goal of electricity law should be to bring power even to those who struggle to afford it. The other predominant theory—which rests on efficiency—argues that the aim of electricity law should be to price services according to their costs as precisely as possible, to provide the greatest overall welfare benefits.[21] Observing the fact that electricity law, in practice, fits neatly within neither of these frameworks, some scholars have suggested that "equity" is "the mother of all confusion" within electricity law.[22] In contrast, this Article suggests that there is an underlying coherence to this dialectic: energy law's central distributive norm is one of ensuring *widespread access to affordable power*. Achieving this aim has always required compromise between the two poles of efficiency and equity. And, as this Article traces, regulators have made just these

against clean energy on distributional grounds as implicating "equity" concerns, by which I simply mean questions over how the benefits and burdens of the policies are allocated. *See, e.g.,* Daniel A. Farber, *Pollution Markets and Social Equity: Analyzing the Fairness of Cap and Trade*, 39 ECOLOGY L.Q. 1, 7 (2012) (defining equity as the consideration of "uneven impact of a program on different groups or individuals").

20. *See generally* EDWARD E. ZAJAC, FAIRNESS OR EFFICIENCY: AN INTRODUCTION TO PUBLIC UTILITY PRICING (1978) (arguing that public utility law is largely an ongoing contest between the aims of fairness and efficiency). *See also* BENJAMIN K. SOVACOOL & MICHAEL H. DWORKIN, GLOBAL ENERGY JUSTICE: PROBLEMS, PRINCIPLES, AND PRACTICES 5 (2014) (defining "an energy-just world as one that equitably shares both the benefits and burdens involved in the production and consumption of energy services" and that "involves the right of all to access energy services").

21. For sources setting forth the tension between the two camps, see *supra* note 20; JAMES C. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES (1961); CHARLES F. PHILLIPS, JR., THE REGULATION OF PUBLIC UTILITIES 20 (3d ed. 1993); Harry M Trebing, *Equity, Efficiency, and the Viability of Public Utility Regulation*, in APPLICATIONS OF ECONOMIC PRINCIPLES IN PUBLIC UTILITY INDUSTRIES 17 (Werner Sichel & Thomas G. Gies eds., 1981); Richard A. Posner, *Taxation by Regulation*, 2 BELL J. ECON. & MGMT. SCI. 22, 23 (1971) (elucidating the phenomenon of "internal subsidies," which cuts against theories suggesting that regulation's purpose is "to approximate the results of competition"); Jim Rossi, *The Common Law "Duty to Serve" and Protection of Consumers in an Age of Competitive Retail Public Utility Restructuring*, 51 VAND. L. REV. 1233, 1235 (1998) (explaining the inherent tension between providing aid to low-income customers and implementing competition).

22. W. ARTHUR LEWIS, OVERHEAD COSTS 47 (2003). This confusion stems from an inability to pinpoint the animating theory of electricity law—sometimes, it appears deeply efficiency focused; at other times, it seems to care primarily about distributive concerns. *See infra* Part II for more details on this dialectic.

sorts of compromises in both long-standing and more recent electricity law frameworks.

Climate change complicates the regulatory commitment to widespread, affordable power. Experts widely agree that there is a need for rapid "decarbonization" of the electricity sector in order to effectively combat climate change and avoid dangerous levels of warming.[23] To decarbonize, electricity regulators will have to build new legal frameworks that achieve high penetration of low- or no-carbon electricity generation, likely at considerable expense.[24] Concordantly, they will have to grapple with the complicated question of how to preserve the field's commitment to widespread, affordable electricity in a world where we now need to promote *less* electricity consumption.[25]

This Article asserts that there is space within these changing aims to preserve a commitment to distributive justice

23. *See* James Hansen et al., *Assessing "Dangerous Climate Change": Reduction of Carbon Emissions to Protect Young People, Future Generations, and Nature*, PLOS ONE, Dec. 2013, at 2 (finding that "there are already clear indications of undesirable impacts at the current level of warming and that 2°C warming would have major deleterious consequences"); SIR NICHOLAS STERN, STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE 238 (2006) (noting that stabilization *at any level* of ultimate CO2 concentration will require reducing global emissions by approximately 80 percent); IPCC 2014, *Summary for Policymakers*, *in* CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP III TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 20 (O. Edenhofer et al. eds., 2014) [hereinafter "WORKING GROUP III"] ("In the majority of low-stabilization scenarios, the share of low-carbon electricity supply . . . increases from the current share of approximately 30 percent to more than 80 percent by 2050, and fossil fuel power generation without [carbon capture and storage] is phased out almost entirely by 2100.").

24. *See* RON BINZ ET AL., PRACTICING RISK-AWARE ELECTRICITY REGULATION: WHAT EVERY STATE REGULATOR NEEDS TO KNOW 5–6 (2012) (predicting that retail electricity prices will "rise sharply" in the next twenty years due to the level of investment needed in the U.S. electricity sector); *see also* JAMES H. WILLIAMS ET AL., PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES 1, 24 (2014) (estimating the median price of cutting carbon dioxide emissions 80 percent from 1990 levels by 2050 to be between $160 billion and $560 billion).

25. As a theoretical matter, decreased consumption of electricity might not be necessary if we could convert electricity generation to 100 percent renewable energy. But as a practical matter, given the likely expense and only partial accomplishment of this aim, decreasing consumption is likely to remain a critical decarbonization strategy for the foreseeable future. *See* Kate Galbraith, *McKinsey Report Cites $1.2 Trillion in Potential Savings from Energy Efficiency*, N.Y. TIMES GREEN BLOG (July 29, 2009), http://green.blogs.nytimes.com/2009/07/29/mckinsey-report-cites-12-trillion-in-potential-savings-from-energy-efficiency/ [http://perma.cc/T76E-3CLA] (summarizing a report that estimates that the United States could save $1.2 trillion through 2020 by investing in cost-effective energy-efficiency options).

that accords with electricity law's long tradition of ensuring access and affordability, even while pursuing decarbonization policies. After all, electrification was never valued as an end in itself.[26] Access is important because of the worlds that electricity opens up: relief from backbreaking farm and factory labor;[27] light to read by in the evenings, and a radio to connect to politics and culture;[28] expanded markets for new appliances;[29] "[c]omfort, cold beer, and warm homes";[30] and more recently, computers, cell phones, and the Internet.

Expanding grid access and ensuring low rates were twentieth-century mechanisms for achieving these economic and social benefits of electrifying America.[31] Now, climate change requires a turn away from universal promotion of increased electricity consumption as a driver of economic growth and civic participation.[32] Regulators embracing the imperative to decarbonize have increasingly turned towards the strategy of creating a "participatory" grid.[33] In a participatory grid, pricing signals and incentives will motivate

26. *See* JENNIE C. STEPHENS, ELIZABETH J. WILSON & TARLA RAI PETERSON, SMART GRID (R)EVOLUTION: ELECTRIC POWER STRUGGLES 78 (2015) ("People use energy to do things; having access to electricity is not an end in itself."); David B. Spence, *Regulation, "Republican Moments," and Energy Policy Reform*, B.Y.U. L. REV. 1561, 1580 (2011) ("It is not oil or gas or electricity that we really want: rather, it is the services that they provide.").

27. *See* ROBERT A. CARO, THE PATH TO POWER 516–17 (1982); DAVID NYE, ELECTRIFYING AMERICA 185–235 (1998).

28. *See* CARO, *supra* note 27, at 514–15; *see also* THE NEXT GREATEST THING 110–17 (Richard A. Pence ed., 1984) (describing the educational, cultural, and economic value of radio to newly electrified rural households).

29. *See generally* Gregory B. Field, *"Electricity for All:" The Electric Home and Farm Authority and the Politics of Mass Consumption, 1932–1935*, 64 BUS. HIST. REV. 32 (1990); NYE, *supra* note 27, at 238–39.

30. Linda Kanamine, *Iowa Revolution: Town of Energy Pioneers*, USA TODAY, Apr. 22, 1992, at 8A (quoting a utility executive regarding what they really sell).

31. *See infra* Parts II.A–B.

32. *See* LIZABETH COHEN, A CONSUMERS' REPUBLIC: THE POLITICS OF MASS CONSUMPTION IN POSTWAR AMERICA 119 (2003) (describing the twentieth century belief that Americans "simultaneously fulfilled personal desire and civic obligation by consuming"); *see also* Lorie Higgins & Loren Lutzenhiser, *Ceremonial Equity: Low-Income Energy Assistance and the Failure of Socio-Environmental Policy*, 42 SOC. PROB. 468, 471 (1995) (criticizing the U.S. approach to energy equity as belonging to the "recurrent theme in U.S. political culture" that "substitute[s] . . . economic opportunity and growth for redistributional equity").

33. *See, e.g.*, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, 319 P.U.R.4th 1, 3 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (order) [hereinafter N.Y. REV Feb. 26 Order]; see *infra* Part II for additional examples.

consumers to change their patterns of energy consumption in order to alleviate climate change, through technologies like "smart" thermostats, solar panels, energy storage devices, and electric vehicles.[34] These kinds of participatory technologies will allow consumers to use power when it is cheapest, and to supply power back to the grid when it is most expensive, thereby maintaining affordability. Such participation offers underappreciated psychological benefits as well: through participating in the project of decarbonization, consumers may find a partial salve against feelings of helplessness and vulnerability produced by climate change, and gain a sense of engagement in a project larger than themselves.[35]

The participatory grid vision has important parallels to the twentieth-century challenge of electrification. Access to affordable power allowed twentieth-century consumers to flourish in society. Grid *participation* will be required to provide twenty-first century consumers the affordable electricity necessary to do the same. From this parallel between regulatory eras flows this Article's central conclusion: if grid participation is to become the means of affordable energy and a significant mode of civic engagement with respect to climate change, then electricity law's longstanding equity commitment counsels for a concerted effort to widen the class of Americans able to become a part of the participatory grid. The project of electrification was the twentieth-century response to the challenge of energy justice. In the coming decades, the challenge of clean energy justice will require a project of clean electrification, to broaden access not to the grid itself but to the technologies necessary to be a successful twenty-first century grid participant.

Lawmakers might work to broaden grid participation through a range of programs and strategies. Because states maintain jurisdiction over the interactions between energy suppliers and consumers,[36] much of the potential for reform exists at the state level. I suggest several prominent debates in state public utility law where clean electrification norms might play an important role: the continuing evolution of electricity law's core mandate to ensure "just and reasonable" rates; the

34. *See infra* Part I for a more detailed discussion of these technologies and the policies motivating their uptake.

35. *See infra* Part III.B.

36. *See* 16 U.S.C. § 824(a) (2012).

question of how to manage the wealth of new data produced by the smart grid; and conversations about the role of utilities in the participatory grid of the future. I also discuss the ways in which public utility law cannot fully accomplish clean electrification, just as it proved unable to single-handedly electrify America last century. Finally, I call into question the individualistic notion of "participation" that prevailing versions of the participatory grid embody. The history of electrification counsels that our most successful grid experiments in terms of equity and empowerment may come from focusing on more collective forms of grid participation.[37] Thus, regulators might pay particular attention to programs like community solar and micro-grid formation for the community-scale participation that they embody.

We stand at an important juncture for gaining a deeper understanding of electricity law's approach to distributive justice. State clean energy efforts are likely to dominate domestic climate change policy for the foreseeable future, particularly given the Trump administration's hostility to federal climate regulation.[38] Relatedly, many states are considering radically restructuring their energy governance to meet the challenge of decarbonization.[39] As they move toward a participatory grid, states may call on utilities to perform a significantly different role this century than they did in the previous century. These shifts present major opportunities for re-envisioning the role that equity plays within the electricity system, and for adapting enduring norms to meet the challenges ahead. Updating discussions of energy law's historical equity norms for the present era is thus a matter of both scholarly and practical importance.

This Article develops the argument for clean electrification in five parts. Part I looks at how equity concerns factor into current clean energy debates, focusing on four policies that have received the most attention on these grounds: net metering, dynamic pricing, energy storage, and electric vehicle infrastructure. Part II turns to examine electricity law's historical commitment to equity, tracing the forms this

37. Thanks to William Boyd for encouraging this line of thinking.

38. *See* Kimberley A. Strassel, *Scott Pruitt's Back-to-Basics Agenda for the EPA*, WALL ST. J. (Feb. 17, 2017), https://www.wsj.com/articles/scott-pruitts-back-to-basics-agenda-for-the-epa-1487375872 [https://perma.cc/KJK8-QXUV].

39. *See infra* Part II.A.

commitment has taken over time. Part III discusses the ways in which climate change and its disparate burdens present new challenges for understanding equity within electricity law. It argues that the best way to synthesize energy law's equity commitment and climate change's many inequities is to pursue clean electrification: a broadening of the range of Americans able to take advantage of the participatory grid. Part IV begins the process of imagining how clean electrification might proceed, considering the promise and limits of public utility law in achieving clean energy justice. Part V briefly concludes by considering the politics of clean electrification.

I. THE PARTICIPATORY GRID AND ITS DISCONTENTS

Across the country, states are tackling climate change in a range of ways. In part, states are using broad mandates,[40] economy-wide solutions like cap-and-trade programs,[41] and experiments with large-scale, carbon-free generation.[42] But

40. The most popular clean energy mandate is a "Renewable Portfolio Standard" (RPS). Twenty-eight states utilize RPS policies, which require utilities to obtain an annually increasing percentage of their power from renewable sources. Similarly, twenty-six have Energy Efficiency Resource Standards (EERS), which require utilities to achieve certain energy savings targets. *See* NC Clean Energy Tech. Ctr., U.S. Dep't of Energy, Renewable Portfolio Standard Policies, DSIRE (2016), http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/Renewable-Portfolio-Standards.pdf [https://perma.cc/78XT-RQQT]; NC Clean Energy Tech. Ctr., U.S. Dep't of Energy, Energy Efficiency Resource Standards, DSIRE (and Goals) (Mar. 2015), http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/Renewable-Portfolio-Standards.pdf [https://perma.cc/E9PW-NE2M].

41. Ten states currently have cap-and-trade programs, which establish caps on the amount of carbon dioxide that covered sources can emit and permit trading of emissions permits among the sources. *See* CAL. CODE REGS. tit. 17 § 95801 (2016) (establishing a greenhouse gas cap and trade program for California); Regional Greenhouse Gas Initiative, http://www.rggi.org/ (last visited Nov. 2, 2016) [https://perma.cc/K7WZ-BE9G] (explaining the carbon dioxide cap-and-trade program covering nine northeastern states). As numerous scholars have documented, these cap-and-trade programs, if not well designed, raise equity concerns of their own. Because these impacts are well explored elsewhere, this Article does not focus on them. *See*, *e.g.*, Farber, *supra* note 19; Tracey M. Roberts, *Mitigating the Distributional Impacts of Climate Change Policy*, 67 WASH. & LEE L. REV. 209, 209 (2010); Vien Truong, *Addressing Poverty and Pollution: California's SB 535 Greenhouse Gas Reduction Fund*, 49 HARV. C.R.-C.L. L. REV. 493, 520 (2014).

42. *See* William Boyd & Ann E. Carlson, *Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law*, 63 UCLA L. REV. 810, 844–54 (2016) (describing state experiments with financing the construction of new nuclear energy generation and carbon capture and storage facilities).

increasingly, as either a complementary or an alternative solution,[43] states are more directly mediating the relationship between consumers and electricity, seeking to prompt more active grid participation on the part of consumers.[44] And they are doing so in ways that raise a host of new equity problems by threatening electricity law's long commitment to cheap power for all.

This Part focuses on four popular state-level clean energy policies often criticized on equity grounds: net metering, dynamic pricing, energy storage, and electric vehicle infrastructure.[45] It directs its focus to these *state* policies because such state energy laws are where most U.S. climate change policy is playing out.[46] Many scholars have weighed in on why states are surprisingly active on climate change given the collective action problems it raises, and this Article will not retrace those steps.[47] For present purposes, it suffices to note

43. Even where cap-and-trade programs exist, they "may not be sufficient to achieve ambitious near- and long-term emissions reduction targets," such that "[c]omplementary strategies are probably needed and certainly advisable." Thomas Dietz et al., *Household Actions Can Provide a Behavioral Wedge to Rapidly Reduce U.S. Carbon Emissions*, 106 PNAS 18452, 18452 (2009); Ann E. Carlson, *Designing Effective Climate Policy: Cap-and-Trade and Complementary Policies*, 49 HARV. J. ON LEGIS. 207, 207 (2012) (exploring issues of complementarity and competition between economy-wide carbon policies and more targeted strategies).

44. *See infra* Part I.A for a more detailed explication of this vision.

45. Notably absent from this list is energy efficiency policy, largely because programs to distribute energy efficiency more equitably have long existed, although in far from ideal form. *See infra* notes 233–235 and accompanying text. Also absent from this list is federal and state tax policy. Because this Article focuses on theories, history, and avenues for reform *within* energy law, it leaves tax policy to the side. Nevertheless, as others have observed, tax policy certainly compounds many of clean energy's equity challenges, as tax credits for clean energy predominantly go to the wealthy. *See* Severin Borenstein & Lucas W. Davis, *The Distributional Effects of U.S. Clean Energy Tax Credits*, 30 U. CHI. PRESS 191 (2016); U.C. Berkeley Energy Institute at Haas Working Paper No. 262, July 2015. Further examination of how tax policies and energy policies interact—and have potentially compounding inequities—would be a useful intervention.

46. I do not want to understate the importance of federal financial support for clean energy projects, particularly the importance of tax credits: "Between 2009 and 2014, the federal government will have spent more than $150 billion in clean energy projects through direct lending, tax expenditures, and loan guarantees." KEN BERLIN ET AL., STATE CLEAN ENERGY FINANCE BANKS: NEW INVESTMENT FACILITIES FOR CLEAN ENERGY DEPLOYMENT 5 (Sept. 2012). However, federal government spending has been declining as programs created under the American Recovery and Reinvestment Act expire, *see id*., making states increasingly important loci of climate policy in the coming years.

47. *See, e.g.*, Ann E. Carlson, *Regulatory Capacity and State Environmental*

that states have stepped in to fill what has largely been a void in federal and international clean energy policies over the past two decades, and every state in the country has some clean energy policies in place.[48] Although the Obama administration took significant steps to federalize climate policy, state efforts are likely to again return to the fore under the Trump administration.[49] As these initiatives grow, so will the equity concerns that they raise.

A. The Participatory Grid

1. The Vision in Leading States

Before turning to the equity challenges raised against particular policies, it is helpful to begin with a broader picture of the vision that regulators have for transforming passive

Leadership: California's Climate Policy, 24 FORDHAM ENVTL. L. REV. 63, 63–64 (2013); Brandon Hofmeister, *Roles for State Energy Regulators in Climate Change Mitigation*, 2 MICH. J. ENVTL. & ADMIN. L. 67, 67 (2012); Vivian E. Thomson & Vicki Arroyo, *Upside-Down Cooperative Federalism: Climate Change Policymaking and the States*, 29 VA. ENVTL. L.J. 1, 1–2 (2011); Hari M. Osofsky, *Multiscalar Governance and Climate Change: Reflections on the Role of States and Cities at Copenhagen*, 25 MD. J. INT'L L. 64 (2010); Richard B. Stewart, *States and Cities As Actors in Global Climate Regulation: Unitary vs. Plural Architectures*, 50 ARIZ. L. REV. 681, 681 (2008).

48. *See* DATABASE OF STATE INCENTIVES FOR RENEWABLES AND EFFICIENCY, http://www.dsireusa.org (last visited Nov. 4, 2016) [https://perma.cc/RR5K-5EL5].

49. *See supra* note 38. If the Obama administration's signature climate regulation, the Clean Power Plan, remains intact, it too is likely to spurn further state participatory grid strategies. The Clean Power Plan requires states to develop plans for achieving mandated levels of emissions reductions from existing power plants, but allows considerable flexibility as to how states achieve these reductions. *See* 42 U.S.C. § 7410 (2012) (giving states authority to design their own implementation plans subject to EPA approval); EPA Rule, 40 C.F.R. pt. 60 (2015). [hereinafter EPA Final Rule]. However, the fate of the Clean Power Plan remains uncertain: in February 2016, the Supreme Court stayed implementation of the Clean Power Plan during the pendency of a suit against it in the D.C. Circuit. *See* North Dakota v. EPA, 136 U.S. 999 (Feb. 9, 2016) (order granting stay); *see also* EPA Fact Sheet: *Clean Power Plan: Key Changes and Improvements* 3, https://www.epa.gov/sites/production/files/2015-08/documents/fs-cpp-key-changes.pdf (last visited Nov. 4, 2016) [https://perma.cc/K2TF-9G77] ("EPA . . . anticipates that, due to its low costs and potential in every state, demand-side [energy efficiency] will be a significant component of state plans under the Clean Power Plan."); *U.S. Unveils Measures to Encourage Solar Power Use*, SOLAR ENERGY INDUSTRIES ASS'N (Mar. 24, 2015), http://www.seia.org/news/us-unveils-measures-encourage-solar-power-use [https://perma.cc/87JL-8SWZ] (explaining how the Clean Power Plan "provides strong incentives" for the development of solar power).

"ratepayers" into active "participants" in the fight against climate change. The following two subparts aim to paint—and then complicate—this vision. This subpart describes how leading states are working to make the grid "participatory." Part I.A.2 then interrogates the extent to which this new grid can really be considered "participatory," acknowledging the ways in which grid "participation" demands less robust engagement than traditional political participation.

Several states make up the vanguard of efforts to create a more participatory grid, including New York, Massachusetts, Minnesota, Hawaii, Maryland, and California. In these states, regulatory commissions or their consultants have put forth vision statements describing the shape they want electricity markets and the electricity grid to take—all of which center on inducing greater customer participation. New York, for example, recognizing the "enormous and largely untapped resource" of the "customer side of the grid," is holding a regulatory proceeding to establish new markets in which customers become "active participants."[50] Similarly, Massachusetts' regulatory commission issued a 2014 order "launch[ing] a new energy future for Massachusetts . . . [that] will empower customers to manage and reduce their energy costs."[51] Minnesota is in the midst of a proceeding to create a grid that "enables customers to manage and potentially reduce their energy costs."[52] In California, a 2013 Commission White Paper asserted that "[c]ustomer participation, more than the actions of the utilities or of the regulators, is critical to meet California's greenhouse gas emission goals in a cost-effective manner."[53] Since this time, California's regulatory commission

50. N.Y. REV Feb. 26 Order, *supra* note 33, at 7.

51. Mass. Dep't of Pub. Util., *Investigation by the Department of Public Utilities on its Own Motion into Modernization of the Electric Grid*, D.P.U. 12-76-B (June 12, 2014), http://web1.env.state.ma.us/DPU/FileRoomAPI/api/Attachments/Get/?path=12-76%2FOrder_1276B.pdf [https://perma.cc/JB2D-2X8Y] (order).

52. *See* Nancy Lange et al., *Building a Minnesota Conversation on Grid Modernization with a Focus on Distribution Systems*, Presentation, MINN. PUB. UTIL. COMM'N (May 12, 2015), http://mn.gov/puc/documents/pdf_files/grid_modernization_5-12-2015.pdf [https://perma.cc/8RN5-QNXC]; *see also* Haw. Pub. Util. Comm'n, *Exhibit A: Commission White Paper: Commission's Inclinations on the Future of Hawaii's Electric Utilities*, PUC.HAWAII.GOV (2014), http://puc.hawaii.gov/wp-content/uploads/2014/04/Commissions-Inclinations.pdf (last visited Nov. 4, 2016) [https://perma.cc/K4U3-SYDD].

53. KRISTIN RALFF DOUGLAS & MARZIA ZAFAR, CAL. PUB. UTIL. COMM'N POLICY AND PLANNING DIV., CUSTOMERS AS GRID PARTICIPANTS: A

has launched several proceedings aimed at engaging customers as "partners" in grid decarbonization.[54]

What will the new participatory grid look like? Its shape remains fuzzy, as vision still largely exceeds technological capacity.[55] Nevertheless, a few elements seem clear. "Con"-sumers of energy are becoming "pro"-sumers, not only purchasing energy but also generating electricity through onsite "distributed generation," largely in the form of rooftop solar panels.[56] A "smart grid" will better balance electricity supply and demand by modernizing outdated infrastructure and providing customers with new energy management tools.[57]

Chief among these tools are "smart meters," which record time-specific energy usage data and enable two-way communications between utilities and customers.[58] Smart meters provide huge amounts of new data about energy consumption[59] and allow electricity pricing to better reflect production costs.[60] Such pricing reforms—particularly when coupled with rising rates—might incentivize customers to adopt a range of new technologies, including communicative thermostats, appliances capable of automated control, and electric vehicles.[61] These technologies could also allow utilities

FUNDAMENTALLY NEW ROLE FOR CUSTOMERS 3 (2015).

54. *See id.*; *see also* Proposed Decision on Order Instituting Rulemaking on the Commission's Own Motion to Conduct a Comprehensive Examination of Investor Owned Electric Utilities' Residential Rate Structures, the Transition to Time Varying and Dynamic Rates, and Other Statutory Obligations, R. 12-06-013 (Cal. Pub. Util. Comm'n Apr. 21, 2015) [hereinafter Cal. Pub. Util. Comm'n Proposed Decision].

55. Andre Begosso et al., *Retail Resurgence*, 148 PUB. UTIL. FORT. 42, 43 (2010).

56. *See* IEA, *supra* note 6, at 5–6; Sharon B. Jacobs, *Consumer Generation*, ECOLOGY L. Q. (forthcoming 2016).

57. *See* Joel B. Eisen, *Smart Regulation and Federalism for the Smart Grid*, 37 HARV. ENVTL. L. REV. 1, 6 (2013); Quinn & Reed, *supra* note 14.

58. *See* Eisen, *supra* note 57, at 10–11; EDISON ELEC. INST., UTILITY-SCALE SMART METER DEPLOYMENTS 1 (2014).

59. *See* Alexandra B. Klass & Elizabeth J. Wilson, *Energy Consumption Data: The Key to Improved Energy Efficiency*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 69, 74 (2015).

60. Paul L. Joskow & Catherine D. Wolfram, *Dynamic Pricing of Electricity*, 102 AM. ECON. REV. 381, 382 (2012).

61. *See, e.g.*, ENERGY FUTURE COAL., UTILITY 2.0: PILOTING THE FUTURE FOR MARYLAND'S ELECTRIC UTILITIES AND THEIR CUSTOMERS 10 (Mar. 15, 2013), http://www.montgomerycountymd.gov/Berliner/Resources/Files/efc_full_report.pdf [https://perma.cc/5THZ-HULF]; Klass & Wilson, *supra* note 59, at 75 (describing how advanced metering allows for "set and forget" commands that program "air conditioners, water heaters, or refrigerators . . . to automatically cycle in response

to more actively control customer load during peak periods in exchange for incentive payments.[62] Other consumers might exit the grid entirely by backing up their distributed generation with on-site energy storage to fulfill all their energy needs.[63]

In some states, the role of utilities in this new system might be radically different. New York's Public Service Commission, for example, has begun a proceeding dedicated to "Reforming the Energy Vision," under which utilities will become "Distributed System Platform providers" that facilitate and coordinate consumer offerings to the grid.[64] Under this model, utilities' primary job will be to create a platform where consumers can bid into a central market any local generation (such as excess energy from rooftop solar), energy storage potential, or ability to cut demand for which they would like to receive payment. The utility's job will then be to organize and deploy all cost-effective consumer-side offerings.[65] Once systems like this are in place, an urban dweller might buy not only her produce but also her electricity from a trusted farmer down the road.[66]

Outside of this leading group of states, regulators are less

to system signals or pre-set price points."); Stephanie M. Stern, *Smart-Grid: Technology and the Psychology of Environmental Behavior Change*, 86 CHI.-KENT L. REV. 139, 140 (2011) (describing a potential future in which imploring behavior change is abandoned "in favor of sophisticated default- and preference-setting and integrated external control of residential electricity.").

62. *Cf.* AHMAD FARUQUI, RYAN HLEDIK & JENNIFER PALMER, REGULATORY ASSISTANCE PROJECT & BRATTLE GRP. GLOB., TIME-VARYING AND DYNAMIC RATE DESIGN 6 (2012), http://www.raponline.org/wp-content/uploads/2016/05/rap-faruquihledikpalmer-timevaryingdynamicratedesign-2012-jul-23.pdf [https://perma.cc/E7EV-HWQK] (arguing that the real promise of dynamic pricing lies in the ability of system operators to run an improved system rather than in individualized consumer responses to price fluctuations).

63. On-site energy storage would likely take the form of batteries capable of storing energy during times of over-supply and releasing that energy for consumption during times of high demand. *See* PETER BRONSKI ET AL., THE ECONOMICS OF GRID DEFECTION: WHEN AND WHERE DISTRIBUTED SOLAR GENERATION PLUS STORAGE COMPETES WITH TRADITIONAL UTILITY SERVICE 6 (2014).

64. N.Y. REV Feb. 26 Order, *supra* note 33, at 2.

65. *See* Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, 329 P.U.R.4th 1, 37–39, 41–42 (N.Y. Pub. Serv. Comm'n, May 19, 2016) (order).

66. *See* Matthew Crosby, *An Airbnb or Uber for the Electricity Grid?*, RMI BLOG (Sept. 2, 2014), http://blog.rmi.org/blog_2014_09_02_an_airbnb_or_uber_for_the_electricity_grid [https://perma.cc/QHX5-89CA]; *see also* Eisen, *supra* note 14 (laying out a proposal for FERC to create a nationwide platform of this sort).

likely to articulate this kind of comprehensive vision of a participatory, consumer-centric grid. And in all states, it remains the case that significant investments in new, large-scale infrastructure will be critical in the clean energy transition.[67] Nevertheless, all states have in place at least some policies aimed at inducing consumers to more actively participate in their energy management, with net metering and energy efficiency policies being the most widespread.[68] States where the electricity industry remains "vertically integrated," such that the same company owns and manages generation, transmission, and distribution under public utility commission oversight, may be less inclined to adopt a full-throated version of the participatory grid than their counterparts that have more fully opened their electricity sectors up to competition.[69] But these reforms are penetrating even many states with more traditional regulatory structures,[70] suggesting that the participatory grid may be a change poised to sweep the nation.

67. Necessary upgrades just to the U.S. transmission and distribution grid are estimated to be in the range of $50 billion *per year* over the next two decades. *See* CHRIS NEME & RICH SEDANO, REGULATORY ASSISTANCE PROJECT, US EXPERIENCE WITH EFFICIENCY AS A TRANSMISSION AND DISTRIBUTION SYSTEM RESOURCE i (2014), http://www.raponline.org/wp-content/uploads/2016/05/rap-neme-efficiencyasatanddresource-2012-feb-14.pdf. [https://perma.cc/SBU9-H3SD]. Any money that states choose to spend on pursuing new nuclear power, carbon capture and storage, or utility-scale renewable energy is additional to this basic infrastructure spending.

68. *See, e.g.*, DATABASE OF STATE INCENTIVES FOR RENEWABLES AND EFFICIENCY, http://www.dsireusa.org (last visited Sept. 5, 2015) [https://perma.cc/Y6EZ-XUVQ].

69. For a thorough description of the different state models of utility regulation in the United States, see Boyd & Carlson, *supra* note 42, at 835–39. Frank Wolak does a good job describing why restructured states might find demand-side management—i.e., participatory grid solutions—particularly important, as their market prices will benefit from the increased competition that low-cost, demand-side solutions provide. *See* Frank A. Wolak, *Regulating Competition in Wholesale Electricity Supply*, *in* NAT'L BUREAU OF ECON. RESEARCH (Nancy Rose ed., 2014), http://www.nber.org/chapters/c12567.pdf [https://perma.cc/WYM6-8JVS]. In traditional, vertically integrated states, where generation costs are bundled into overall rates, generation pricing is less visible and less subject to market manipulation, creating less pressure on regulators to implement demand-side solutions. *See id.* at 210–11.

70. Minnesota, California, and Hawaii, for example, retain traditionally regulated retail sectors but are considering or implementing sweeping reforms along the lines of a participatory grid. *See supra* note 52.

2. Is This Really Participation?

There are at least two reasons one might be skeptical of the participatory grid vision. The first is practical: it is not clear that overextended Americans want to invest more time in redesigning their electricity systems or interfacing with their utility companies. This concern is legitimate, but is addressed to a certain extent by the vision itself: in speaking of "participation," regulators do not intend to actively engage consumers on an hour-to-hour basis, such that they continually rejigger their electricity consumption in response to changing prices. Instead, much of this system is likely to be automated: smart thermostats will send automatic signals to household appliances indicating when they should shut off and on, based on pricing data, and utilities might be granted remote control over certain consumer-side functions (such as cycling air conditioners off and on) in exchange for incentive payments.[71] And much of the coordination of these tasks might occur not at the consumer level, but instead at the "aggregator" level—that is, third parties who construct a business model on the ability to contract with consumers to manage their energy supply.[72]

The participatory grid is thus participatory only in the sense that consumer-side offerings will become a standard component of the larger grid and electricity marketplace, and participating consumers will reap the attendant financial benefits and the psychological satisfaction of knowing that they are contributing to a cleaner energy system. This conception of participation is likely to be pragmatically achievable. But it creates a second potential problem by narrowing the concept of the term "participation" as it is commonly understood in our democratic tradition.[73] The new vision for the grid is not one in which citizens come together, deliberate their energy

71. *See supra* note 61.

72. 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, 76 (2013) (explaining the role and expertise of aggregators).

73. Contrast this vision with, for example, Archon Fung & Erik Olin Wright, *Thinking About Empowered Participatory Governance, in* DEEPENING DEMOCRACY: INSTITUTIONAL INNOVATIONS IN EMPOWERED PARTICIPATORY GOVERNANCE 5 (Archon Fung & Erik Olin Wright eds., 2003) (calling for "active political involvement of the citizenry" and "political consensus through dialogue"); Mark Seidenfeld, *A Civic Republican Justification for the Bureaucratic State*, 105 HARV. L. REV. 1511 (1992) (similar).

preferences, and settle upon forms of collective action to promote decarbonization. Instead, the vision focuses specifically on individuals *as consumers*, and capitalizes on the desire to save money as the primary impetus for grid participation.[74] Moreover, the model does not even ask consumers to exert much effort in the market domain, given the automation expected to dominate the process.

There are compelling reasons for regulators to promote this type of participation. Individuals contribute approximately one-third of all carbon dioxide emissions in the United States, amounting to roughly eight percent of the world's total emissions.[75] Incentivizing individual behavioral changes may therefore be important in the fight against climate change.[76] And *financially* incentivizing (automated) right action on climate change may be particularly important. It is hard to instill an ethic that turning on a light, or driving to visit a friend, is "wrong" per se,[77] even though these small actions collectively create much of the problem. Financial incentives and technological fixes help eliminate the need for difficult appeals to conscience. Additionally, a model that relies on consumer incentives avoids some of climate change's political challenges. In place of moral appeals, a consumer-based model allows even climate skeptics to choose to adopt participatory grid technologies purely for their cost-saving potential.[78]

But a focus on this narrow, market-centric version of participation also has downsides. Many scholars believe that "people hold and express different preferences in their

74. *Cf.* Douglas A. Kysar, *Preferences for Processes: The Process/Product Distinction and the Regulation of Consumer Choice*, 118 HARV. L. REV. 525, 527 (2004) ("For better or worse . . . the market and the consumer are central to public policy at the beginning of the twenty-first century.").

75. Michael P. Vandenbergh & Anne C. Steinemann, *The Carbon-Neutral Individual*, 82 N.Y.U. L. REV. 1672, 1677 (2007); Dietz et al., *supra* note 43, at 18452 (finding that behavioral changes could cut "20% of household direct emissions or 7.4% of US national emissions, with little or no reduction in household well-being").

76. *See* Vandenbergh & Steinemann, *supra* note 75, at 1675.

77. *See* DALE JAMIESON, REASON IN A DARK TIME: WHY THE STRUGGLE AGAINST CLIMATE CHANGES FAILED—AND WHAT IT MEANS FOR OUR FUTURE 7 (2014) ("Even most of us who care deeply about climate change would have to admit . . . that we do not feel like killers when we fly or drive.").

78. *Cf.* Dan M. Kahan, *The Cognitively Illiberal State*, 60 STAN. L. REV. 115, 118, 145 (2007) (advocating "expressive overdetermination" in laws and policies, which makes them susceptible to multiple cultural interpretations and thereby enhances their appeal).

'consumer' role and in their 'citizen' role,"[79] and may act more benevolently in their role as citizens than as consumers.[80] If this is true, then a participatory grid focused largely on empowering consumers *qua* consumers—and with as little personal effort as possible—may miss opportunities for engaging Americans in the struggle against climate change in more meaningful and impactful ways.[81]

I find this critique of the dominant participatory grid vision compelling, and will return to discuss it further in Part IV of this Article. For now, however, I want to set it aside and focus specifically on the participatory grid's equity problem—that is, on distributional disparities in the ability of Americans to become a part of the vision as it exists now. The remainder of this section explores in detail the equity implications of several of the most prevalent participatory grid policies: net metering, smart meters and dynamic pricing, and the promotion of electric vehicle infrastructure and energy storage. Collectively, these policies—widely celebrated as promising approaches to achieving clean energy[82]—risk creating a new problem of clean energy justice.

79. Daphna Lewinsohn-Zamir, *Consumer Preferences, Citizen Preferences, and the Provision of Public Goods*, 108 YALE L.J. 377, 378 (1998)

80. *See id.* at 378–79 (discussing the various scholars who make this assertion); Kysar, *supra* note 74, at 636 (same).

81. *Cf.* Benjamin R. Barber, *A Failure of Democracy, Not Capitalism*, N.Y. TIMES (July 29, 2002), http://www.nytimes.com/2002/07/29/opinion/a-failure-of-democracy-not-capitalism.html [https://perma.cc/D323-SDVQ] (arguing that "we have diminished the power of the public sphere" in favor of "a private liberty that allows us to work and prosper individually"); SLAVOJ ŽIŽEK, FIRST AS TRAGEDY, THEN AS FARCE 34, 52 (2009) (expressing skepticism about "cultural capitalism," wherein "the capitalist mobilization of a society's productive capacity can also be made to serve ecological goals, the struggle against poverty, and other worthy ends"). *But see* Vandenbergh & Steinemann, *supra* note 75, at 1723 (arguing that it is "equally likely" that individuals who undertake market actions to reduce carbon "will become more supportive of government regulation").

82. *See generally* Priya Barua, Letha Tawney & Lutz Weischer, *Delivering on the Green Economy: The Role of Policy in Developing Successful Domestic Solar and Wind Industries* (World. Res. Inst., Working Paper 2012), http://www.wri.org/sites/default/files/pdf/delivering_clean_energy_economy.pdf [https://perma.cc/9RC5-WQPF]; Severin Borenstein, Michael Jaske & Arthur Rosenfeld, *Dynamic Pricing, Advanced Metering, and Demand Response in Electricity Markets* (Ctr. for the Study of Energy Mkts., Working Paper 105, 2002), https://escholarship.org/uc/item/11w8d6m4 [https://perma.cc/4ZS7-APHA]; PAUL DENHOLM ET AL., NAT'L RENEWABLE ENERGY LAB, THE ROLE OF ENERGY STORAGE WITH RENEWABLE ELECTRICITY GENERATION (Jan. 2010), http://www.nrel.gov/docs/fy10osti/47187.pdf [https://perma.cc/59ZT-EEUM].

B. Net Metering

The rooftop solar panel might seem to beautifully evoke the American ideal of self-sufficiency. In reality, solar panels have required substantial policy and grid support to become viable in most places.[83] As noted earlier, forty-four states and the District of Columbia use net metering to foster solar panel growth.[84] This policy allows customers to draw power from the grid when necessary, while permitting them to sell their solar power into the grid when their home produces excess power.[85] The "net" aspect of the policy comes from the fact that the transactions are monitored by a single meter, which counts upwards when the consumer is drawing in grid power, and back downwards when the consumer is providing power to the grid. Net metering's popularity is largely due to its simplicity. Customers easily understand the concept of "running the meter backwards," and the policy avoids federal-state jurisdictional complications that exist at the intersection of wholesale and retail power.[86] Net metering is also effective: because it makes investment in solar panels pay off relatively quickly, it has been one of the key policy drivers of the recent solar "boom."[87]

But in recent years, opponents have launched a nationwide assault on the policy,[88] which has gained particular traction in

83. *See* LORI BIRD ET AL., NAT'L RENEWABLE ENERGY LAB, REGULATORY CONSIDERATIONS ASSOCIATED WITH THE EXPANDED ADOPTION OF DISTRIBUTED SOLAR 3 (Nov. 2013) (cataloguing the range of support policies for solar energy).

84. *See* text accompanying *supra* note 6.

85. *See id.*

86. *See* Steven Ferrey, *Nothing but Net: Renewable Energy and the Environment, Midamerican Legal Fictions, and Supremacy Doctrine*, 14 DUKE ENVTL. L. & POL'Y F. 1, 3 (2003) (describing how the "state/federal struggle over net metering replays seventy years of federalism's jurisdictional friction regarding electric power development").

87. Solar production has doubled annually every year since 2009, and in leading states like California and Hawaii, it has climbed to one or two percent of overall energy. However, it remains less than 0.1 percent of the energy mix in a majority of states (31). *See* Solar Energy Industries Association Fact Sheet, "Net Metering By State" (Nov. 2012), http://www.seia.org/research-resources/net-metering-state [https://perma.cc/A6S3-BXBA]. At the end of 2012, 99 percent of installed solar PV was on net metering tariffs. BIRD ET AL., *supra* note 83, at 33.

88. One 2016 study found that "[i]n 2015, regulators, lawmakers, or utilities in at least forty-six states studied, proposed, or enacted policy changes pertaining to net metering, valuation of distributed solar, fixed or solar charges, third-party or utility-led rooftop solar ownership, or community solar . . .". Twenty-seven states specifically considered or enacted changes to net metering in 2015. N.C. CLEAN ENERGY TECHNOLOGY CENTER, 2015 POLICY REVIEW Q4 REPORT, 50 STATES OF SOLAR, 11, 14 (Feb. 2016), https://nccleantech.ncsu.edu/wp-

content/uploads/ 50sosQ4-FINAL.pdf [https://perma.cc/GXJ5-GCYJ]. Regarding specific state debates, see, for example, Diane Cardwell, *On Rooftops, a Rival for Utilities*, N.Y. TIMES (July 26, 2013), http://www.nytimes.com/2013/07/27/business/energy-environment/utilities-confront-fresh-threat-do-it-yourself-power.html [https://perma.cc/X553-EM57] (detailing Arizona's and California's debates in particular); Thomas Content, *Green-power, Low-Energy Users Get Brunt of Utility Rate Increase,* MILWAUKEE-WISCONSIN J. SENTINEL (Jan 5, 2013), http://archive.jsonline.com/business/greenpower-lowenergy-users-get-brunt-of-utility-rate-increase-6e88n4n-185771321.html [https://perma.cc/MDZ7-N3MK] (reporting that Wisconsin commission approved a twenty percent increase in the fixed portion of utility rates); Donna Bryson, *Contentious Solar Energy Issue Raised in Colorado*, WASH. TIMES (Mar. 12, 2014), http://www.washingtontimes.com/news/2014/mar/12/contentious-solar-energy-issue-raised-in-colorado/ [https://perma.cc/89ZJ-4AR7]; In the matter of the Application of Pub. Serv. Co. of Colo. for Approval of Its 2014 Renewable Energy Standard Compliance Plan, 13A-0836E, 2015 WL 7424163 (Colo. Pub. Util. Comm'n Nov. 10, 2015); Cathy Proctor, *Xcel Energy and Solar Power Backers Broker Deal for 2014 Solar Rewards*, DENVER BUS. J. (May 6, 2014), http://www.bizjournals.com/denver/blog/earth_to_power/2014/05/xcel-energy-and-solar-power-backers-broker-deal.html?utm_source%3Dfeedburner%26utm_medium%3Dfeed%26utm_campaign%3DFeed%253A%2Bindustry_5%2B(Industry%2BEnergy%2B%2526%2Bthe%2BEnvironment [https://perma.cc/G2CG-YUKJ]; Press Release, Hawaiian Electric, Hawaiian Electric Companies Propose Plan to Sustainably Increase Rooftop Solar (Jan. 20, 2015) (on file with author) (proposing to reduce amount paid to new solar customers); Passera Laurel, *Idaho PSC Improves Net Metering Rules of Idaho Power*, INTERSTATE RENEWABLE ENERGY COUNCIL: NEWS (July 10, 2013), http://www.irecusa.org/2013/07/idaho-psc-improves-net-metering-rules-for-idaho-power/ [https://perma.cc/JHE8-5DVK]; Karen Uhlenhuth, *In Defeat for ALEC, Kansas Lawmakers Pass Net Metering Plan*, MIDWEST ENERGY NEWS (Apr. 7, 2014), http://midwestenergynews.com/2014/04/07/in-defeat-for-alec-kansas-lawmakers-pass-net-metering-plan/ [https://perma.cc/B8Y9-Z4RN]; Examination of the Comprehensive Costs and Benefits of Net Metering in Louisiana No. X-33192 (La. Pub. Serv. Comm'n Mar. 28, 2014); Order Approving Distributed Solar Value Methodology, No. E999/M-14-65 (Minn. Pub. Util. Comm'n Apr. 1, 2014); Order Granting Rehearing in Part, Establishing Transition Plan, and Making Other Findings, Nos. 14-E-0151 & 14-E-0422 (N.Y. Pub. Serv. Comm'n Apr. 17, 2015); Sean Whaley, *Review Proposed for Rates of Homeowners Who Install Solar Systems*, LAS VEGAS REV. J. (June 16, 2014), http://www.reviewjournal.com/news/review-proposed-rates-homeowners-who-install-solar-systems [https://perma.cc/AWF8-3FBE]; Paul Monies, *Oklahoma House Passes Solar Surcharge Bill*, OKLAHOMAN (Apr. 15, 2014), http://newsok.com/article/3955378 [https://perma.cc/QS6P-FNTJ]; Distributed Energy Resource Program Act, No. 236 of 2014, Docket No. 2014-246-E, (S.C. Pub. Serv. Comm'n Dec. 11, 2014) (order approving settlement agreement); Garrett Hering, *West Virginia Governor Approves Previously Vetoed Net Metering Bill*, P.V. MAG. (Mar. 16, 2015), http://www.pv-magazine.com/news/details/beitrag/west-virginia-governor-approves-previously-vetoed-net-metering-bill-_100018604/#axzz4PAH3KpWY [https://perma.cc/937T-62EK]; Roy L. Hales, *Utilities Try to Harness Net Metering in Washington State*, CLEAN TECHNICA (Mar. 17, 2014), https://cleantechnica.com/2014/03/17/utilities-try-harness-net-metering-washington-state/ [https://perma.cc/F4R8-M3HD]; Kari Lydersen, *In Wisconsin, Solar 'New Math' Could Equal Big Impacts*, MIDWEST ENERGY NEWS (Jan. 16, 2015), http://midwestenergynews.com/2015/01/16/in-wisconsin-solar-new-

states such as Arizona where solar panels are most popular.[89] Opponents assert that consumers with solar panels are "free riding" off the grid: by running the meter backwards, sometimes all the way to zero, net metering allows them to escape from paying their fair share of grid maintenance costs, even though they rely on the grid's services whenever they are under- or over-producing power.[90] Some utilities have alleged that the cost-shift from net-metered to non-net-metered customers may be as high as $1000 per residential net-metered system, and have argued that net-metered customers should pay special charges to compensate for their added costs.[91] This "free riding"—or, more accurately, cross-subsidization—appears particularly egregious when coupled with statistics showing that predominantly wealthier consumers put solar panels on their roofs.[92] As these consumers enjoy the benefits

math-could-equal-big-impacts/ [https://perma.cc/XTH5-S7SH].

89. *See* TOM STANTON, NAT'L REG. RES. INST., REPORT NO. 13–07 STATE AND UTILITY SOLAR ENERGY PROGRAMS: RECOMMENDED APPROACHES FOR GROWING MARKETS iv (July 2013) (suggesting that net metering reform will become increasingly pressing as solar's growth continues); *see also* NAÏM R DARGHOUTH, GALEN BARBOSE, & RYAN WISER, LAWRENCE BERKELEY NAT'L LAB., LNVL-6017E, ELECTRICITY BILL SAVINGS FROM RESIDENTIAL PHOTOVOLTAIC SYSTEMS: SENSITIVITIES TO CHANGES IN FUTURE ELECTRICITY MARKET CONDITIONS viii (Jan. 2013).

90. *See, e.g.*, AZ Net Metering Decision, *supra* note 9, at 6 (describing Arizona utility's concern that non-participants in net metering schemes shouldered a disproportionate share of grid maintenance costs). Utilities recover some grid maintenance costs through "fixed" portions of utility bills that all consumers (including net-metered customers) pay, but most utilities recover more than half of fixed costs through volumetric electricity rates. *See* Griselda Blackburn, Clare Magee & Varun Rai, *Solar Valuation and the Modern Utility's Expansion into Distributed Generation*, 27 ELECTRICITY J. 18, 26 (2014); *see also* Frank A. Felder & Rasika Athawale, *The Life and Death of the Utility Death Spiral*, 27 ELECTRICITY J. 9 (2014); Ryan Hledik, *Rediscovering Residential Demand Charges*, 27 ELECTRICITY J. 82, 84 (2014).

91. *See* AZ Net Metering Decision, *supra* note 9, at 6.

92. One 2013 California study found that whereas the median California household income is $54,283, the average median household income of customers installing net-metered systems since 1999 was $91,210. *See* ENERGY AND ENVTL. ECON., INC., INTRODUCTION TO THE CALIFORNIA NET ENERGY METERING RATEPAYER IMPACTS EVALUATION 11 (Oct. 28, 2013). A smaller 2011 study of San Diego and Sacramento revealed that the median income for neighborhoods with at least one solar panel system was 84 percent higher than for neighborhoods with no solar. Samuel Dastrup et al., *Understanding the Solar Home Price Premium: Electricity Generation and "Green" Social Status* 20 tbl.2 (Nat'l Bureau of Econ. Res., Working Paper No. 17200, July 2011). The growth of third-party leasing, where a homeowner contracts with a company that agrees to install and maintain solar panels on their home, is likely to lessen the regressive nature of net metering by eliminating up-front infrastructure costs for homeowners. *See* Jason

of self-generation, lower-income consumers who cannot afford solar panels are left shouldering a rising proportion of grid maintenance costs.

In contrast, net metering proponents insist that distributed solar generation provides substantial benefits to the grid, thereby lowering overall grid costs for all consumers, such that solar customers aren't cross-subsidized. In fact, they might even be getting underpaid by net metering for the energy that they supply to the grid.[93] Frustratingly for regulators, empirical evidence does not provide conclusive answers to this debate. Most studies show that average retail rates—at which net-metered customers are credited—approximate the value of solar to the grid, with about half of the studies finding that solar is underpaid, and the other half finding that solar is overpaid.[94] These divergent results point to a deeper challenge in framing this equity debate as an empirical question. The results depend heavily on the values measured: when solar energy's environmental and social benefits are included within a study, its overall value predictably rises considerably.[95] But whether to include these external benefits within solar's grid

R. Wiener & Christian Alexander, *On-site Renewable Energy and Public Finance: How and Why Municipal Bond Financing is the Key to Propagating Access to On-Site Renewable Energy and Energy Efficiency*, 26 SANTA CLARA COMPUT. & HIGH TECH. L.J. 559, 566 (2010). But third-party leasing cannot change the fact that over two-thirds of American residences aren't solar-appropriate. *See* Samantha Booth, *Here Comes the Sun: How Securities Regulations Cast a Shadow on the Growth of Community Solar in the United States*, 61 UCLA L. REV. 760, 767 (2014).

93. Solar energy can lower energy and capacity costs that utilities would otherwise incur; reduce the need for investments in transmission and distribution infrastructure; act as a fuel price hedge to natural gas or coal; provide resilience to the grid by decentralizing generation; reduce conventional air pollutants, carbon emissions, and water and land use; and improve economic development by providing more local jobs and tax revenue. But precisely valuing these benefits remains controversial. *See* Travis Bradford & Anne Hoskins, *Valuing Distributed Energy: Economic and Regulatory Challenges* 13–14 (Princeton Roundtable, Working Paper, 2013).

94. Laura Hansen et al., *A Review of Solar PV Benefit & Cost Studies* 22 (Rocky Mountain Institute, 2d ed. Sept. 2013) (meta-study reviewing seventeen recent studies of solar's value to the grid) [hereinafter RMI DG Study]. *See also* STANTON, *supra* note 89, at 22 (reviewing existing studies of solar's costs and benefits and reaching similar conclusions about the trends in these studies). However, as the RMI DG Study cautions, average retail rates cannot perfectly measure whether solar is appropriately compensated by net metering, because this determination depends on the particular tariff utilized by the net-metered customer. *See id.* at 22.

95. *See* STANTON, *supra* note 89, at 22.

valuation turns on the question of what values regulators want ratepayers to fund. This question is fraught: While the societal benefits of solar may be considerable, it is not clear whether remaining grid customers, as opposed to society as a whole, should shoulder the costs of attaining solar's non-monetized environmental benefits.

State regulators have adopted divergent responses to these complex equity considerations. In 2014, Arizona imposed special charges on solar customers[96] and Wisconsin increased the fixed portion of all utility bills.[97] In late 2015, Nevada chose to suspend its net metering program, prompting a crash of its solar industry.[98] Most states have taken a more cautious approach, demanding closer empirical scrutiny before reforming net metering.[99] An increasingly popular policy option is the "value of solar tariff," which attempts to more precisely compensate solar owners for the value of the energy they produce to the grid, while charging them separately for the power they draw from the grid.[100] Technical solutions like this

96. *See, e.g.*, AZ Net Metering Decision, *supra* note 9 (Commissioner Burns, dissenting) (imposing a per-kilowatt of solar capacity charge that will amount to $4.90 on average per solar customer per month).

97. Application of Wisc. Pub. Serv. Corp. for Authority to Adjust Electric and Natural Gas Rates, No. 6690-UR-123, 2014 WL 7398755, 39–54 (Wisc. Pub. Serv. Comm'n Dec. 18, 2014) (final decision) (raising fixed charges on all customers); *see also* Thomas Content, *Regulators Agree to Increase Fixed Charge on WE Energies Electric Bills*, MILWAUKEE J. SENTINEL (Nov. 14, 2014), http://archive.jsonline.com/business/psc-begins-consideration-of-we-energies-rate-hike-plan-b99390765z1-282726581.html [https://perma.cc/M6Z7-PF5Q] (reporting that the decision will raise the fixed portion of bills from around $9 to $16 per month).

98. *See* Ivan Penn, SolarCity to Leave Nevada After PUC Cuts Rooftop Solar Benefits, L.A. TIMES (Dec. 23, 2015), http://www.latimes.com/business/la-fi-solarcity-nevada-rooftop-20151223-story.html [https://perma.cc/YA6D-9QSA]; Chris Nelder & Mark Dyson, Rocky Mountain Inst., Nevada, Previously a Solar Leader, Shutters its Residential Rooftop Market, RMI BLOG (Jan. 15, 2016), http://blog.rmi.org/blog_2016_01_15_nevada_shutters_its_residential_rooftop_market [https://perma.cc/54WE-F7F8].

99. *See, e.g.*, Assemb. B. 2514m, 2012 Reg. Sess. (Cal. 2012) (ordering commission to evaluate "who benefits from, and who bears the economic burden, if any, of the net energy metering program"); Assemb. B. 8557, 237th Leg. Sess. (N.Y. 2013) (similar).

100. *See* CLEAN POWER RESEARCH, MINN. DEPT. OF COMMERCE, MINNESOTA VALUE OF SOLAR: METHODOLOGY (Apr. 1, 2014), http://mn.gov/commerce/energy/images/MN-VOS-Methodology-FINAL.pdf [perma.cc/VEA4-VHE5] (adopting a "Value of Solar Methodology" that utilities can use in place of net metering). Minnesota's program is modeled off of a similar effort by the municipal utility in Austin, Texas. *See* CLEAN POWER RESEARCH, AUSTIN ENERGY, 2014 VALUE OF SOLAR AT AUSTIN ENERGY 2 (Oct. 21, 2013), http://www.austintexas.gov/edims/

will be important for appropriately compensating solar customers without escalating costs for remaining ratepayers, but they do not go the full distance in remedying equity concerns. Even if solar owners are accurately compensated, there remains the question of whether we are comfortable with the marketplace determining which consumers become a part of the distributed generation movement, and which do not.

C. Smart Meters, the Smart Grid, and Dynamic Pricing

The smart grid and smart meters hold considerable promise for helping to make the grid more efficient, as these technologies will allow much more accurate and time-sensitive tracking and management of electricity supply and demand.[101] However, they also raise significant equity concerns, largely due to the potential pricing changes they enable.[102] The installation of around fifty million smart meters in approximately 43 percent of U.S. households[103] has caused many scholars and regulators to push for changes in electricity pricing.[104] Right now, the vast majority of consumers pay a flat rate per kilowatt-hour for their electricity even though the costs of generating power fluctuate considerably over the course of a day and a year.[105] "Dynamic pricing" refers to a

document.cfm?id=199131 [perma.cc/3ZJR-EBJD]. *See also* NAT'L ASSN. OF REGULATORY UTILITY COMM'RS., DRAFT MANUAL ON DISTRIBUTED ENERGY RESOURCES COMPENSATION (2016), http://pubs.naruc.org/pub/88954963-0F01-F4D9-FBA3-AC9346B18FB2 [perma.cc/4B8H-B9LY] (setting forth various options for reforming rate design to account for the costs and benefits of integrating distributed energy resources into the grid).

101. *See supra* notes 51–54 and accompanying text.

102. BARBARA ALEXANDER, SMART METERS, REAL TIME PRICING, AND DEMAND RESPONSE PROGRAMS: IMPLICATIONS FOR LOW INCOME ELECTRIC CUSTOMERS 4 (2007). Opponents have also raised privacy and health concerns against smart meters. *See generally* Katrina Fischer Kuh, *Personal Environmental Information: The Promise and Perils of the Emerging Capacity to Identify Individual Environmental Harms*, 65 VAND. L. REV. 1566 (2012); *Smart Meter Health Complaints*, EMF Safety Network, http://emfsafetynetwork.org/smart-meters/smart-meter-health-complaints/ (last visited Nov. 21, 2016) [https://perma.cc/QR3Z-YQZZ]; Sonia McNeil, *Privacy and the Modern Grid*, 25 HARV. J. L. & TECH. 199 (2011); Cheryl Dancey Balough, *Privacy Implications of Smart Meters*, 86 CHI.-KENT L. REV. 161 (2011).

103. EDISON ELEC. INST., UTILITY-SCALE SMART METER DEPLOYMENT: BUILDING BLOCK OF THE ELECTRIC POWER GRID 1 (2014).

104. *See* Severin Borenstein, *Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing*, 42 REV. IND. ORGAN. 127, 127 (2013); Joskow & Wolfram, *supra* note 60, at 381–83.

105. *See* Borenstein, Jaske & Rosenfeld, *supra* note 82, at 5.

range of rate design reforms that would better align retail electricity pricing with the price fluctuations that occur in wholesale electricity markets.[106] These reforms would make retail rates more expensive during peak demand periods, such as early evenings on hot summer days, while dramatically lowering them during periods when supply is high but demand is low, such as late-night wind surges. Reforms might take the form of real-time pricing, where customers pay a retail rate directly linked to the wholesale price of electricity; time-of-use rates, which employ several different pricing levels for different times of day; or critical peak pricing, which prices certain particularly expensive hours much higher (generally 100-200 hours per year).[107] These pricing reforms help consumers understand, through market signals, how to participate effectively in energy markets.[108]

Spurred by federal funding,[109] many states and localities have run pilot programs to experiment with dynamic pricing options.[110] These experiments—and the possibility they augur that dynamic pricing could become a commonplace mandatory or default pricing option[111]—have prompted a staunch equity backlash.[112] Opponents worry that such schemes will disproportionately harm low-income consumers because the

106. *See id.* at 5–7.

107. *See* AHMAD FARUQUI ET AL., INST. FOR ELEC. EFFICIENCY WHITE PAPER, THE IMPACT OF DYNAMIC PRICING ON LOW INCOME CONSUMERS 4–5 (Sept. 2010).

108. Ahmad Faruqui, *The Ethics of Dynamic Pricing*, 23 ELECTRICITY J. 13, 13 (2010) (reviewing several studies finding that dynamic pricing might reduce peak consumption from ten to fourteen percent).

109. *See* American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115; Eisen, *supra* note 57, at 18 (explaining that "[f]ederal funds defraying half the cost" made smart grid projects more appealing to state commissions).

110. *See* Theresa Flaim et al., *Pilot Paralysis: Why Dynamic Pricing Remains Over-Hyped and Underachieved*, 26 ELECTRICITY J. 8, 10 (2013).

111. Few states seem willing to mandate dynamic pricing for all customers without an opt-out. However, default dynamic pricing is likely to capture a majority of customers: "the limited literature on the topic suggests that about 80 percent would stay on dynamic pricing if it is offered as the default rate . . . ." AHMAD FARUQUI ET AL., THE BRATTLE GROUP, THE POWER OF FIVE PERCENT: HOW DYNAMIC PRICING CAN SAVE $35 BILLION IN ELECTRICITY COSTS 4 (May 2007). In contrast, voluntary dynamic pricing schemes requiring opt-in have seen very low uptake. *See* Stefanie A. Brand, *Dynamic Pricing for Residential Electric Customers: A Ratepayer Advocate's Perspective*, 23 ELECTRICITY J. 50, 52 (2010).

112. *See, e.g.*, AARP, National Consumer Law Center, and Public Citizen, Comment on Smart Grid RFI: Addressing Policy and Logistical Options (2010), http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/AARPNCLCPublic_CitizenCommentsDOE1101.pdf [https://perma.cc/T9PU-6AYQ].

class of low-income consumers disproportionately includes the elderly, those out of work, and those at home caring for children.[113] These consumers may not be able to cut demand during peak periods as easily as those fully employed outside of the home.[114] Furthermore, low-income consumers may have the least ability to make investments in thermostats and automated appliances that help control the timing of energy use.[115]

As in the net metering debate, regulators take these equity concerns seriously. Even though experts view dynamic pricing as one of the most effective reforms for promoting more rational energy use, regulators hesitate to employ it: a 2010 survey found that only one percent of residential customers are on time-of-use rates, while very few utilities even offer real-time pricing.[116] Regulators remain resistant to these reforms predominantly because of worries about how dynamic pricing might redistribute costs among consumers.[117]

Like net metering, dynamic pricing's equity impacts are less certain than its opponents fear. Current electricity rates contain a hidden (although long-accepted) cross-subsidy: those who use less energy at peak times are subsidizing those who use more.[118] Because the poor do not typically consume a larger share of their power during peak hours,[119] and may actually consume less during peak periods, dynamic pricing might produce a progressive shift in rate design, immediately lowering most low-income consumers' bills.[120]

113. Faruqui, *supra* note 108, at 17; Brand, *supra* note 111, at 52.

114. Faruqui, *supra* note 108, at 17; Brand, *supra* note 111, at 52.

115. *See* Barbara R. Alexander, *Dynamic Pricing? Not So Fast! A Residential Consumer Perspective*, 23 ELECTRICITY J. 39, 43 (2010).

116. Joskow & Wolfram, *supra* note 60, at 382.

117. *Id.* at 384; *see also, e.g.*, In the Matter of the Application of Baltimore Gas and Elec. Co. for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for the Recovery of Cost, No. 9208, Order No. 83410, at 6 (Md. Pub. Serv. Comm'n June 21, 2010) (rejecting utility's application for a smart grid program in part because the Commission was "persuaded that some of the Company's most vulnerable residential customers . . . are less likely to realize the potential benefits of [time-of-use] pricing than would the 'average' residential customer").

118. Faruqui, *supra* note 108, at 19–20.

119. Borenstein, *supra* note 104, at 139.

120. Faruqui, *supra* note 108, at 17 fig.9 (meta-review of seventy dynamic pricing studies from around the country). Faruqui found that dynamic pricing is likely to immediately lower bills for two-thirds to three-quarters of all customers. *Id.* at 16; *see also* FARUQUI ET AL., *supra* note 107 (examining five dynamic pricing schemes from around the U.S. and reaching similar conclusions).

However, there is a rival consideration when it comes to the equity of dynamic pricing: the long term impacts of a pricing change may be even more significant than its immediate impacts, especially in a world where electricity prices are likely to rise over time. To understand the impacts of dynamic pricing policies that are expected to endure and perhaps become more stringent over time, it matters considerably whether consumers will be able to make changes in the time of their electricity consumption in order to manage their bills. The evidence of low-income consumers' ability to adapt to dynamic pricing signals is mixed: while there is some evidence that low-income consumers respond well,[121] other studies have shown that higher-income households are more responsive.[122] And irrespective of immediate responsiveness, there is a longer-term risk associated with the increasingly important role that costly new technologies are likely to play in load management over time. If these technologies remain out of reach for low-income consumers, then they will be less able to manage spikes in their loads that occur during periods of high demand, causing increased bill volatility and higher prices.[123] Thus again, empirical studies may prove useful but not determinative in debates over dynamic pricing schemes, given the inability of such studies to make the value judgments necessary to balance short-term benefits and long-term concerns. To date, the empirical evidence has not persuaded regulators: although pilots abound, no state has moved to mandatory dynamic pricing, and very few utilities even offer opt-out programs that make dynamic pricing the default.[124]

121. Faruqui, *supra* note 108, at 22–23 (reviewing a D.C. study of a critical peak pricing rebate program that found that low-income consumers were two times more likely to respond than other consumers); *see also* FARUQUI ET AL., *supra* note 107, at 21 (finding no measurable difference in response based on income).

122. Ahmad Faruqui & Stephen George, *Quantifying Customer Response to Dynamic Pricing*, 18 ELECTRICITY J. 53, 56 (2005) (finding that college-educated households and households with higher incomes are twice as responsive to dynamic pricing as low-income households).

123. *See, e.g.*, Lisa Wood & Ahmad Faruqui, *Better Data, New Conclusions*, PUB. UTIL. FORT., Mar. 2011, at 47, 47 (2011) ("[L]ow-income consumers did respond to dynamic pricing, but in most cases their rate of price responsiveness was lower than that for non-low-income consumers."); Flaim et al., *supra* note 110, at 18 (finding that the response was 3.5 times larger when control technologies accompanied dynamic pricing).

124. A May 2015 Washington Post article reported that out of 50 million smart-metered customers, only eight million have access to any kind of "smart

D. Energy Storage and Electric Vehicles

Energy storage and electric vehicles present largely untapped but significant possibilities for grid participation. Energy storage[125] is emerging triumphant from years of slow technological progress as it gains in affordability.[126] Buoyed by these advancements, California recently became the first state to impose an energy storage mandate on its utilities, requiring them to procure 1,325 megawatts of energy storage by 2020 in an effort to create a market for storage and further drive down its costs.[127] Ratepayers will bear the costs of procuring this storage.[128]

Ratepayer funding of this program has proven controversial, in part because storage remains a relatively experimental technology with unproven benefits, but in part due to more explicit equity concerns.[129] Energy storage has two

pricing" program, and considerably fewer actually use one. Chris Mooney, *You Should Be Saving Energy and Money on Hot Days This Summer. Here's Why You're (Probably) Not*, WASH. POST (May 21, 2015), https://www.washingtonpost.com/news/energy-environment/wp/2015/05/21/hot-summer-days-could-be-helping-you-save-energy-and-money-heres-why-theyre-probably-not/?utm_term=.da9fd6835a30 [https://perma.cc/ZZ9J-HP75]. California is poised to become the first state to require its utilities to utilize default time-variant pricing. *See* Cal. Pub. Util. Comm'n Proposed Decision, *supra* note 54.

125. Energy storage can take many forms, including batteries, flywheels, compressed air, and "pumped hydro," where water is pumped up a hill during periods of low demand and then used to generate power during periods of higher demand. *See* Amy L. Stein, *Reconsidering Regulatory Uncertainty: Making a Case for Energy Storage*, 41 FL. ST. UNIV. L. REV. 697, 705–07 (2014).

126. *See, e.g.*, John Vidal, *Big Power Out, Solar In: Ubs Urges Investors to Join Renewables Revolution*, GUARDIAN (Aug. 27, 2014), https://www.theguardian.com/environment/2014/aug/27/ubs-investors-renewables-revolution [https://perma.cc/98TD-ZR3X] (describing a recent UBS memo to investors predicting that by 2025, everyone will be able to produce and store power cost-competitively due to declining battery costs); Richard Fioravanti, *Energy Storage: Out of the Lab and Onto the Grid*, PUB. UTIL. FORT., Apr. 2015, at 30, 33 ("In 2013 and 2014, utilities issued more . . . announcements for megawatts of storage than in the past 30 years combined.").

127. Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-Effective Energy Storage Sys., D. 14-01-029, 2014 WL 252061, at 2 (Cal. Pub. Util. Comm'n, Jan. 16, 2014) [hereinafter Cal. Energy Storage Order].

128. Approving San Diego Gas & Electric Company, Pacific Gas & Electric Company, and Southern California Edison Company's Storage Procurement Framework and Program, D. 14-10-045, at 2 (Cal. Pub. Util. Comm'n Oct. 16, 2014).

129. *See* Cal. Energy Storage Order, *supra* note 127, at 16 (discussing utilities' filed comments that "the targets are very aggressive and will come at a high cost to California ratepayers").

promising applications. First, storage might form a critical part of a renewable energy-powered grid, as it could store energy produced during periods of abundant sun and wind for release during other times, thereby solving renewable energy's worrisome "intermittency" problem.[130] Second, storage might act not as a grid stabilizer but as a grid replacement: if distributed generation—that is, small-scale, locally-sited generation—can be cost-effectively combined with storage, self-generating consumers will no longer have any need for the grid.[131] This latter possibility presents similar but more severe equity concerns than net metering. With affordable storage, rich consumers might exit the grid altogether.[132] On a large scale, such exit would radically change electricity's social infrastructure, decoupling wealthy consumers and large businesses from the remainder of the population's need for grid stability and maintenance.[133] Whether or not mass grid exit is likely depends on many unknown factors, including future storage costs and regulatory strategies.[134] But its mere possibility haunts discussions of policies promoting energy storage.

A similar set of concerns animates the controversy over

130. Intermittency refers to the fact that renewable resources are intermittently available based on weather conditions, rather than on stand-by to respond to levels of customer demand. *See* JIM EYER & GARTH COREY, SANDIA NAT'L LABS., ENERGY STORAGE FOR THE ELECTRICITY GRID: BENEFITS AND MARKET POTENTIAL ASSESSMENT GUIDE at xvi (2010).

131. *See* BRONSKI ET AL., *supra* note 63, at 6 (predicting that grid parity for solar-plus-battery systems is "well within the 30-year planned economic life of central power plants and transmission infrastructure"); *see also* Diane Cardwell, *Solar Power Battle Puts Hawaii at Forefront of Worldwide Changes*, N.Y. TIMES (Apr. 18, 2015), http://www.nytimes.com/2015/04/19/business/energy-environment/solar-power-battle-puts-hawaii-at-forefront-of-worldwide-changes.html [https://perma.cc/7E8L-ZBH4] (describing growing trend in Hawaii of installing solar plus batteries).

132. *See, e.g.*, NY REV Feb. 26 Order, *supra* note 33, at 2 ("[T]he 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, with implications for the obligation to ensure reasonably priced and reliable service.").

133. There is not yet empirical evidence on who precisely will exit the grid as the combination of storage and on-site generation becomes a more viable economic proposition, but one can surmise that, similar to solar panels, it is likely to be those consumers able to afford the intensive up-front capital costs. On solar, *see supra* note 92; on grid exit more generally, *see* BRONSKI ET AL., *supra* note 63.

134. RMI estimates the year in which distributed generation combined with storage will reach "grid parity" (i.e., will cost the same as remaining connected to the grid) in five states: pre-2014 (Hawaii); 2025 (New York); 2031 (California); and 2047 (Kentucky and Texas). BRONSKI ET AL., *supra* note 63, at 7 fig.1.

how to fund the construction of a robust electric vehicle (EV) infrastructure, capable of coaxing car owners out of their oil-fired cars and into grid-powered ones. After years of slow progress by private companies, some states are considering whether to permit their regulated utilities to take over the task of building a public network of charging stations, with the costs borne by utility ratepayers.[135] The move would serve the dual purposes of "making the electric car a viable alternative for millions of consumers" and "helping shore up [utilities'] flattening business of supplying electricity."[136] Again, however, equity concerns loom large. In particular, ratepayer advocates question whether it is "fair to burden the majority of . . . ratepayers with building the network. . . ."[137] These fairness concerns stem from two distinct sources: ratepayer advocates question the certainty of the benefits that the public will derive from investing in a charging station network, and also worry that the benefits of this network are likely to accrue predominantly to more affluent ratepayers, who will be more likely to adopt EV technology.[138] Alongside determinations over the extent to which ratepayers should fund charging networks, public utility commissions will play an important role in determining the rates customers pay for charging their EVs, and the rates customers receive if their EVs function as grid storage.[139] The compensation levels set for EVs acting as batteries are likely to spur a debate similar to net metering, regarding whether EVs should be rewarded above the level of wholesale electricity prices for the benefits they provide to the grid and beyond.

E. Whose Equity Concerns?

It would be naïve to think that deep and abiding concerns over the fate of low-income consumers drive all of the equity

135. *See* Diane Cardwell, *Utilities Push Into Fuel Stations for Electric Cars*, N.Y. TIMES (Feb. 19, 2015), http://www.nytimes.com/2015/02/20/business/utilities-push-into-fuel-stations-for-electric-cars.html [https://perma.cc/M5ZZ-XADL]; *see also* Inara Scott, *Teaching an Old Dog New Tricks: Adapting Public Utility Commissions to Meet Twenty-First Century Climate Challenges*, 38 HARV. ENVTL. L. REV. 371, 399–400 (2014) (describing the Oregon PUC's hesitation to approve ratepayer funding of EV infrastructure).

136. Cardwell, *supra* note 135.

137. *See id.*; *see also* Truong, *supra* note 41, at 495.

138. Truong, *supra* note 41, at 495.

139. Scott, *supra* note 135, at 399.

arguments against clean energy policies. As mentioned in the introduction, utilities frequently mount the strongest equity arguments against these policies,[140] although consumer advocates and other interest groups often join them.[141] And utilities sometimes seem to be using equity arguments opportunistically, given the fact that in opposing these clean energy policies, they are centrally concerned with the impacts the policies are likely to have on the utility business model.[142] For example, in the case of net metering, if the policy does in fact shunt more grid costs onto a smaller, poorer group of consumers, then these price increases create incentives for *more* customers to install distributed generation, which in turn causes prices to rise even further. Some fear that this will ultimately create a "utility death spiral," with the remaining customer base unable to support the costs of maintaining the grid and the regulated business model failing.[143] Similar concerns over revenue impacts animate utility opposition to smart grid, dynamic pricing schemes, and energy storage—

140. EV infrastructure policies are an exception—utilities frequently support these because such projects expand the demand for electricity. *See* Cardwell, *supra* note 135.

141. *See, e.g.*, STANTON, *supra* note 89, at 1 (noting that "[m]any interested parties are sounding alarms," although singling out utilities as taking a lead). For its part, the National Association for the Advancement of Colored People (NAACP) has included energy as a core civil rights issue in its agenda, and supports net metering as "an opportunity to break fossil fuel company monopolies that are actively resistant to transition, by offering options for consumers to generate clean energy and drive this necessary transition." Jacqueline Patterson, Environmental and Climate Justice Director, Energy Democracy, #BlackLivesMatter, and the NAACP Advocacy Agenda, Webinar on Net Metering for Solar Advocates Hosted by the Energy Foundation (May 29, 2015), http://www.naacp.org/latest/energy-democracy-blacklivesmatter-and-the-naacp-advocacy-agenda/ [https://perma.cc/G3ZW-JHY8]. Individual state chapters of the NAACP have diverged, however, on their opinions with respect to net metering. *Compare, e.g.,* R. L. Nave, *NAACP Calls for 'Energy Justice'*, JACKSON FREE PRESS (Dec. 26, 2013), http://www.jacksonfreepress.com/news/2013/dec/26/naacp-calls-energy-justice/ [https://perma.cc/8KPR-4QRY] (expressing Mississippi NAACP Chapter's support for net metering), *with* Evan Halper, *Mintority Groups Back Energy Companies in Fight Against Solar Power*, L.A. TIMES (Feb. 9, 2015), http://www.latimes.com/nation/la-na-solar-race-20150209-story.html [https://perma.cc/2CS5-QR6Y] (describing Florida NAACP Chapter's opposition to net metering).

142. *See* Boyd, *supra* note 14, at 1675–82 (describing in more detail the concerns over the sustainability of rate-of-return regulation); Graffy & Kihm, *supra* note 14.

143. *See* PETER KIND, EDISON ELECTRIC INST., DISRUPTIVE CHALLENGES: FINANCIAL IMPLICATIONS AND STRATEGIC RESPONSES TO A CHANGING RETAIL ELECTRIC BUSINESS 6–9 (Jan. 2013); Graffy & Kihm, *supra* note 14.

each of which has the possibility of harming utilities' profitability under current regulatory regimes.[144]

The fact that utilities so frequently filter their protectionist concerns through discussions of equity, however, serves to underscore its importance in electricity law: utilities make these arguments because they are aware that regulators care about the equities of clean energy policies.[145] Even so, the messenger shapes the arguments made. In each of the cases examined above, the right asserted on behalf of low-income consumers is in opposition to progress on clean energy: a right not to subsidize richer customers' solar energy preferences; not to face pricing schemes that increase bill volatility but reduce carbon emissions; and not to pay extra to support experimental technologies that the rich are likely to adopt first. To frame these concerns in this way is not to suggest that they are necessarily unreasonable demands. But it makes the equity concerns with clean energy appear to be limited to ensuring that no policies are adopted or persist that unfairly distribute grid maintenance costs among consumers. In the following parts, I suggest that this is a profoundly shortsighted way to approach the question of how climate change, clean energy, and equity interact.

It is not only utilities, however, that are guilty of shortsighted approaches to clean energy and equity. Clean energy advocates, skeptical of utilities' motives in asserting equity concerns, often respond by initiating an empirical battle, seeking to debunk the validity of such concerns through better studies and more precise valuation of clean energy policies' benefits.[146] The empirical disagreements described above in the cases of net metering and dynamic pricing are examples of this phenomenon. This response is understandable, and this evidence can be useful to commissions evaluating the merits of equity claims. Identifying and addressing real cross-

144. Quinn and Reed adeptly explain why utilities may aggressively promote only that part of the smart grid vision that poses no threat to their bottom line. *See* Quinn & Reed, *supra* note 14, at 840–47. For reasons they observe, many utilities will be natural opponents of smart grid policies aimed at inducing strategic conservation of energy, such as smart meters and dynamic pricing. *See also* Vandenbergh & Rossi, *supra* note 14, at 1531.

145. *See* KIND, *supra* note 143, at 1 (explaining how regulators' concerns about not overburdening low-income consumers who remain tied to the grid as prices rise might ultimately lead to stranded costs that utilities will have to absorb).

146. *See, e.g.*, *supra* notes 93–94.

subsidization claims—and parsing these from other, self-interested utility complaints—will certainly be one important component of achieving clean energy justice.

However, responding piecemeal to narrow concerns about the equity implications of particular policies misses the validity of longer-term concerns about clean energy equity. These concerns cannot be captured empirically or in the context of any particular clean energy policy debate, but are nevertheless vital questions about the future of energy in American society.

F. A More Holistic Conception of Clean Energy's Equity Problem

The debates highlighted above do not lend themselves to easy conclusions regarding the equitability of particular clean energy policies at particular points in time. But moving past empiricism to long-term thinking, I believe clean energy's opponents have highlighted a potentially significant problem.

The suite of policies that makes up the participatory grid portends a troubling future for electricity law's commitment to widespread affordability. Standing alone, participatory grid policies may not pose an unequivocal threat to low-income consumers, as there might not be that much to lose from non-participation. However, the likely interaction *between* participatory grid policies and additional state and federal policies presents particular cause for concern. Participatory grid policies are just one component of the significant transitional policies that climate experts agree will be necessary to keep climate change to manageable levels. These transitional policies are likely to require substantial infrastructure investment, accompanied by a hefty price tag that will be borne by those ratepayers still connected to the grid and still drawing power during periods of high demand.

Meeting the world's agreed-upon but non-binding goal of keeping planetary warming below two degrees Celsuis[147]—a politically ambitious yet already ecologically questionable

147. *See* Framework Convention on Climate Change Draft Dec. -/CP.15, Coppenhagen Accord, UN Doc. FCCC/CP/2009/L.7, at 1 (Dec. 18, 2009). At the 2015 Paris climate change negotiations, delegates further agreed to attempt to keep warming "well below" two degrees. Framework Convention on Climate Change Draft Dec. -/CP.21, Paris Accord, U.N. Doc. FCCC/CP/2015/L.9, art. 2 (Dec. 12, 2015).

aim[148]—would require near total elimination of developed country greenhouse gas emissions by 2050.[149] The implications for U.S. clean energy policy are twofold: First, we would have to almost completely decarbonize our electricity sector, switching to some mixture of renewable energy, fossil energy combined with carbon capture and storage, and nuclear energy.[150] Second, the country would have to electrify several additional sectors, most notably transportation and heating.[151] All told, if the U.S. were to make good on its portion of the two-degree commitment (an unlikely scenario, but a useful one for understanding the scale of changes necessary), electricity generation would need to approximately double by 2050, while carbon emissions from electricity were reduced to three to ten percent of current levels.[152] Even if pursued only half-heartedly and as economically as possible, the necessary changes would increase electricity bills for those customers who continue to rely on the grid for their power.[153]

In the face of these changes, state policies that focus on a participatory grid as a decarbonization strategy present a particular challenge. To become a part of this new grid requires significant technological investment. A platform of solar panels, smart grids, new appliances, electric vehicles, and self-storage does not ring of egalitarianism, given the costs

148. *See* James Hansen et al., *Assessing "Dangerous Climate Change": Reduction of Carbon Emissions to Protect Young People, Future Generations, and Nature*, PLOS ONE, Dec. 2013, at 2 (finding that "there are already clear indications of undesirable impacts at the current level of warming and that 2°C warming would have major deleterious consequences").

149. *See* WILLIAMS ET AL., *supra* note 24, at 1.

150. *Id.* at xi (finding four plausible scenarios for decarbonization, which rely either on high deployment of renewables, nuclear, carbon capture and storage, or a "mixed case").

151. *Id.* at xiii, 25 (finding in all decarbonization scenarios that the "use of electricity and fuels produced from electricity increases from around 20% at present to more than 50% by 2050").

152. *Id.* at xii; *see also* STERN, *supra* note 23, at 238 (noting that stabilization *at any level* of ultimate CO2 concentration will require reducing global emissions by approximately 80 percent); WORKING GROUP III, *supra* note 23, at 20 ("In the majority of low-stabilization scenarios, the share of low-carbon electricity supply . . . increases from the current share of approximately 30% to more than 80% by 2050, and fossil fuel power generation without CCS is phased out almost entirely by 2100.").

153. *Cf.* STERN, *supra* note 23, at 212 ("Any costs to the economy of cutting GHG emissions, like other costs, will ultimately be borne by households. Emissions-intensive products will either become more expensive or impossible to buy.").

involved, *even if*—and this is a critical, underappreciated point—customers who remain tied to the grid are not unjustly cross-subsidizing these technologies' profusion. Even after all cross-subsidies are eliminated, a focus on empowering consumer action may leave low-income consumers, and even plenty of "middle class" consumers,[154] isolated from these changes.

Put differently, reforming participatory grid policies to more precisely align costs with rates only addresses the efficiency concerns raised by the participatory grid, by focusing on achieving perfect distribution of costs as a method of maximizing social welfare.[155] Within electricity law, this principle is often called cost causation or the cost-price standard: a belief that every person should pay precisely for the costs she causes to the system.[156]

But it is not clear that cost causation actually maximizes welfare in the electricity context. Cost causation is justified by the premise that keeping system costs as low as possible leaves society, as a whole, the most additional wealth to devote to other welfare enhancing endeavors.[157] And this premise, in turn, depends upon the use of wealth as a proxy measure for welfare.[158]

Wealth maximization may be a particularly poor proxy for welfare maximization in the context of electricity, where distribution matters considerably. Access to a certain basic quantity of electricity proves life-transformational and foundational to societal engagement, as the history in the next

154. *Cf.* Patricia Cohen, *Middle Class But Feeling Economically Insecure*, N.Y. TIMES (Apr. 10, 2015), http://www.nytimes.com/2015/04/11/business/economy/middle-class-but-feeling-economically-insecure.html [https://perma.cc/8LUY-S8V3] (documenting the increasing economic vulnerability of Americans who identify as "middle class").

155. *See infra* Part II for more on these two competing conceptions of equity.

156. *See* BONBRIGHT, *supra* note 21, at 23–25; K N Energy, Inc. v. Fed. Energy Reg. Comm'n, 968 F.2d 1295, 1300 (D.C. Cir. 1992) ("[I]t has come to be well established that . . . rates should be based on the costs of providing service to the utility's customers . . .").

157. *See* David Spence, Naïve Energy Markets at 10–17 (Feb. 22, 2016) (unpublished manuscript) (on file with author) (tracing conservative economic thought making this case).

158. *See* Richard A. Posner, *The Value of Wealth: A Comment on Kronman and Dworkin*, 9 J. LEGAL STUD. 243, 248 (1980) (arguing for the "appeal of wealth maximization as an alternative to utilitarianism"), *see also* Spence, *supra* note 157, at 20 (explaining economics' break with utilitarian philosophy in the early-twentieth century).

section illustrates. However, adding access to ever-increasing amounts of electricity has diminishing import in terms of life sustenance—for example, if an electricity user has access to ten times the basic amount necessary, adding that tenth unit might allow the user to upgrade from a 3,000-square-foot to a 4,000-square-foot home.[159] This fact means that a legal regime aiming not to maximize overall efficiency, but instead to provide certain basic minima to all citizens, may actually produce greater social welfare.[160] If this is the case, then clean energy policy reforms that aim only to perfectly price costs and benefits may fail to deliver welfare gains.

Moreover, even if cost causation is welfare maximizing as a theoretical matter, there is another hurdle to this approach: it does not reflect the balance struck, as a historical and political matter, within electricity law. As the next section will show, electricity law has never accepted perfect cost alignment as its sole aim. Instead, lawmakers and the voters who elected them have long been willing to sacrifice some efficiency for the sake of ensuring wider access.[161]

II. ENERGY LAW'S HISTORICAL EQUITY NORMS

There is a reason that arguments implicating the inequities of clean energy policies resonate with energy regulators: electricity law has a longstanding commitment to incorporating and addressing equity concerns. I am not the first to observe the centrality of distributional issues in electricity law: scholars have long portrayed the field of public utility law as a protracted ideological battle between "equity,"

159. This argument reflects the well-accepted economics concept of diminishing marginal utility. *See, e.g.*, Michael B. Dorff, *Why Welfare Depends on Fairness: A Reply to Kaplow and Shavell*, 75 S. CAL. L. REV. 847, 867 (2002).

160. This critique is not novel: the argument that "wealth is too narrow a measure of human happiness" is "one of the most powerful critiques of the economic analysis of law." *Id.* at 849. But it is a critique that often gets lost within the debates over energy market design. *See* Spence, *supra* note 157, at 20–22. I take up the argument that efficiency, or wealth maximization, remains a justifiable criterion for legal regime design, and that all redistribution should occur through the tax code. *See infra* Part III.D.

161. *Cf.* Spence, *supra* note 157, at 17 ("While economics seeks allocative efficiency, voters and their agents in Congress care not only about what is efficient, but also what is just, or fair; and they sometimes favor collective responses to risk.").

on the one hand, and "efficiency," on the other.[162] In this view, regulators are caught in a compromise game between two camps of advocates. One side argues from the perspective of fairness or equity that electricity, as a fundamental service, should be priced based on need and ability to pay, such that lower-income consumers should receive discounted rates.[163] The other side defends the cost-causation principle introduced above as a means to maximize social welfare, arguing that perfectly apportioning costs to those who cause the system to incur the costs will maximize social welfare.[164] These two contradictory approaches both manifest themselves in various facets of existing electricity law, causing scholars to long bemoan the field's inability to muster a coherent approach to questions of equity.[165]

In a time of rapidly shifting priorities within the field, it is worth a fresh look at electricity law's equity norms. In this Part, I argue that framing electricity law as a protracted contest between equity and efficiency obscures what has long been electricity law's underlying goal: a focus on access to affordable electricity as a means of enabling broad participation in markets and civil society. As this Part illustrates, electricity law since its inception has focused on widening the range of Americans able to take advantage of the opportunities electricity provides, and has therefore incorporated legal commitments to equity within a framework that frequently emphasizes efficiency in order to do so. Understanding energy's equity commitment as rooted in this goal of widespread access is critically important in regulators' effort to retain important historical norms and precedents in an era that requires radical shifts within the electricity sector. The regulatory mandate has always been—and remains—enabling access to affordable power; it is only the means that must shift.

162. *See supra* note 21 and accompanying text.

163. These arguments harken to John Rawls's concept of "primary goods." *Cf.* JOHN RAWLS, A THEORY OF JUSTICE xiii, 79 (rev. ed. 1999) (arguing for a theory of equality that maximizes the least advantaged group's index of "primary goods," which are those things that "persons need . . . as normal and fully cooperating members of society over a complete life").

164. *See supra* note 156 and accompanying text.

165. Trebing, *supra* note 21, at 31.

A. The Creation of Public Utility Law

Before 1900, most Americans viewed electricity as a spectacle: It lit the homes of the wealthy and formed "Great White Ways" down the main streets of cities, but it was neither commonplace nor necessary.[166] Fairly quickly, though, Americans came to understand electricity's practical importance in easing the tasks of labor and daily home life.[167] At the same time, the technical elite saw its potential as a tool of social reform, capable of "dispers[ing] the ghettos of poverty, the slums of misery and the Alsatias of vice."[168]

For these reasons, although electricity began as a commodity produced and distributed by private companies,[169] a public clamor began for government control over these businesses. The question of whether utilities should be privately owned or taken under municipal control became one of the most prominent political debates of the early 1900s.[170] Theodore Roosevelt advocated for increasing government supervision of the utility industry to ensure it was used "for and not against the interest of the people as a whole."[171] Many in the industry and the academy also propounded the view that these businesses were "natural monopolies" where competition did not make sense, because duplicative sets of transmission and distribution lines would be wasteful and inefficient.[172] But

166. *See* NYE, *supra* note 27, at 2, 29, 242.

167. *Id.* at 186, 250.

168. John Burns, *Municipal Ownership a Blessing*, *in* INDEPENDENT, Vol. 60 at 449 (1906) (advocating municipal ownership of electricity as a way to bring its virtues into more homes); NYE, *supra* note 27, at 157.

169. RICHARD HIRSH, POWER LOSS 12–14 (1999); NYE, *supra* note 27, at 139.

170. *See, e.g.*, Edward F. Dunne, *Our Fight for Municipal Ownership*, INDEPENDENT Oct. 18, 1906, at 927 ("In recent years perhaps no subject has engrossed so much of the attention of the public in the great cities of this country . . . as the question of ownership and operation by the public of public utilities."); DANIEL T. RODGERS, ATLANTIC CROSSINGS: SOCIAL POLITICS IN A PROGRESSIVE AGE 135–36, 148–49 (1998) (noting that municipalization was a major issue in mayoral campaigns in New York City, Detroit, Chicago, San Francisco, and Cleveland, among others).

171. DAVID NYE, CONSUMING POWER 127 (1999) (quoting address by Roosevelt).

172. *See* PHILLIPS, *supra* note 21, at 3–5; Horace M. Gray, *The Passing of the Public Utility Concept*, 16 J. LAND & PUB. UTIL. ECON. 8, 10 (1940). *But see* Robert L. Bradley, Jr., *The Origins and Development of Electric Power Regulation*, 43, 54, *in* THE END OF A NATURAL MONOPOLY 43, 43 (Peter Z. Grossman & Daniel H. Cole eds., 2003) (arguing that at its inception, "government intervention into electric markets was not the result of market failures but business and political

natural monopoly status also created the possibility of monopoly profits—an unacceptable proposition in the context of a good so fundamental to American notions of progress.[173]

Lawmakers navigated this tension by declaring electric companies to be "public utilities," which would be run by private entities but regulated by state commissions.[174] Wisconsin and New York formed the first state public utility commissions (PUCs) to oversee electric power in 1907,[175] and by 1921 every state but Delaware had a commission.[176] The framework established then persists largely intact today, at least for those elements of the electric utility industry that remain under commission control[177]: commissions govern utilities predominantly by "rate of return" regulation, rewarding utilities a monopoly service area and a "fair return" on their assets[178] in exchange for delivering power under a set of conditions designed to protect the public. These conditions include (1) an obligation to serve all those within a utility's service area who are willing and able to pay;[179] (2) a requirement of safe and adequate service, (3) a prohibition on "undue or unjust price discrimination," and (4) a requirement that rates be "just and reasonable."[180]

opportunism" and questioning whether the duplicative lines justification really held weight).

173. NYE, *supra* note 27, at 141.

174. *See* WILLIAM E. MOSHER ET AL., ELECTRICAL UTILITIES: THE CRISIS IN PUBLIC CONTROL 4 (1929). For more detailed accounts of the rise of public utility regulation, *see* Bradley, Jr., *supra* note 172; Boyd, *supra* note 14; William J. Hausman & John L. Neufeld, *The Market for Capital and the Origins of State Regulation of Electric Utilities in the United States*, 62 J. ECON. HIST. 1050 (2002); MOSHER, *supra*, ch. 1.

175. MOSHER ET AL., *supra* note 174, at 5.

176. NYE, *supra* note 27, at 181.

177. Since the 1990s, many states have required their electric utilities to sell most or all of their generation assets. *See* Severin Borenstein & James Bushnell, *The U.S. Electricity Industry After 20 Years of Restructuring,* 7 ANN. REV. ECON., 437, 445 (2015). Some states have also introduced retail competition, such that only transmission and distribution utilities remain under commission oversight. *See infra* notes 237–240 and accompanying text.

178. *See* Smyth v. Ames, 169 U.S. 466, 547 (1898) (allowing regulated companies to receive a "fair return upon the value of that which it employs for the public convenience."). The Supreme Court has since repudiated the "fair value" standard, subsuming this question within the general inquiry of whether rates are "just and reasonable." *See* Fed. Power Comm'n v. Natural Gas Pipeline Co. of Am., 315 U.S. 575, 602 (1942).

179. This obligation is frequently referred to as the "duty to serve." *See* Rossi, *supra* note 21, at 1239.

180. *See* PHILLIPS, *supra* note 21, at 118–19; Vol. 1, ALFRED E. KAHN, THE

Several of these conditions demonstrate an early commitment to access and affordability. The "just and reasonable" rates mandate aimed, at least in theory, to keep utility rates as low as possible for consumers.[181] Similarly, the "obligation to serve" expanded access to all within a service area, including those most expensive to reach.[182] And finally, the prohibition on "unjust discrimination" prohibited utilities from exploiting certain segments of the population by over-charging them as compared to their peers.[183]

B. Widening Access: Public Power

Despite these protections, within a few decades the limitations of public utility law became apparent. Early critics railed against public utility law's predominantly "negative" character, which "prohibited certain obvious forms of monopolistic behavior, but failed to impose definite responsibility for socially desirable actions" and lacked any "express mandate for the positive promotion of public welfare."[184] Such criticisms reflected the sense that lawmakers had an obligation to do more than merely prohibit price gouging for those already connected to the electric system. And this sentiment sprang from a stark reality facing the country by 1930 with respect to electricity: whereas urban dwellers

ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, at 3 (1988) (identifying the same four principal components of public utility regulation); Boyd, *supra* note 14, at 1641.

181. *See, e.g.*, P.R. Tel. Co., Inc. v. Telecom. Reg. Bd. of P.R., 665 F.3d 309, 316 (1st Cir. 2011) ("Regulation of retail prices focused on setting 'just and reasonable rates,' balancing the utility provider's interest in a fair return on investment against the public's interest in a fair price for services.").

182. *See* N.Y. & Queens Gas Co. v. McCall, 245 U.S. 345, 351 (1917) (Public service corporations "may not pick and choose, serving only the portions of the territory covered by their franchises which it is presently profitable for them to serve . . . ."); PHILLIPS, *supra* note 21, at 119.

183. *See* Robert Hale, *Commissions, Rates, & Policies*, 53 HARV. L. REV. 1103, 1105 (1940) (defining "unjust discrimination" as resulting "from unequal rates for services whose rates ought to be equal, or from equal rates for services whose rates ought to be different").

184. Horace M. Gray, *The Passing of the Public Utility Concept*, 16 J. LAND & PUB. UTIL. ECON. 8, 16 (1940). *See also* KAHN, *supra* note 180, at 18 ("[T]he role of the government remains essentially negative—setting *maximum* prices . . . specifying *minimum* standards of service"); MOSHER ET AL., *supra* note 174, at xix (cataloguing "the extent to which the industry is still being administered as any other exploitative private industry").

considered electricity a commonplace necessity,[185] 90 percent of farms still lacked access.[186]

The notable gap in electricity service left by public utility regulation caused consternation among a wide group of progressive thinkers and rural Americans.[187] Many declared electrical service "a right";[188] Franklin D. Roosevelt called it "a definite necessity" and considered its profusion a key component of New Deal social and economic reforms.[189]

Electrification beyond the city required a strategy beyond public utility law. Under no legal compulsion to operate outside their service territories, utilities not only refused to extend service into unprofitable regions but also fought farmers' efforts to form their own local electric cooperatives.[190] Ultimately this strategy backfired, as increasing frustration with utilities' monopolistic behavior combined with the hardships of the Great Depression to turn public opinion in favor of large-scale public power projects during the 1930s.[191] Consequently, Congress passed legislation creating the Tennessee Valley Authority (TVA) in 1933 and the Rural Electrification Administration (REA) in 1936,[192] which together

185. NYE, *supra* note 171, at 171.

186. NYE, *supra* note 27, at 287; MOSHER ET AL., *supra* note 174, at xiv (comparing U.S. progress on rural electrification unfavorably to Germany, Sweden, Denmark, and Ontario).

187. *See, e.g.*, NYE, *supra* note 27, at 304; SARAH T. PHILLIPS, THIS LAND, THIS NATION 21–26, 35 (2007) (documenting how electrification functioned as part of a larger effort to relieve rural poverty and promote efficient resource use); Jean Christie, *Giant Power: A Progressive Proposal of the Nineteen-Twenties*, 96 PENN. MAG. OF HIST. & BIOGRAPHY 480, 485 (1972) (finding that one of the "leading theme[s] of the arguments for government diffusion of electric power" was "concern for rural life").

188. NYE, *supra* note 27, at 301 (discussing the address of L.J. Taber to a 1920s National Electric Lighting Association convention on rural electrification); ROY TALBERT, JR., FDR'S UTOPIAN: ARTHUR MORGAN OF THE TVA 147 (1987) (describing TVA head David Lilienthal's "vigorous campaign on behalf of electricity as a natural right for all Americans").

189. NYE, *supra* note 27, at 304; TALBERT, *supra* note 188, at 118, 128; *see also* Christie, supra note 187, at 494–95 (discussing Gifford Pinchot's call for greater government intervention to ensure that electric power would "be made incomparably the greatest material blessing in human history").

190. NYE, *supra* note 27, at 292, 308; Bruce Wyman, *The Obligations of Public Services to Make Connections*, 22 HARV. L. REV. 564, 571 (1909).

191. NYE, *supra* note 27, at 304.

192. *See* Tennessee Valley Authority Act of 1933, ch. 32, 48 Stat. 58 (1933) (codified as amended at 16 U.S.C. § 831 (2012)) [hereinafter TVA Act]. The REA was first created by Executive Order in 1935, and later statutorily authorized and expanded. *See* Exec. Order No. 7037 (May 11, 1935) (adopted under the authority

brought electricity to most farms throughout the country.

These statutes' central focus was on empowering rural Americans to build their own electricity networks.[193] The TVA Act did so by prioritizing public purchasers in selling the electricity generated by its dams, thereby providing a reliable source of cheap power for consumers not served by utilities.[194] The Act also gave the TVA's governing board authority to extend loans to help municipalities and electric cooperatives construct and operate the transmission and distribution lines necessary to access TVA power.[195]

Similarly, the REA operated primarily through the assurance of loans provided at the government rate of interest.[196] Rural electric cooperatives, organized and democratically controlled by participating residents, received the vast majority of these loans.[197] These cooperatives proved exceedingly successful in marshaling the resources necessary to electrify rural America: within twenty years, they had wired ninety percent of their service territories.[198] The cooperative structure also served participatory functions: thousands of farmers and their families would gather to discuss their

of the Emergency Relief Appropriation Act of 1935, ch. 48, 49 Stat. 115 (1935)); Rural Electrification Act of 1936, ch. 432, 49 Stat. 1363 (May 20, 1936) (codified at 7 U.S.C. § 901) [hereinafter REA Act]. Many states also undertook rural electrification efforts around this time. *See* RURAL ELEC. ADMIN, ELECTRIC POWER ON THE FARM 143 (David Cushman Cole ed., 1936) (noting state authorities in North and South Carolina, Alabama, and Tennessee and other programs in Wisconsin and Minnesota) [hereinafter ON THE FARM].

193. *Cf.* PHILLIPS, *supra* note 187, at 35 (arguing that electrification was driven by the question of how to distribute the wealth of industrialism and modernity more equitably).

194. *See* TVA Act Preamble, § 11; *see also* Joseph P. Mentor, Jr., *The Preference Clause Revisited: Central Lincoln Peoples' Utility District v. Johnson and the Pacific Northwest Electric Power Planning and Conservation Act*, 58 WASH. L. REV. 413, 416–17 (1983).

195. TVA Act §§ 12–12a.

196. *See* REA Act §§ 2–4; U.S. DEP'T. OF AGRIC., A BRIEF HISTORY OF THE RURAL ELECTRIFICATION AND TELEPHONE PROGRAMS 1 (1983).

197. *See* Jim Cooper, *Electric Co-operatives: From New Deal to Bad Deal?*, 45 HARV. J. ON LEGIS. 335, 346, 346 n.77 (2008); ON THE FARM, *supra* note 192, at 136, 157 (noting that loans were typically not made for less than $40,000 for approximately forty miles of line, the smallest project considered financially feasible, which caused rural residents to have to canvass and campaign for cooperative participants); *see also* THE NEXT GREATEST THING, *supra* note 28, at 81–87 (describing co-ops' formation process).

198. Cooper, *supra* note 197, at 347 ("No private companies had ever stretched copper wire faster, over longer distances, or been a conduit of more federal subsidy dollars.").

cooperative's finances and operations during day-long sessions.[199] These meetings had "a spiritual meaning to people who were so long denied the benefits of modern energy."[200]

Both the TVA and the REA relied on private sector support to create economically sustainable models that could broaden access. In conjunction with national appliance manufacturers, the agencies designed and promoted more affordable versions of popular electronic appliances for rural residents, marketed under the logo "Electricity for All."[201] The agencies also extended loans directly to farms to assist in the wiring of houses and outbuildings and the purchase of electrical equipment.[202] These sales increased electricity demand, allowing cooperatives to pay for their newly constructed transmission lines while keeping prices low.[203]

For rural residents, electricity proved transformational on a physical and more profound level. In addition to easing the enormous burdens of hauling wood and water, electricity brought connections to the world beyond the farm, powering radios and eliminating the challenge of reading by kerosene lamp.[204] One widely printed poem called rural electrification "democracy at work," proclaiming: "out of the darkness, light, out of despair / the new fulfillment of equality."[205]

As a legal matter, the public power mandates of the 1930s reflected a societal refusal to allow the boundaries of energy access to be determined by the economics of public utility companies or the reach of public utility law. These programs treated electricity as an important foundational good, necessary for participation in the nation's economy and in its democratic traditions. But it is important not to overstate their

199. *See* DAVID E. LILIENTHAL, DEMOCRACY ON THE MARCH 19–20 (1944).

200. *Id.* at 20.

201. *See* TALBERT, *supra* note 188, at 145–48; NYE, *supra* note 27, at 318; ON THE FARM, *supra* note 192, at 159. The Electric Home and Farm Authority (EHFA), created by the TVA, supplied these loans to families. *See* Exec. Order No. 6514 (Dec. 19, 1933).

202. *See* REA Act § 5; ON THE FARM, *supra* note 192, at 158.

203. Field, *supra* note 29, at 33; *see also* LILIENTHAL, *supra* note 199, at 22 (explaining the TVA's strategy in this regard); THE NEXT GREATEST THING, *supra* note 28, at 61 (explaining Morris Cooke's argument that the key to rural electrification's success was to create large average use of current, in order to keep rates low enough "to effect the coveted social advantages").

204. *See* CARO, *supra* note 27; THE NEXT GREATEST THING, *supra* note 28.

205. NYE, *supra* note 27, at 325–26 (discussing a poem on rural electrification written by Walter Paschall).

idealism: While those behind the public power movement often spoke of electricity as a right, the Acts themselves only went so far as to enable more Americans to organize themselves into groups able to access reasonably priced electricity.[206] And the Acts did not reach all Americans: those rural areas that could not, for economic or other reasons, organize themselves into viable cooperatives continued to be left out of electrification's gains.[207] Public power thus widened affordable electricity access, but did not disrupt its status as a commodity for sale only to those who could afford to pay something for it.

C. Creating a Floor or Creating Rationality? The Debates of the 1970s

The model of public utility commissions combined with rural electric cooperatives proved adequate to address equity concerns within energy law for many decades.[208] But in the 1970s, electricity rates finally began to rise,[209] putting pressure on electricity law to consider equity in new ways.[210] Long-dormant questions over cost distribution among consumers came to the fore, discussed in conversations over "rate design."[211]

206. *See supra* notes 192–203 and accompanying text.

207. *See, e.g.*, CARO, *supra* note 27, at 502–03 (describing why electricity took decades longer to come to remote Texas Hill Country); *see also* Alysa Landry, *Not Alone in the Dark: Navaho Nation's Lack of Electricity Problem*, INDIAN COUNTRY MEDIA NETWORK (Feb. 11, 2015), http://indiancountrytodaymedianetwork.com/2015/02/11/not-alone-dark-navajo-nations-lack-electricity-problem-159135 [https://perma.cc/L89S-Z86M] (documenting ongoing challenges in connecting thousands of Navajo Nation residents to the electric grid).

208. *See* Peter Z. Grossman, *The Zenith of the Natural Monopoly System*, *in* THE END OF A NATURAL MONOPOLY 89, 101 (Peter Z. Grossman & Daniel H. Cole eds., 2003) ("[T]he natural monopoly system outweighed the costs in the period between 1945 and 1965 for the following reasons: predictability, the direction of electricity prices, path dependence, and transition costs."); *see also* Paul Joskow, *Inflation and Environmental Concern: Structural Change in the Process of Public Utility Price Regulation*, 17 J. L. & ECON. 291, 312 (1974).

209. Stefan H. Krieger, *An Advocacy Model for Representation of Low-Income Intervenors in State Public Utility Proceedings*, 22 ARIZ. ST. L.J. 639, 640 (1990) ("Nationally, electric rates rose ninety percent in the five years after 1970.").

210. PHILLIPS, *supra* note 21, at 12; Joskow, *supra* note 208, at 312–13 (arguing that a confluence of factors "wreaked havoc" on ratemaking, including inflation, rising interest rates, increased environmental concern, and energy shortages).

211. PHILLIPS, *supra* note 21, at 19–20. Concurrently, the number of utility rate cases soared and the public began to intervene in commission proceedings in much greater numbers. *See* Krieger, *supra* note 209, at 640; Joskow, *supra* note

An influential 1971 article by Richard Posner highlighted the prevalence of "internal subsidies" in regulated industries as a form of "taxation by regulation."[212] Posner's article illustrated the ways in which regulation performed "distributive and allocative chores," particularly through uniform rates charged to consumers with different costs of service.[213] Attention to internal subsidies caused some economists and conservationists to unite in pressing for regulated prices to better reflect the costs of providing energy at the particular time and place it was demanded.[214] Such changes would reduce electricity demand, particularly at peak periods, thus improving the environment and increasing economic welfare.[215]

But these goals collided with the objective of helping consumers to manage their skyrocketing energy bills, especially as it became clear that rising rates did not equally harm all consumers. Rising energy prices caused low-income households to devote eleven to fourteen percent of their income to home energy costs, as compared to an average of three percent.[216] This disparity either caused lower-income households to lose service or crowded out their ability to purchase other basic goods.[217] Advocates on behalf of energy as a basic good or necessity therefore pressed for reduced prices for those struggling to pay their electricity bills.[218]

These debates crystallized the "fairness versus efficiency" contest in public utility law (and well beyond), which pitted the

208, at 299; William T. Gormley, Jr., *Public Advocacy in Public Utility Commission Proceedings*, 17 J. APPLIED BEHAV. SCI. 446, 446 (1981).

212. Posner, *supra* note 21, at 22. Posner argued that "internal subsidies" resulted from the fact that services like electricity were priced equally for all consumers within particular classes, despite the fact that individual households and businesses actually cost different amounts to serve, such that some customers were non-transparently subsidizing others. *Id.*

213. *Id.* at 23.

214. *See* Joskow, *supra* note 208, at 314, 317; PHILLIPS, *supra* note 21, at 20; *see also* Kahn, *supra* note 180, at xxviii (tracing commissions' rising interest in "economic efficiency" to discourage inefficient consumption and reduce capacity expansion); Gerald R. Faulhaber, *Cross-Subsidization: Pricing in Public Enterprises*, 65 AM. ECON. REV. 966, 966 (1975) (defining policy makers' equity concerns as centering on the question of whether a proposed price structure "unduly" favors certain consumers by resulting in a cross-subsidy).

215. Joskow & Wolfram, *supra* note 60, at 381.

216. Higgins & Lutzenhiser, *supra* note 32, at 470.

217. *Id.*; Diana Hernández & Stephen Bird, *Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy*, 2 POVERTY & PUB. POL'Y 5, 11–13 (2010).

218. Higgins & Lutzenhiser, *supra* note 32, at 472–73.

two visions of the purpose of energy law against each other: one focused on rationalizing rates so everyone paid her own way, and the other focused on differential treatment based on ability to pay.[219] At its heart, this debate concerned the legal question of when discrimination among consumers is "due" or "just": for one group, it was just when discrimination remedied efficiency failures; for another group, it was just when it helped maintain affordable electricity for all. More broadly, this debate called into question the role of regulatory commissions: were they to act as a substitute for competition, trying to produce the outcomes that a theoretical market would, but for the existence of a natural monopoly?[220] Or were they to play a more capacious role in the provisioning of basic services that society refused to leave to the market?[221]

Neither side of this debate fully triumphed. The major federal energy statute passed at the time, the Public Utility Regulatory Policies Act of 1978 (PURPA),[222] reflects lawmakers' refusal to choose between fairness and efficiency. The Act required state commissions to eliminate cross-subsidization among classes of electric consumers and to consider adopting time-of-use rates that varied by time of day and season.[223] But PURPA tempered its push towards economic rationality by requiring states to consider the adoption of "lifeline rates," which would give elderly and low-income consumers a certain quantity of basic service below cost.[224]

219. PHILLIPS, *supra* note 21, at 20; ZAJAC, *supra* note 20, at 2–3 (explaining that public utility pricing represents "100 years" of "deal[ing] in practical terms with the tradeoff" between equity and efficiency); Trebing, *supra* note 21, at 17; BONBRIGHT, *supra* note 21, at 121–34.

220. *See, e.g.*, PHILLIPS, *supra* note 21, at 173 ("[R]egulation is a substitute for competition and should attempt to put the utility sector under the same restraints competition places on the industrial sector."); BONBRIGHT, *supra* note 21, at 109 ("Regulation can . . . be regarded as a substitute for competition—probably as an inferior substitute.").

221. *See* Boyd, *supra* note 14, at 1651–58 (explaining how understandings of the role of regulatory commissions evolved during this period).

222. Public Utilities Regulatory Policies Act of 1978, Pub. L. 95–617, 92 Stat. 3117 (1978) (codified at 16 U.S.C. §§ 2601–2645 (2012)).

223. *See* 16 U.S.C. § 2621; *see also* H.R. Rep. No. 95-543, at 10 (1978), as reprinted in 1978 U.S.C.C.A.N. 7673, 7679 (explaining that the bill aims to move utilities towards pricing electricity "at true cost" to encourage conservation).

224. 16 U.S.C. § 2624; PHILLIPS, *supra* note 21, at 449; *see also* Lester W. Baxter, *Electricity Policies for Low-Income Households*, 26 ENERGY POL'Y 247, 248 (1998). PURPA also established recommended standards that prohibited terminating electric service for non-payment during periods "especially dangerous

State regulators followed PURPA's lead in mixing efficiency and fairness reforms. Many commissions adopted "inverted block rate" pricing, which punished large consumers by charging more for consumption above certain levels.[225] These rates responded to conservationists' concerns that energy scarcity should be reflected in rates,[226] but also implicitly protected low-income consumers by charging the lowest price for power adequate to cover basic needs.[227] Lifeline rates proved more controversial: While some states, including California and New York, adopted such rates, they remained difficult to implement within the confines of public utility law.[228] It was hard to determine who deserved a lifeline, and onto whom the costs of lifeline rate provision should be shifted.[229] For this reason, many commissions rejected lifeline rates as falling outside the purview of what public utility law was set up to do.[230]

Separately from these public utility debates and spurred by skyrocketing energy bills, in 1981 Congress adopted a federally-funded program designed to mitigate energy inequality called the "Low Income Home Energy Assistance Program" (LIHEAP).[231] LIHEAP, which is still in existence today, uses block grants to states to assist low-income households in meeting their home energy costs, although

to health." *See* 16 U.S.C. §§ 2623, 2625(g) (2012).

225. KAHN, *supra* note 180, at xxx–xxxi.

226. *Id.* at xxxi. Some commissions also began to move towards time-of-use tariffs for large industrial and commercial customers, who had the metering infrastructure necessary to utilize these more complex tariff structures. *See* Joskow & Wolfram, *supra* note 60, at 382.

227. KAHN, *supra* note 180, at xxx–xxxi.

228. PHILLIPS, *supra* note 21, at 449–51; Krieger, *supra* note 209, at 663–65 (describing contentious implementation of lifeline rates in California, where "most of the [commission] staff objected to the concept" but consumer groups succeeded in building a coalition "involving senior citizen groups, labor unions, and environmental organizations").

229. PHILLIPS, *supra* note 21, at 450 (explaining the challenges of including industrial ratepayers in paying for lifeline rates, given the countervailing argument that including this class might increase the price of other basic goods, also harming low-income consumers).

230. *See, e.g.*, Rate Concessions to Poor Persons & Senior Citizens, 14 P.U.R.4th 87, 90 (Or. Pub. Serv. Comm'n Jan. 16, 1976) (finding no authority for commissioner to "discriminate between customers on the basis of income levels," and collecting decisions from other states reaching the same conclusion); *see also* Trebing, *supra* note 21, at 33 (explaining that commissions were reluctant to adopt redistributive rate structures).

231. Omnibus Budget Reconciliation Act of 1981, Pub. L. 97–35, 95 Stat. 357 (Aug. 13, 1981) (codified at 42 U.S.C. §§ 8621–8630 (2012)).

funding has never been near sufficient to cover demand.[232] Contemporaneously with LIHEAP, federal and state governments also began to direct funding towards low-income "weatherization" efforts, which provide home energy audits, storm windows, insulation, and other technologies to low-income households.[233] Weatherization programs have proven an enduring alternative to direct rate subsidization, as they permanently reduce energy costs in low-income households,[234] which often prove among the least efficient energy users.[235] In this way, such policies might prove important models for policies that attempt to spread additional clean energy technologies more equally.

D. Restructuring & Low-Income Consumers

Widening Americans' access to affordable power began as a Progressive and New Deal era project, consonant with the ideologies of those times. But by the end of the twentieth century and in a very different political climate, regulators

232. *See* 42 U.S.C. §§ 8621–8622 (defining "home energy" as residential heating and cooling). Each state establishes its own LIHEAP program guidelines and distributes its funds through local agencies. The maximum income eligibility is the greater of 150 percent of the federal poverty level or 60 percent of the state median income. *See* 42 U.S.C. § 8624 (2012). A 1995 study found that only 20 percent of the 30 million eligible households received any LIHEAP assistance. Higgins & Lutzenhiser, *supra* note 32, at 469. For a more detailed discussion of LIHEAP, see LIBBY PERL, CONG. RES. SERV., LIHEAP: PROGRAM AND FUNDING 7 (2013); Behles, *supra* note 13, at 27–31.

233. *See* Higgins & Lutzenhiser, *supra* note 32, at 472. States can use up to fifteen percent of their LIHEAP grants towards weatherization efforts, and the U.S. Department of Energy also runs its own Weatherization Assistance Program (WAP) targeted at low-income households. *See* The Energy Conservation in Existing Buildings Act of 1976, Pub. L. No. 94–385, title IV, 90 Stat. 1150 (1976) (codified as amended at 42 U.S.C. § 6851 et seq.).

234. *See* Baxter, *supra* note 224, at 249; *see also* Scott, *supra* note 135, at 389 (suggesting that commissions adopted energy efficiency policies primarily to lower rates). The American Recovery and Reinvestment Act of 2009 allocated $5 billion to the WAP. *See* U.S. DEP'T OF HEALTH & HUMAN SERVS., LOW INCOME HOME ENERGY ASSISTANCE PROGRAM: REPORT TO CONGRESS FOR FISCAL YEAR 2008 39–40 (2011).

235. A 2016 study found that low-income households pay on average $1.41 in energy costs per square foot, whereas the average non-low-income household pays only $1.17 per square foot, indicating that low-income households "reside in less efficient housing." *See* ARIEL DREHOBL & LAUREN ROSS, LIFTING THE HIGH ENERGY BURDEN IN AMERICA'S LARGEST CITIES (2016), http://energyefficiencyforall.org/sites/default/files/Lifting%20the%20High%20Energy%20Burden_0.pdf [https://perma.cc/R2JX-W2DH].

across the country viewed it as central to their mission. They demonstrated this enduring commitment during industry upheavals in the 1990s, when "retail restructuring" changed the basic model of electricity provisioning in many states.[236]

Retail restructuring followed a series of reforms in federal law that increased competition in electricity markets.[237] Buoyed by this enhanced competition in wholesale electricity markets, many states decided to allow competition among retail electricity suppliers as well.[238] Under retail restructuring, consumers would be able to choose their electricity supplier from a competitive pool, with only distribution service remaining a traditionally regulated monopoly.[239] Competition created through this model would, in theory, lower energy prices by allowing consumers to shop for the best deal.[240]

One of the greatest obstacles to retail restructuring quickly proved to be the question of how to ensure continued affordable universal service within a competitive marketplace, where retail suppliers could screen out those customers considered risky or high-cost.[241] In some places, these concerns caused regulators to abandon altogether plans to open electricity provisioning to competition.[242] In those states where retail

236. *See* Paul L. Joskow, *The Difficult Transition to Competitive Electricity Markets in the United States*, *in* ELECTRICITY DEREGULATION: CHOICES AND CHALLENGES 5–10 (James M. Griffin & Steven L. Puller eds., 2005).

237. *See* Energy Policy Act of 1992, Pub. L. No. 102–486, 106 Stat. 2776, §§ 721–22 (1992) (relevant portions codified at 16 U.S.C. §§ 824(j)–(k) (2012)); FERC Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities 18 C.F.R. §§ 35, 385 (1996); *see also generally* David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765 (2008) (describing the restructuring process and exploring its purpose, promise, and limits).

238. By 1998 more than half of states had opened proceedings to consider retail restructuring. *See* BARBARA ALEXANDER, CONSUMER PROTECTION PROPOSALS FOR RETAIL ELECTRIC COMPETITION: MODEL LEGISLATION AND REGULATIONS 2 (1996).

239. Rossi, *supra* note 21, at 1294 (observing that states created "de jure monopol[ies] for distribution, subject to fairly traditional regulation").

240. *See* ALEXANDER, *supra* note 238, at 3; Rossi, *supra* note 21, at 1281 ("It is well-recognized that, in order to maximize the benefits of competition in wholesale power markets, retail access to competition for all customers will be necessary.").

241. *See* Rossi, *supra* note 21, at 1288, 1299–1300 (suggesting that defining the "scope of extraordinary service obligations and their financing" was critical to the success of retail competition).

242. *Id.* at 1290. Regulators also worried about losing other consumer protections, including protections regarding credit terms, contract terms, late fees, security deposits, and disconnection and connection practices. *See* ALEXANDER,

restructuring proceeded, the challenge of assuring continued affordable service for all consumers assumed a central position on regulatory dockets.[243]

Thus, even two decades into a deregulatory revolution in the United States,[244] no state proved willing to leave electricity to the market.[245] Instead, each state pursuing restructuring adopted some variant of "provider of last resort" service, which created an obligation to serve those who otherwise could not obtain service.[246] Restructuring legislation also typically included some means of continued funding for low-income assistance programs, typically by assessing a "system benefits charge" on all distribution customers.[247]

Retail restructuring has had a rocky rollout and reception.[248] Its successes and failures remain a topic of some debate, and one that will not be explored in depth here.[249] For

supra note 238, at 4.

243. *See* Rossi, *supra* note 21, at 1292–94 (collecting states' views on the importance of maintaining protections for low-income consumers during restructuring).

244. *See* Richard D. Cudahy, *Whither Deregulation: A Look at the Portents*, 58 N.Y.U. ANN. SURV. AM. L. 155, 165–68 (2001) (situating electricity deregulation and restructuring within broader deregulatory trends in telecommunications, airlines, railroads, and natural gas); Joseph D. Kearney & Thomas W. Merrill, 98 COLUM L. REV. 1323, 1327 (1998) (describing the paradigm shift in regulated industries law).

245. *Cf.* Rossi, *supra* note 21, at 1291 ("Without a duty to serve, the electricity market might operate much like other deregulated markets, such as trucking and banking, which rely on contractual obligations and general consumer protection laws to ensure service delivery.").

246. This obligation attaches either to the incumbent distribution utility or certain retail suppliers. *Compare* 66 PA. CONS. STAT. § 2807(e)(3) (2015) (distribution company), *with Electricity Options: Provider of Last Resort,* TEX. PUB. UTILS. COMM'N, https://www.puc.texas.gov/consumer/electricity/polr.aspx (last visited June 22, 2015) [https://perma.cc/G3CW-LBXF] (selected retail supplier within each region). *See also* Rossi, *supra* note 21, at 1311–12.

247. *See* Rossi, *supra* note 21, at 1241. System benefits charges also cover other "public benefits," including energy efficiency and demand-side-management programs. *See* ALEXANDER, *supra* note 238, at 4; Scott, *supra* note 135, at 388.

248. California's infamous challenges with its restructuring design, which created widespread power outages and left the market ripe for manipulation, caused many states to reconsider restructuring. Of the twenty-four states that instigated electricity restructuring, seven have suspended it. *See* Timothy P. Duane, *Regulation's Rationale: Learning from the California Energy Crisis*, 19 YALE J. ON REG. 471, 471 (2002); U.S. Energy Info. Admin., *Status of Electricity Restructuring by State* (Sept. 2010) http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html [https://perma.cc/UD7P-VEF8].

249. *See generally* Spence, *supra* note 237; Peter Navarro & Michael Shames, *Electricity Deregulation: Lessons Learned from California*, 24 ENERGY L.J. 33 (2003).

present purposes, it is important merely to note that even in the midst of a profound legal shift in how regulators conceived of the relationship between consumers and electricity supply, affordable access remained a core consideration. Electricity remained too foundational to human flourishing to be left to the whims of the market, available only to those who could negotiate to obtain it.

E. Summing the Parts

It is certainly true, as many scholars have suggested, that electricity law provides no ready formula for balancing fairness and efficiency.[250] But the laws and policies adopted during the twentieth century project of electrification demonstrate an enduring commitment to the goal of enabling widespread access to affordable electricity. This goal was furthered at certain points by a focus on efficiency—as in the case of rate design reforms in the 1970s—and at other points by a focus on fairness—as in the case of providing discounted power to assist rural electrification efforts and, later, keeping all consumers connected to the grid during times of energy price spikes.[251]

One reason that electricity law has not settled for an exclusive focus on low rates is that these have never been an end in themselves, just as electricity has never been a "good" in and of itself.[252] The justification for governmental control over electricity has been its ability to lift Americans out of drudgery and into a life where engagement with society—on terms of the individual's choosing—is possible. In their focus on access and affordability, our electricity laws reflect a marriage between concepts of electricity as a necessity for full participation in American life and as a utilitarian tool to help "grow the American pie" by inducing widespread consumerism.[253] While

250. *See* Trebing, *supra* note 21, at 31 (noting a "tendency toward averaging conflicting claims"); Posner, *supra* note 21, at 44 (finding "no objective basis for balancing off distributive benefits against allocative costs").

251. *Cf.* Spence, *supra* note 157, at 39 (observing that "[s]ince its inception more than a century ago, modern American energy law – public utility law and environmental law – has sought to reconcile . . . conflicting impulses [towards efficiency and fairness]").

252. *See supra* note 26 and accompanying text.

253. *Cf.* HENRY M. HART, JR. & ALBERT M. SACKS, THE LEGAL PROCESS: BASIC PROBLEMS IN THE MAKING AND APPLICATION OF LAW 103 (1994) ("How to make the pie larger, not how to divide the existing pie, is the crux of the long-range and primarily significant problem."); LILIENTHAL, *supra* note 199, at 75–76 (describing

only in extreme cases have we been willing to provide an energy "handout,"[254] lawmakers have eagerly used law to expand the number of people capable of enjoying the life-transforming qualities of electricity, and have been tolerant of some pricing inefficiencies that appear to support this aim.

III. FROM GRID ACCESS TO THE PARTICIPATORY GRID

Electricity law's historical embrace of "widespread access to cheap power" as a means of ensuring equity presents a challenging precedent for the current era. This animating goal worked when consuming more power was presumed to lead inexorably to a stronger economy and a stronger democracy.[255] But it is no longer tenable in the era of climate change, whose global, intergenerational, and domestic inequities suggest the need for more complex understandings of energy equity.

The equity debates over clean energy highlighted in Part I have proceeded largely along traditional fault lines within public utility law: the project of adopting reforms to induce more efficient, effective participation in the grid[256] is counter-balanced by the risks such reforms might pose to low-income consumers. The reality is far more complex, given widespread agreement that climate change will harm the poor more than the wealthy.[257] In light of this fact, there appears a certain absurdity in halting clean energy policies—policies designed to stem the tide of climate change—in the name of equity.

This Part begins by parsing the complex equity questions that electricity regulators confront as they consider using clean energy policies to address climate change. Section A shows that

the importance of electrification in providing a sense of empowerment and participation).

254. Sovacool and Dworkin explain that many states are quite limited in their exceptions to shutoffs: They give the example of Vermont, where residential customers can only avoid shutoff outside of the coldest winter months by furnishing a physician's certificate asserting the resident would suffer "an immediate and serious health hazard by the disconnection." SOVACOOL & DWORKIN, *supra* note 20, at 223.

255. *See supra* note 32.

256. "Efficient" in the sense that the participatory grid is a cost-effective way to induce the kinds of changes in electricity consumption that climate change demands. *Cf.* DOUGLAS & ZAFAR, *supra* note 53, at 3 ("Customer participation, more than the actions of the utilities or of the regulators, is critical to meet California's greenhouse gas emission goals in a cost-effective manner.").

257. *See infra* notes 259, 262–268.

there is good reason to believe that halting or slowing clean energy *also* will seriously harm low-income consumers within the United States, making "equity" a poor justification for impeding clean energy policies. Section B then argues that if electricity regulators choose to pursue grid participation as a way to mitigate the impacts of climate change, then their long-standing regulatory duty to ensure widespread access requires a widening of the range of people able to participate in the grid. Section C defends this conclusion as not only in line with a century-old effort to maintain or enhance the affordability of electricity, but also as part of the long tradition of using electricity to empower Americans to become active members of the economy and polity.

A. Climate and Energy Laws' Distinct but Overlapping Equities

Domestic regulators—such as public utilities commissions—have a difficult task in figuring out how to balance the overlapping concerns of climate justice and clean energy justice.[258] The geographical and temporal dimensions of climate change equity make it hard to square with domestic regulatory frameworks. The poor within developing countries, particularly those in Africa and Southeast Asia, will be most negatively impacted by climate change.[259] And although we are already experiencing the negative effects of climate change, climate disruptions anticipated in the future dwarf the effects of today, such that the future poor stand to benefit more than the present poor from policies designed to mitigate climate

258. *See* ERIC A. POSNER & DAVID WEISBACH, CLIMATE CHANGE JUSTICE 101, 144 (2010); Jonathan S. Masur & Eric Posner, *Climate Regulation and the Limits of Cost-Benefit Analysis*, 99 CAL. L. REV. 1557, 1591–96 (2011).

259. These disparate impacts stem from geographical disparities in climate change's impacts, as well as settlement and livelihood patterns. *See* Christopher B. Field et al., *Summary for Policymakers, in* CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY, PART A: GLOBAL AND SECTORAL ASPECTS, CONTRIBUTION OF WORKING GROUP II TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 6–9 (2014) [hereinafter IPCC WORKING GROUP II]; Tim Hayward, *Climate Change and Ethics*, *in* 2 NATURE CLIMATE CHANGE 843, 843 (Dec. 2012); Steve Vanderheiden, *Climate Change, Fairness, & Equity*, *in* ATMOSPHERIC JUSTICE: A POLITICAL THEORY OF CLIMATE CHANGE 2 (2008); ENCYCLICAL LETTER LAUDATO SI' OF THE HOLY FATHER FRANCIS, ON CARE FOR OUR COMMON HOME 21–22 (2015).

change.[260]

The inter-temporal and international dimensions of climate change have long made domestic progress on climate change mitigation challenging. That said, these far-reaching equity debates do *not* comprise the central challenge in clean energy justice. In the debates over clean energy's equities, regulators are concerned primarily with the disparate impacts that clean energy policies present for the present poor as compared to the present rich—or, in other words, with more traditional questions of *access* within electricity law.[261] These equity concerns, once properly contextualized, are far less intractable than the intergenerational and international equity challenges that plague climate negotiations.

Moreover, there are compelling equity-based reasons for energy regulators—even operating within their mandated focus on near-term equity concerns within the United States—to value moving clean energy policies forward. Although it is less frequently observed, climate change will also produce disparate impacts *within* the United States.

Experts broadly agree that climate change will harm the poor within the United States more than the affluent along three dimensions, although assessing the magnitude of these disparities remains challenging.[262] First, poor and minority

260. *See, e.g.*, POSNER & WEISBACH, *supra* note 258, at 144. Indeed, the poor of today cannot benefit in the short term from carbon mitigation *as such*, because we have already emitted enough carbon to "lock in" warming effects for some time into the future. STERN, *supra* note 23, at 156 ("Only a small portion of the cost of climate change between now and 2050 can be realistically avoided, because of inertia in the climate system."); Lisa V. Alexander et al., *Summary for Policymakers*, *in* CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 27 (2013) ("Most aspects of climate change will persist for many centuries even if emissions of CO2 are stopped.") [hereinafter IPCC WORKING GROUP I].

261. *See generally supra* Part I (explaining the ways in which regulators' concerns over the disparate burdens of clean energy policies are impeding their advancement).

262. *See, e.g.*, IPCC WORKING GROUP II, *supra* note 259, at 12 ("Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development*."); U.S. National Climate Assessment, Highlights: Climate Change Effects in the U.S.*, U.S. GLOBAL CHANGE RES. PROGRAM, http://nca2014.globalchange.gov/report (last visited Nov. 22, 2016) [https://perma.cc/NQH7-NVEF] ("Certain groups of people are more vulnerable to the range of climate change related health impacts, including the elderly, children, the poor, and the sick."); ANTHONY LEISEROWITZ & KAREN AKERLOF, RACE, ETHNICITY AND PUBLIC RESPONSES TO CLIMATE CHANGE 4 (2010); STERN, *supra* note 23, at 5(10) ("Low-income households will be disproportionately

communities are likely to be disproportionately impacted by climate change-related disasters, including heat waves and storms,[263] due to factors including lack of air conditioning, greater prevalence of pre-existing health conditions, location and condition of housing, inadequate access to transportation, relatively greater rates of under-insurance, and concentration in strenuous occupations.[264] Indeed, Hurricanes Sandy and Katrina already brought to the public's attention the ways in which domestic disasters—which are likely increasing in severity and frequency due to climate change—cause disparate impacts according to class.[265]

Second, climate change will increase the price of basic necessities, including water, energy, and food,[266] causing lower-

affected by increases in extreme weather events. Those on lower incomes often live in higher-risk areas, marginal lands and poor quality housing."). It is notoriously challenging to predictively model how particular changes in greenhouse gas concentrations will cause earth systems to respond, and how these changes will in turn impact global, regional, and local economies. For these reasons, economists have not yet been able to offer much quantitative insight into the differential impacts that climate change will have on low-income populations within countries. *See* STERN, *supra* note 23, at 143; IPCC WORKING GROUP I, *supra* note 260, at 13–14; IPCC WORKING GROUP II, *supra* note 259, at 20 (noting difficulty of estimating economic impacts from climate change); Masur & Posner, *supra* note 258, at 1560 (describing our climate-society models as "extraordinarily crude").

263. *See* RACHEL MORELLO-FROSCH ET AL., THE CLIMATE GAP: INEQUALITIES IN HOW CLIMATE CHANGE HURTS AMERICANS & HOW TO CLOSE THE GAP 7–12 (2009).

264. *See* SETH B. SHONKOFF ET AL., ENVIRONMENTAL HEALTH AND EQUITY IMPACTS FROM CLIMATE CHANGE AND MITIGATION POLICIES IN CALIFORNIA: A REVIEW OF THE LITERATURE 16–17 (2009) (reviewing a wide body of scientific literature reaching these conclusions particularly as they relate to California); CONG. BLACK CAUCUS FOUND., INC., AFRICAN AMERICANS AND CLIMATE CHANGE: AN UNEQUAL BURDEN 3 (2004), http://rprogress.org/publications/2004/CBCF_REPORT_F.pdf [https://perma.cc/2QGS-9TQT].

265. *See generally* Sherrie Armstrong Tomlinson, Note, *No New Orleanians Left Behind: An Examination of the Disparate Impact of Hurricane Katrina*, 38 CONN. L. REV. 1153 (2006); Pratt Ctr. for Cmty. Dev., *Toward an Informed Rebuilding: Documenting Sandy's Impacts*, http://www.prattcenter.net/research/toward-informed-rebuilding-documenting-sandys-impacts [https://perma.cc/C4QF-HCQT] (collecting maps showing the disparate impact of Hurricane Sandy on low-income New Yorkers).

266. MORELLO-FROSCH ET AL., *supra* note 263 at 15. A Natural Resource Defense Council study found that under a business-as-usual scenario, climate change will cause energy costs to rise $28 billion by 2025 and $141 billion by 2100, and water sector costs to rise $200 billion by 2025 and $950 billion by 2100. FRANK ACKERMAN & ELIZABETH A. STANTON, THE COST OF CLIMATE CHANGE: WHAT WE'LL PAY IF GLOBAL WARMING CONTINUES UNCHECKED v (2008); SHONKOF ET AL., *supra* note 264, at 9–10.

income households to face difficult budgetary tradeoffs between feeding their families and paying their utility bills.[267] And third, the poor will experience the greatest disruptions in employment opportunities, as they are disproportionately employed in agriculture and tourism, the two economic sectors most impacted by climate change.[268]

These inequitable burdens should at least raise serious questions about a strategy of halting clean energy policies on grounds of equity. To be sure, these impacts will harm future U.S. low-income households more than present-day ones.[269] But given the rapid scale of changes, "today's poor" are also, to a large extent, the poor of a climate-changed tomorrow.[270] Thus, when the poor of today pay something towards addressing climate change, they themselves and especially their children and grandchildren stand to gain in the future. This fact appears to be well understood and valued by many of "today's poor" in the United States. Surveys consistently show greater support among minority communities for action on climate change—even if it will prove costly—than among the American public more generally.[271] These preferences deserve

267. *See* David A. Super, *From the Greenhouse to the Poorhouse: Carbon-Emissions Control and the Rules of Legislative Joinder*, 158 U. PA. L. REV. 1093, 1108 (2010) ("When energy prices rose 42.1% from 2000 to 2005, families with annual incomes between $15,000 and $30,000 reduced their food spending by 10%."); Hernández & Bird, *supra* note 217, at 6 ("With energy costs increasingly on the rise, low-income families are often left to make hard choices about whether to spend their money on food or energy."); *see generally* Jayanta Bhattacharya et al., *Heat or Eat? Cold-Weather Shocks and Nutrition in Poor American Families*, 93 AM. J. PUB. HEALTH 1149 (2003).

268. MORELLO-FROSCH ET AL., *supra* note 263, at 15–16.

269. *Cf.* POSNER & WEISBACH, *supra* note 258, at 26–27 (arguing that "[r]educing carbon emissions is not a way to help today's poor").

270. *See* Arden Rowell, *Time in Cost-Benefit Analysis*, 4 U.C. IRVINE L. REV. 1215, 1215, 1234–35 (2014) (observing that "time flow creates systematic line-drawing challenges for decision makers who must distinguish between present and future events," as there is in fact no moment at which the "next generation" arrives).

271. *See* Coral Davenport, *Climate Is Big Issue for Hispanics, and Personal*, N.Y. TIMES (Feb. 10, 2015), http://www.nytimes.com/2015/02/10/us/politics/climate-change-is-of-growing-personal-concern-to-us-hispanics-poll-finds.html?_r=0 [https://perma.cc/XY7E-Y3ZB] (describing results of a recent survey finding that Hispanics "are more likely than non-Hispanic whites to view global warming as a problem that affects them personally" and "are more likely to support policies, such as taxes and regulations on greenhouse gas pollution, aimed at curbing it"); Harry Enten, *The Racial Gap on Global Warming*, FIVETHIRTYEIGHT (Sept. 23, 2014), http://fivethirtyeight.com/datalab/the-racial-gap-on-global-warming/ [https://perma.cc/S63W-DRUV] (reporting that non-white

to be taken seriously.

Moreover, the inter-temporal equity challenges of climate mitigation policies can be reduced if policies are designed to serve multiple ends, such that they contemporaneously work to cut carbon and reduce inequality.[272] Of course, experts frequently make this suggestion; it forms much of the basis of the popular concept of, "sustainable development."[273] But usually, given lawmakers hesitance to transform these ideals into concrete and binding law, there is little in the way of a firm legal commitment in which to root such multifaceted efforts, causing reality to fall short of expectations.[274] There is, then, a strange and underappreciated alchemy to U.S. climate change efforts proceeding predominantly through energy law: as demonstrated in the previous section, electricity law provides its own long-standing legal commitment to equity in which to ground an effort to spread clean energy's benefits more broadly.

B. Affordability via Participation and the Regulatory Duty of the Future

Climate change necessitates that electricity from

Americans are significantly more likely to think that global warming should be a U.S. governmental priority); LEISEROWITZ & AKERLOF, *supra* note 262, at 7. Note, however, that most surveys focus on the correlation between attitudes towards climate change and race, rather than income. Thus, although there is a long-standing correlation between minority status and lower incomes in the United States, these surveys do not document a specific relationship between income status and climate change attitudes. *Cf.* CARMEN DENAVAS-WALT & BERNADETTE D. PROCTOR, U.S. CENSUS BUREAU, INCOME AND POVERTY IN THE UNITED STATES: 2013, at 5 (Sept. 2014), http://www.census.gov/content/dam/Census/library/publications/2014/demo/p60-249.pdf [https://perma.cc/2SF2-7XBU] (showing real median household income by race and Hispanic origin, 1967 to 2013).

272. *See* Ottmar Edenhofer et al., *Summary for Policymakers, in* CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE 5 (Ottmar Edenhofer et al. eds., 2014) ("Mitigation and adaptation can positively or negatively influence the achievement of other societal goals, such as those related to human health, food security, biodiversity, local environmental quality, energy access, livelihoods, and equitable sustainable development . . . .").

273. *See, e.g.*, UNITED NATIONS WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, OUR COMMON FUTURE (1987) (defining sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs").

274. *See* Douglas A. Kysar, *Sustainable Development and Private Global Governance*, 83 TEX. L. REV. 2109, 2115 (2005) (describing the results of the sustainable development movement as "decidedly mixed, both in terms of conceptual clarity and programmatic success").

particular sources and at particular times become more expensive. To meet this challenge, regulators in leading states have opted to create a more participatory grid that allows consumers to manage the timing and source of their electricity consumption.[275] Consumers who do not take advantage of these opportunities will pay escalating rates that reflect the cost of financing large-scale changes in generation and transmission infrastructure. In this model, *participation in the grid* becomes the means for maintaining affordable electricity, which is itself ever more necessary to flourish in the American economy and civil society.

What implications does this move have for regulators' ongoing duties to ensure "just and reasonable rates" and widespread access? At an empirical level, as Part I illustrated, it may well be that certain clean energy policies are not as harmful to low-income consumers as interested parties would have regulators believe, particularly in the short run. Where they do prove harmful, addressing problems of cross-subsidization will be important in addressing clean energy justice concerns. Many novel attempts are underway to properly value the contribution of clean energy technologies to the grid[276] in ways that do not fundamentally undermine the adoption of clean energy policy, and these are worth encouraging.

However, reliance on this approach alone is shortsighted and incomplete. In the long run, even after cross-subsidies are eliminated, the clean energy policies that states are pursuing may collectively create an America once again divided on electricity grounds: the rich to their new set of wondrous appliances, which save them money while doing good for the planet, and the poor to their aging grid infrastructure, a crumbling relic of past abundance that requires considerable investment to decarbonize. This vision is hardly in accord with electricity law's twentieth-century commitments to widespread electrification and affordability.

To avoid this outcome while inducing necessary shifts in electricity consumption, electricity law requires an updated version of the twentieth-century's project of electrification. In place of electrification, we require *clean* electrification: a

275. *See supra* Part I.A.

276. *See*, *e.g.*, *supra* note 100 and accompanying text.

widening of access to the participatory grid.[277]

Lawmakers, regulators, and the public should care about broadening grid participation for two reasons. The first is that the history of electricity law demonstrates an abiding commitment to providing widespread access to affordable power. The only way for a consumer to maintain affordability in states that create a participatory grid will be to become a part of this project. Rates will rise for those who do not pay attention to patterns of energy use, shift times of consumption, or generate their own electricity. Although we might be comfortable with this outcome in the case of consumers who simply choose to pay more in order to maintain the convenience of a twentieth-century lifestyle, our history indicates a deep discomfort with allowing class dimensions to determine the ability to access affordable power.

A class rift in electricity access presents particular cause for concern in the current context of widening inequality, and widening "energy poverty" in particular.[278] The number of households eligible for income-based energy assistance increased 70 percent between 1981 and 2008, from around 19 to 33 million.[279] These households continue to spend around

277. In May 2016, the New York Public Service Commission—which has been a leader in considering issues of energy justice and clean energy—explicitly embraced something akin to the principle of "clean electrification" I advocate here. In adopting a new form of utility compensation under its "Reforming the Energy Vision" proceeding, the Commission espoused the following principle regarding access: "Customers with low and moderate incomes or who may be vulnerable to losing service for other reasons should have access to energy efficiency and other mechanisms that ensure they have electricity at an affordable cost." Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, No. 14-M-0101, at 112 (N.Y. Pub. Serv. Comm'n May 19, 2016) (order). *Cf.* SOVACOOL & DWORKIN, *supra* note 20, at 246 (calling for a similar principle of utilizing renewable technologies to electrify low-income communities internationally).

278. Energy poverty's definition is not without debate, but it is frequently defined as spending more than ten percent of household income on energy. *See, e.g.*, Stephen Bird & Diana Hernández, *Policy Options for the Split Incentive: Increasing Energy Efficiency for Low-Income Renters*, 48 ENERGY POL'Y 506, 507 (2012). *See also* SOVACOOL & DWORKIN, *supra* note 20, at 231 (defining "fuel poverty" as spending "more than 10 or 15 percent of . . . monthly income on energy bills").

279. The predominant source of this assistance is the federal Low-Income Home Energy Assistance Program (LIHEAP). *See* APRISE INC., LIHEAP Home Energy Notebook for Fiscal Year 2008, at 29 (2010) [hereinafter LIHEAP 2008]. Only around 15 percent of those qualifying for LIHEAP actually receive assistance due to limited funding, and funding per household also decreased 10 percent between 1981 and 2008. *See id.; see also* Hernández & Bird, *supra* note 217, at 25; LIHEAP 2008, at xi. A more recent study found that "[o]ver the last

fourteen percent of their income on home energy, as compared to an average household expenditure of 7.4 percent.[280] Consequently, in one survey half of low-income households reported having to reduce spending for basic necessities in order to meet their energy needs during periods of financial instability,[281] and 80 percent reported "commonly . . . having problems with utilities that include[] lack of affordability, arrearages, and shut-offs."[282] These consumers are the ones who would most benefit from tools that give them the ability to control energy bills, but are least likely to have the resources necessary to take advantage of participatory grid policies. To do nothing to promote their access to the participatory grid risks undermining much of the historical purpose of electricity law.

Moreover, those who face energy poverty are often under what is essentially a triple assault, with environmental justice, climate change justice, and now, clean energy justice challenges concentrated in the same group of individuals.[283] Although the overlap is not perfect, many of the same communities who bear a disproportionate burden of environmental hazards, and who face the greatest risks (at least domestically) with respect to climate change, are also the ones who will have the hardest time participating in the technology-heavy clean energy transition. The triple burden of harm faced by these communities provides all the more reason for regulators to focus on broadening participatory grid access as a key strategy of clean energy justice.

decade alone, electricity expenditures as a proportion of low-income household budgets increased by a third, while falling for higher earners." PATRICK SABOL, FROM POWER TO EMPOWERMENT: PLUGGING LOW INCOME COMMUNITIES INTO THE CLEAN ENERGY ECONOMY 1 (2015), http://groundswell.org/frompower_to_empowerment_wp.pdf [https://perma.cc/3W99-457Y].

280. LIHEAP 2008, *supra* note 279, at i. The "very poor" often spend more than 20 percent of income on energy. Hernández & Bird, *supra* note 217, at 7.

281. Lynne Chester, *Energy Impoverishment: Addressing Capitalism's New Driver of Inequality*, 48 J. ECON. ISSUES 395, 395 (2014) (explaining how increased energy bills lead to "social exclusion").

282. Hernández & Bird, *supra* note 217, at 11 (reporting results of a 72-household field survey conducted in an inner-city Boston neighborhood).

283. GORDON WALKER, ENVIRONMENTAL JUSTICE 193 (2012) (describing the "double injustice" that arises from the fact that climate change will most harm those already subject to the greatest environmental hazards).

C. Beyond Economic Consequences

Affordability concerns alone justify a clean electrification agenda, given the importance of electricity to participation in the modern economy and society. But there is a second reason that a commitment to clean electrification matters, which goes beyond the economics of grid participation and speaks to the purposes of grid interconnection in the first place. Lawmakers have treated electricity as a special, foundational good because it enhances citizens' ability to lead productive, participatory lives across multiple dimensions. Not only did electricity provide relief from back-breaking and repetitive farm and factory labor, but it also—via lamps for reading, radio, and increased leisure time—made people feel part of a *polis* in ways that had been previously unimaginable.[284] Indeed, it was the process of connecting to the grid itself that engendered these feelings for many rural Americans, through the sense of empowerment they experienced in forming and managing electric cooperatives.[285]

The participatory grid provides an interesting opportunity for reimagining these ideas of grid access as *participation enabling*, given its inherently "participatory" nature. To be sure, as discussed in Part I, grid participation offers perhaps a bereft version of participation as compared to the community spirit of electric cooperatives or direct democratic engagement in debates about climate policy formation. But it appears to be a growing method of engaging Americans in climate change and part of a broad trend in U.S. society of using the market as a locus of public engagement.[286]

Though individualistic and market oriented, the participatory grid provides an outlet for such civic engagement. I have witnessed friends, all agog at their new solar panels, unable to take their eyes off of their iPhone app tracking the panels' real-time output. Their delight at seeing moments of over-production, when their panels were making more power than their home was consuming, was more than the satisfaction of saving a few cents. It was a feeling of control and

284. *See supra* notes 204–205 and accompanying text.

285. *Cf.* LILIENTHAL, *supra* note 199, at 76–77 (describing the importance of the TVA's "democratic methods," which induced "widespread and intimate participation" by the people of Appalachia in the project of rural electrification).

286. Kysar, *supra* note 74, at 533.

contribution, of having done their part to fight a problem that frequently induces feelings of helplessness and fatalism.[287] Psychologists sometimes refer to this feeling as "warm glow."[288] And indeed, the new Nest thermostat—which "automatically adapts as your life and the seasons change" in order to keep you comfortable while cutting electricity bills—seems to have taken the warm glow notion literally, with a thermostat that "lights up when you walk in the room," as if to imply that after installing it, you are doing good just by existing.[289]

These examples highlight the psychological component of participation in the participatory grid: not only does participating save one money, it also creates a sense of contributing to a project larger than oneself.[290] The psychological benefits of grid participation are two-fold: first, consumers benefit from the belief that their cuts in emissions improve the world; second, and apart from actual impact, they benefit from "the ability to express their moral and political views" through choosing to participate—and how to participate—in the grid.[291] These psychological benefits appear to hold even in the context of fully cost-justified clean energy investments.[292] In other words, even though states are

287. AM. PSYCHOLOGICAL ASS'N TASK FORCE ON THE INTERFACE BETWEEN PSYCHOLOGY & GLOB. CLIMATE CHANGE, PSYCHOLOGY AND GLOBAL CLIMATE CHANGE: ADDRESSING A MULTI-FACETED PHENOMENON AND SET OF CHALLENGES 80 (observing that climate change can cause "fear, despair, or a sense of being overwhelmed or powerless [that] can inhibit thought and action").

288. *See* Roland Menges et al., *Altruism, Warm Glow and the Willingness-to-Donate for Green Electricity: An Artefactual Field Experiment*, 31 ENVTL. & RES. ECON. 431, 432 (2005) (finding that consumers purchasing green energy get a "warm glow" from knowing they are contributing to environmental quality); Patrick Hartmann & Vanessa Apaolaza-Ibáñez, *Consumer Attitude and Purchase Intention Toward Green Energy Brands: The Roles of Psychological Benefits and Environmental Concern*, 65 J. BUS. RES. 1254, 1254 (2012) (identifying "warm glow feelings derived from the moral satisfaction of contributing to the common good" as one of green energy's psychological benefits).

289. *Meet the Nest Thermostat*, https://nest.com/thermostat/meet-nest-thermostat/ (last visited Nov. 22, 2016) [https://perma.cc/RVQ4-PDPP].

290. *See supra* note 288.

291. Kysar, *supra* note 74, at 581, 604 (explaining how consumers derive satisfaction across multiple dimensions by participating in market-shaping purchasing decisions through both believing that their choices have real-world impact and finding self-expressive value in the act of choosing).

292. *See* Varun Rai & Kristine McAndrews, *Decision-making and Behavior Change in Residential Adopters of Solar PV*, https://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0785_full%20paper.pdf [https://perma.cc/Q63P-8DRD] (surveying homeowners' decisions to install net-metered solar panels and finding that environmental concern was equal in

constructing a model where financial benefits alone might justify grid participation, it appears that many of those participating derive psychological satisfaction in addition to financial gain.

If low(er)-income consumers are disempowered in this transformation, they lose the ability to play a role in solving one of the greatest collective action problems our country and world have ever faced. Whereas electrification empowered a broader swath of Americans across multiple dimensions, the participatory grid risks disempowerment not only through escalating costs but also through segmentation of Americans' ability to become a part of the political project of mitigating climate change, channeled as it is through consumer-oriented grid policies. A project to extend access to the participatory grid is thus important on a level that transcends economics and allows electricity law's commitment to engendering civic participation to endure, even as that participation takes new shapes in today's market-oriented society.[293]

This argument over the centrality of participation as a component of clean energy justice reflects lessons learned during the rise of the environmental justice movement. What began in environmental justice as a concern over unequal distribution of environmental hazards and benefits quickly grew to have a participatory dimension, as communities recognized that voice and access in decisions affecting their environment and health were a critical component of the justice they sought.[294] Similarly, creating a just participatory grid will require more than regulatory tweaks to limit cross-subsidization; it requires taking the steps necessary to create full, equal opportunity for engagement in the new grid paradigm.

importance to financial benefits).

293. *Cf.* SOVACOOL & DWORKIN, *supra* note 20, at 245 (arguing that "energy systems ought to maximize welfare . . . in the ability to enable persons to realize functionings and capabilities," and that "every person has a right to a 'social minimum' of energy or electricity so that they can enjoy a modern, healthy lifestyle").

294. *See* COLE & FOSTER, *supra* note 1, at 13, 16; WALKER, *supra* note 283, at 218–19 (arguing for distributive, procedural, and recognition dimensions to environmental justice).

D. Recognizing the Challenges

Although there are important parallels with electrification, clean electrification is a more contentious and complex program than its historical counterpart. We could all connect to the grid. We cannot all put solar panels on our roofs; we will not become a nation of "yeoman windfarmers."[295] There are practical limits to where such technologies are appropriate[296] and technological limits to how much distributed generation can be integrated into the grid without causing blackouts.[297] Similarly, any possibility of widespread, grid exit via a combination of on-site generation and storage is not likely soon and presents its own complicated trade-offs.[298] But not all participatory grid technologies are so constrained. Many technologies focus on shifting the time and shape of demand in ways that not only are free of scale limitations, but also work to allow more distributed generation to participate in the grid. In particular, "good old energy efficiency" and demand response are likely to prove options available to all households, without any corresponding downside in terms of technological limits to participation.[299]

295. Douglas A. Kysar, *The Consultant's Republic*, 121 HARV. L. REV. 2041, 2056 (2008) (reviewing TED NORDHAUS & MICHAEL SHELLENBERGER, BREAK THROUGH: FROM THE DEATH OF ENVIRONMENTALISM TO THE POLITICS OF POSSIBILITY (2007)) (critiquing a vision of a "new social future" comprised of "yeoman windfarmers forming Toquevillian associations on MySpace" as a way to advance environmental aims).

296. *See* Booth, *supra* note 92, at 768 (explaining that *75 percent* of ratepayers do not own homes with roofs "structurally suitable" for solar).

297. *See* MASS. INST. TECH., THE FUTURE OF THE ELECTRIC GRID: AN INTERDISCIPLINARY MIT STUDY 53–76 (2011) (explaining the intermittency challenges of solar and wind, which are not available on demand but rather at the whims of nature, which creates a need for alternative sources that can quickly respond to changes in wind or solar supply). *See also* Cardwell, *supra* note 131 (reporting on rooftop-solar-induced "voltage fluctuations that can overload circuits, burn lines and lead to brownouts or blackouts"). There is, predictably, debate over precisely how much distributed generation the grid is capable of handling. *See, e.g.*, Jeff St. John, *How Much Renewable Energy Can the Grid Handle?*, GREENTECH MEDIA (Mar. 4, 2013), http://www.greentechmedia.com/articles/read/on-the-uncertain-edge-of-the-renewable-powered-grid [https://perma.cc/5WCC-ZXH9].

298. *See* ELEC. POWER RESEARCH INST., THE INTEGRATED GRID 16–20 (2014) (making the case that grid connection is more valuable than is often appreciated, both for individual consumers and for the sake of the system).

299. *See* MASS. INST. TECH., *supra* note 297, at 57 (describing how demand response can provide operating reserves to counterbalance renewables' intermittency).

Clean electrification, with its focus on specifically empowering grid participation, might be challenged by that camp of economists who would advise against any effort to effectuate redistribution other than through the income tax scheme.[300] Their argument, in brief, is that climate change mitigation policies provide an inefficient avenue for alleviating present-day distributional inequities, such that society would be better served by implementing all efficient clean energy policies and compensating for any resulting inequities through tax redistribution.[301]

One problem with this argument is that solving the participatory grid's equity challenges via tax redistribution is unlikely to be a realistic political strategy.[302] Perhaps a more feasible strategy would be to simply increase traditional welfare-type benefits for energy, under LIHEAP and its state equivalents. Increased support for meeting mounting energy bills would certainly help those unable to participate in the grid cope with energy poverty, but may be ill-advised for several reasons. First, increasing levels of financial support for families struggling to pay their electricity bills fails to reflect the societal importance of reducing electricity demand—to the contrary, it may perversely incentivize more consumption.[303] Second, even if families wanted to spend any additional support they received on-demand reduction technologies, they would still face well-documented investment barriers that can be eliminated only by more targeted regulatory interventions.[304]

300. *See, e.g.*, Louis Kaplow & Steven Shavell, *Should Legal Rules Favor the Poor? Clarifying the Role of Legal Rules and the Income Tax in Redistributing Income*, 29 J. LEGAL STUD. 821 (2000).

301. *See generally id.*; *see also* POSNER & WEISBACH, *supra* note 258 at 4, 175.

302. *Cf.* Lee Anne Fennell & Richard H. McAdams, *Introduction* to FAIRNESS IN LAW AND ECONOMICS 5 (Univ. of Chicago Pub. Law & Legal Theory, Working Paper No. 489, 2014) (arguing that the high *political* costs of tax redistribution may make it cheaper to redistribute outside the tax scheme); Daniel A. Farber, *Climate Justice*, 110 MICH. L. REV. 985, 989 (2012) (reviewing ERIC A. POSNER & DAVID WEISBACH, CLIMATE CHANGE JUSTICE (2011)) ("To say that we should not engage in redistribution unless we can implement the ideal form of redistribution is really to say that we should not engage in redistribution at all.").

303. *See* Rhett Larson, *Adapting Human Rights*, 26 DUKE ENVTL. L. & POL'Y F. 1 (2015) (arguing that increased subsidies for electricity "preclude cost internalization and conservation incentives," and might "aggravate the sustainability challenges associated with global climate change").

304. *See, e.g.*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON., OVERCOMING MARKET BARRIERS & USING MARKET FORCES TO ADVANCE ENERGY EFFICIENCY

More fundamentally, neither a strategy of tax reform nor increasing traditional energy welfare payments accords with the normative commitment that the country has developed to electricity as foundational to meaningful lives and livelihoods.[305] In the twentieth century, legislators and regulators focused on expanding access to electricity because they valued its spread in particular, not merely more equal distribution of goods in general. In a similar vein, there might be sound reasons for commissions and legislatures to prefer targeted support in the case of clean energy, rather than income tax redistribution or increased bill support, because they place value upon enhancing the ability of all citizens to join the participatory grid.[306] In choosing to subsidize participation *in* the grid rather than consumption, regulators help shape norms that place particular value on becoming a part of the project to reduce energy consumption.[307] Because of this interrelationship between regulatory design and norms, redistribution via the tax code or increased bill support would lack much of the normative force of widening grid participation.

IV. IMPLEMENTING CLEAN ELECTRIFICATION

Once lawmakers are convinced of the imperative to pursue an agenda of clean electrification, questions abound regarding implementation. In this Part, I want to make three broad points on this topic without purporting to craft a comprehensive agenda, which will have to occur on a state-by-state basis, ideally with significant community participation.[308] First, public utility law provides some room for promoting clean electrification but cannot unilaterally achieve the vision, just as it could not unilaterally electrify America. Second, although

2–3 (2014) (collecting commonly identified failures that prevent full achievement of cost-effective energy efficiency).

305. *See supra* Part I.

306. *Cf.* Mark Sagoff, *Economic Theory and Environmental Law*, 79 MICH. L. REV. 1393, 1396–97 (1981) (explaining how many of our laws appropriately reflect preferences for ends other than efficiency).

307. *Cf.* Jerry Mashaw, *Accountability & Institutional Design: Some Thoughts on the Grammar of Governance*, *in* PUBLIC ACCOUNTABILITY: DESIGNS, DILEMMAS & EXPERIENCES 135 (Michael Dowdle ed., 2006) (describing how provision of goods and services is itself "a regime of social control that entails norm creation").

308. *Cf.* COLE & FOSTER, *supra* note 1, at 106 (explaining the importance of participation in the environmental justice movement).

we must therefore rely on legislation, we need not despair at this prospect: existing mechanisms for promoting clean energy might be tailored specifically towards promoting clean electrification in ways that do not necessitate significant new expenditures. And third, in moving forward with conceptualizing and crafting a participatory grid, lawmakers and regulators might place more emphasis on community-scale grid participation, not only for its practical ability to broaden participation, but for its more collective valence.

A. Clean Electrification within Public Utility Law

Public utility law's "just and reasonable" rates and "no undue discrimination" standards have endured the test of time largely because they have proven malleable.[309] As public sentiment and policy priorities have shifted, so have legal understandings. Dynamic pricing rests on a new understanding that time-based discrimination is just, given the need to avoid building ever more infrastructure.[310] And commissions concerned with environmental outcomes have increasingly interpreted "just and reasonable" rate standards to permit the pursuit of aims other than the cheapest power available.[311] There is likely room within these concepts for promoting widespread inclusion within new participatory grid policies, particularly those funded by other ratepayers. For example, commissions might interpret these mandates to require that ratepayer-funded initiatives be distributed relatively evenly among the ratepayers funding them, as California has recently done in requiring ten percent of its solar incentives to go to low-income households.[312] Just and reasonable rate standards could also justify placing protections on dynamic pricing programs to ensure that they do not

309. Trebing, *supra* note 21, at 31 (noting regulators' "strong desire to maintain flexibility or a large area of discretion in applying equity judgments").

310. *See* Paul Joskow, *Regulation of Natural Monopoly*, *in* The HANDBOOK OF LAW & ECON. 92 (A. Mitchell Polinsky & Steven Shavell eds., 2007) (unpublished manuscript) http://economics.mit.edu/files/1180 [https://perma.cc/2NRN-ZCZQ] (explaining that dynamic pricing avoids being labeled price discrimination because "peak and off-peak consumption are essentially separate products").

311. *See* Michael Dworkin, David Farnsworth & Jason Rich, *The Environmental Duties of Public Utilities Commissions*, 18 PACE ENVTL. L. REV. 325, 327 (2001).

312. *See* Distributed Generation & Distributed Energy Res., D. 06-01-024, 2006 WL 162584 (Cal. Pub. Util. Jan. 12, 2006) 5, 39–40 (interim order).

disproportionately harm low-income consumers over time.[313]

Two prominent policy debates occurring at commissions around the country are also amenable to incorporating clean electrification concerns. The first is the regulatory debate over how to harness new data that the modernized grid provides. Smart meters provide "interval data" that measure energy consumption granularly, in as little as fifteen-minute intervals.[314] These data can show where participatory grid technologies might prove most beneficial—both environmentally and economically—in a much more targeted way than has previously been possible, and could thus be useful in efforts to design programs to empower more consumers as grid participants.[315] However, due to privacy concerns, questions of who owns and has access to these data have proven controversial in many states.[316]

A commitment to clean electrification might help shape commissions' legal choices about how to manage this data. Reforming data policies would be a cost-effective step for many commissions to take in exploring a clean electrification agenda. Concrete data pointing to the potential for low-income households to save energy could spur new programs and suggest new directions in which to tailor existing programs.[317] Better data analysis could also allow for the design of dynamic pricing schemes that appropriately protect and empower consumers.[318] For all of these reasons, in proceeding with debates over consumer privacy versus the benefits of open access, scholars, advocates, and regulators should keep in mind the ways in which more information could help diffuse technologies more broadly, beyond those consumers self-motivated to seek them out.

Clean electrification considerations will also be important in the question facing commissions about utilities' role in the participatory grid. One of the ways in which utilities might

313. *Cf.* Faruqui, *supra* note 108 (suggesting such limits).

314. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, AN ASSESSMENT OF INTERVAL DATA AND THEIR POTENTIAL APPLICATION TO RESIDENTIAL ELECTRICITY END-USE MONITORING, U.S. 1 (Feb. 2015).

315. *See* STEPHENS, WILSON & PETERSON, *supra* note 26, at 88–91.

316. *See* Klass & Wilson, *supra* note 59, at 88.

317. *Cf. id.* at 71 (noting that "one of the critical barriers" to accomplishing known potential energy efficiency savings "is adequate data on energy consumption").

318. *See* FARUQUI, HLEDIK & PALMER, *supra* note 62.

reinvigorate their business model to compete in changing energy markets is to themselves become owners or sellers of participatory grid technologies.[319] The idea, however, is controversial: it risks giving utilities precisely the market power that a decentralized marketplace hopes to suppress via innovation.[320] Opponents worry that regulated utilities might use their regulated monopoly status to undercut competitive, independent service providers, thereby dampening the market for such services in the long term.[321]

Clean energy justice concerns, though, may point towards the benefits of at least a limited role for utilities in this context. Utilities have historical relationships with a wide range of consumers and may be able to reach low-income consumers more easily—and with a greater level of trust—than third-party service providers can.[322] For this reason, New York recently decided to make an exception to its general rule restricting utility ownership of participatory grid technologies and will allow utilities to own technology used in programs targeting low or moderate income customers.[323] This strategy might prove a powerful force for incentivizing utilities to focus on this otherwise potentially neglected group. As other states grapple with the same utility ownership debate, they should consider the benefits of permitting utilities to have a special role in broadening participation in evolving markets.

B. The Limits of Public Utility Law

If these reform proposals seem modest, it is for good reason: there are obvious limits to public utility law's abilities

319. *See* Troy A. Rule, *Unnatural Monopolies: Why Utilities Don't Belong in Rooftop Solar Markets*, 52 IDAHO L. REV. 387, 402 (2016) (describing a number of utility efforts to use this "if you can't beat 'em, join 'em" strategy).

320. *See* N.Y. REV Feb. 26 Order, *supra* note 33, at 43–44 (describing utility ownership of distributed energy resources (DER) as "one of the most contentious issues in the REV proceeding," and concluding that "unrestricted utility participation in DER markets presents a risk of undermining markets more than a potential for accelerating market growth").

321. *See id.*; *see also* Rule, *supra* note 319, at 4–5 (arguing that allowing utilities to compete in rooftop solar markets "stacks the deck" in favor of the utilities).

322. *See* Graffy & Kihm, *supra* note 14, at 38 ("Utilities have several well-established characteristics that become chief assets in an environment of flux: namely a reputation of service reliability, customer trust, and name recognition.").

323. N.Y. REV Feb. 26 Order, *supra* note 33, at 45–46.

to resolve disparities within the participatory grid. Public utility law is likely to prove an innovation and a constraint for clean electrification, just as it was for twentieth-century electrification.

Commissions control many decisions shaping the electricity grid and electricity supply, but they face an important internal constraint: ratepayer funding.[324] In some cases, expanding programs like energy efficiency and demand response to a broader group of consumers can lower the rates paid by all, such that commissions can justify the expenditure of ratepayer funding.[325] However, energy law's equity commitment suggests that it may be worthwhile to invest public resources in clean electrification projects beyond those that immediately negate other grid expenditures.[326] In these cases, particularly in a system increasingly concerned about chasing away the most affluent ratepayers while retaining those of lesser means, a ratepayer-funded support system will make less and less sense.[327]

For these reasons, it probably will require legislative efforts to fully accomplish an agenda of clean electrification, funded not exclusively by ratepayers, but by taxpayers as a whole. Such efforts will be challenging; after all, one of the primary appeals of "taxation by regulation" was its ability to make the costs of achieving redistribution less apparent.[328] Nevertheless, some jurisdictions are beginning to make progress on this front. For example, Washington, D.C.'s city council passed a new renewable portfolio standard in 2016 that not only requires the city to source 50 percent of its electricity from renewables by 2032, but also establishes a "Solar for All" fund to assist with a new mandate to "reduce by at least 50%

324. *See* Posner, *supra* note 21; Gray, *supra* note 172.

325. *See, e.g.*, Petition of Consol. Edison Co. of N.Y., Inc. for Approval of Brooklyn Queens Demand Mgmt. Program., 14-E-0302, 2014 WL 7049164, at *1–5 (N.Y.P.S.C. Dec. 12, 2014) (approving the acquisition of 41 megawatts of ratepayer funded, consumer-side solutions in low-income communities as a way to delay building expensive sub-transmission infrastructure).

326. *Cf.* Scott, *supra* note 135, at 390 (arguing that commissions have historically only approved efficiency and diversity of supply initiatives when they would "maximize cost savings" or at least "would not add to customer rates").

327. *Cf.* Posner, *supra* note 21, at 46 (observing that it is a "little peculiar" to subsidize the customers of a certain regulated industry via other customers of the same industry, rather than via taxpayers at large).

328. *Id.; see supra* notes 212–213 and accompanying text for discussion of the concept of "taxation by regulation."

the electric bills of at least 100,000 of the District's low-income households with high energy burdens" by 2032.[329] Further possibilities for targeting low-income communities may emerge if states move forward with Clean Power Plan implementation[330]: the Plan's optional "Clean Energy Incentive Program" is designed to help states "meet their goals under the plan by removing barriers to investment in energy efficiency and solar measures in low-income communities."[331]

Legislative efforts to train clean energy efforts in more equitable directions need not entail the creation of entirely new programs. Many states are already innovating in clean energy finance, and these models could be extended and targeted for a clean electrification agenda.[332] State "green banks" in particular have gained traction recently. Green banks leverage existing public funding in order to attract greater private sector funds for clean energy and energy efficiency projects.[333] They do so by using financing tools that are self-sustaining, like on-bill financing, credit enhancements, bonds, and co-investments.[334] Connecticut, New York, Hawaii, and Vermont

329. Council B. No. B21-0650, the Renewable Portfolio Standard Expansion Amendment Act of 2016 (D.C. 2016) (signed July 25, 2016). In adopting a similar 50 percent RPS requirement, to be met by 2030, and doubling energy efficiency requirements for existing buildings, California also mandated that its Public Utilities Commission "develop and publish a study on barriers for low-income customers to energy efficiency and weatherization investments, including those in disadvantaged communities, as well as recommendations on how to increase access to energy efficiency and weatherization investments to low-income customers." That study is due before January 1, 2017. *See* S.B. 350, 2015–16 Reg. Sess. (Cal. 2015) (adopted Sept. 2015).

330. *See supra* note 38 for details on the current legal status of the Clean Power Plan.

331. *See* EPA, *Clean Energy Incentive Program*, https://www.epa.gov/cleanpowerplan/clean-energy-incentive-program (last visited August 26, 2016) [https://perma.cc/K7TQ-J25X].

332. *See, e.g.*, Sandeep Nandivada, *Energy-Efficiency Retrofits in the Commercial Sector: An Analysis of PACE Financing, On-Bill Repayment, and Energy Savings Performance Contracts*, 29 J. ENVTL. L. & LITIG. 363, 366–67 (2014); Neil Peretz, *Growing the Energy Efficiency Market Through Third-Party Financing*, 30 ENERGY L.J. 377, 391–92 (2009); Jason R. Wiener & Christian Alexander, *On-Site Renewable Energy and Public Finance: How and Why Municipal Bond Financing Is the Key to Propagating Access to on-Site Renewable Energy and Energy Efficiency*, 26 SANTA CLARA COMPUTER & HIGH TECH. L.J. 559, 559–60 (2010); Art Harrington & Amy Heart, *PACE Financing Opportunities for Environmental and Energy Lawyers*, 29 NAT. RES. & ENV'T 8, 8 (2014); *see* BERLIN ET AL., *supra* note 46; *see also* Hallie Kennan, *State Green Banks for Clean Energy*, (Energy Innovation, Working Paper Jan. 2014).

333. *See* Kennan, *supra* note 332, at 1–2; BERLIN ET AL., *supra* note 46, at 1.

334. Kennan, *supra* note 332, at 1.

are leading a growing number of states in adopting green bank programs.[335]

In addition, many states retain significant, more traditional financing structures, which provide incentives and rebates to consumers for the installation of a number of technologies, including energy efficiency and distributed generation.[336] And state-level cap-and-trade programs provide a substantial source of revenue for those states that choose to sell off, rather than give away, greenhouse gas emissions permits.[337]

These tools that spur clean energy could also drive clean electrification. But in order for them to do so, program designers must make enabling widespread participation a priority. Programs could expand several different ways. One option is set-asides, such as California's reservation of ten percent of its "California Solar Initiative" funding for low-income residences,[338] and the state's requirement that twenty-five percent of revenues from its cap-and-trade auctions go to projects that benefit identified disadvantaged communities.[339] Or, programs could enable wider participation by targeting either particular types of consumers or particular technologies: for example, green banks might extend clean energy loan guarantees on behalf of those whose credit scores would otherwise not qualify them for funding; or incentive and rebate programs might specifically target technologies that administrators determine are best suited for helping low-income households reduce energy usage.[340] Such efforts might

335. *Id.* at 4.

336. *See* BERLIN ET AL., *supra* note 46, at 6 (explaining that historically, state programs have "tended to focus mostly on individual project financing and deployment through the use of one-off rebates, grants and performance-based incentives that have directly subsidized the installation of clean energy technologies").

337. *See, e.g.*, REGIONAL GREENHOUSE GAS INITIATIVE, INC., INVESTMENT OF RGGI PROCEEDS THROUGH 2013, at 5 (2015) (reporting that participating states spent $1.02 billion, out of $1.57 billion earned from the cap-and-trade program, in energy efficiency and renewable energy investments).

338. *See supra* note 312.

339. *See* S.B. 535, 2011–12 Reg. Sess. (Cal. 2012) (adopted Sept. 30. 2012).

340. One example of an effort in this vein is the Obama Administration's recent announcement of a new "Clean Energy Savings For All Initiative," which operates primarily by tweaking existing financing programs to ensure that federal mortgage requirements do not stand in the way of property owners installing solar programs financed through bill savings. *See* Press Release, The White House, Office of the Press Secretary, Fact Sheet: Obama Administration

also include targeted outreach to low-income communities, which has been shown effective in increasing levels of participation.[341]

Ultimately, my goal here is not to pick among these policy options, but rather to make a broader point with respect to these and other potential programs: a deeper understanding of energy law's focus on access should embolden legislators and regulators to restructure clean energy policies in directions that enable broader grid participation. It is time to move away from equity as an argument against clean energy, towards a broader understanding of energy equity that demands a widening of access to the participatory grid.

C. Beyond Individualism

This Article has largely taken the unfolding participatory grid vision as a given. It has accepted regulators' dominant concept of the participatory grid as revolving around empowered consumers who are incentivized to act within the confines of their own property to construct a new relationship with the grid—a relationship likely to be automated to the point that it in fact involves limited "participation" in the traditional sense. But the vision remains largely inchoate, making it worth asking whether this is the "participatory" grid we want.

There is emerging evidence that many people prefer to engage in climate mitigation as community members rather than as consumers.[342] We like knowing that others are contributing, and we gain empowerment through collectivity.[343] These recent findings resonate with the U.S.

Announces Clean Energy Savings for All Americans Initiative (July 19, 2016), https://www.whitehouse.gov/the-press-office/2016/07/19/fact-sheet-obama-administration-announces-clean-energy-savings-all [https://perma.cc/QDE6-XPZ9]. Whether program administrators and regulators—rather than executives or legislators—could make decisions to target low-income consumers or technologies would depend on the authorizing language of the program in question.

341. Hernández & Bird, *supra* note 217, at 19.

342. Eva Heiskanen et al., *Low-Carbon Communities as a Context for Individual Behavioural Change*, 38 ENERGY POL'Y 7586, 7586 (2010).

343. *Id.*; *cf.* Robyn Bolton, *The Persuasive Pressure of Peer Rankings*, HARV. BUS. REV. (May 13, 2014), https://hbr.org/2014/05/the-persuasive-pressure-of-peer-rankings [https://perma.cc/N8PG-UZ8E] (describing how energy efficiency companies use peer data to induce greater savings among neighbors).

experience of rural electrification almost a century ago: working together to finance and build power lines imbued communities with a sense of democratic spirit beyond what might have been accomplished had the lines been subsidized through general tax revenue.[344]

In several states, legislators and regulators have adopted versions of participatory grid policies that help to foster more collective notions of participation. One concept that has caught hold recently is that of "community net metering," which allows for multiple consumers to purchase shares in a single net-metered system—often called a "solar garden"—that can be located off-site but whose generation is credited to the participating consumers' energy bills.[345] At least eleven states and Washington, D.C. have authorized community net metering or related pilot projects.[346] These efforts may significantly improve the ability of low-income consumers to participate in self-generation, as they eliminate the prerequisite of owning a solar-appropriate home.[347] Solar gardens also ease the burdens of participation, as they do not require each participant to individually seek out, install, and maintain solar panels.[348] As champions of such projects have noted, such projects can also make good use of blighted lands, take advantage of economies of scale available to larger-scale systems, raise awareness of solar power through placement in public areas, and provide participants the same "tangible sense of investment in energy production" that home solar panels

344. *Cf.* Part II.B.

345. *See, e.g.*, COL. REV. STAT. ANN. § 40-2-127 (West 2015) (defining a "community solar garden" as a solar facility belonging to at least ten subscribers located "in or near a community"); *See* MASS. GEN. LAWS ANN. ch. 164, § 140 (West 2016); *see also* Herman K. Trabish, *How Virtual Net Metering Will Save Low Income Massachusetts Residents $60 Million*, UTILITYDIVE (Dec. 9, 2014), http://www.utilitydive.com/news/how-virtual-net-metering-will-save-low-income-massachusetts-residents-60-m/342105/[https://perma.cc/C3SV-MQUR] (explaining how virtual net metering can help low-income consumers who cannot install distributed generation on-site reap the bill savings of net metering).

346. *See Net Metering: Policy Overview and State Legislative Updates*, NAT'L CONF. OF STATE LEGISLATURES, http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx (last visited Sept. 3, 2015) [https://perma.cc/V5G3-MFWF]. Those states are California, Colorado, Delaware, Illinois, Massachusetts, Maine, Minnesota, New York, Rhode Island, Vermont and Washington. *Id.*

347. *See* Samantha Booth, *Community Solar: Reviving California's Commitment to A Bright Energy Future*, 43 ENVTL. L. REP. 10585, 10585 (2013).

348. *Id.* at 10588.

do.[349] And the community scale of the projects creates "mutual support and understanding" among adopters that can make investing in such projects less intimidating and more rewarding.[350]

Another community-scale effort gaining traction is that of "micro-grids," technically defined as "a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid."[351] In practical terms, such systems usually involve a combination of distributed generation, storage, and demand response resources located within a discrete geographic area that are rendered capable of functioning separately from the remaining grid.[352] Many hope such systems might be capable of simultaneously "advancing energy sustainability, system resiliency, and consumer affordability goals," and might also reinforce the sense of community-scale cooperation and self-sufficiency.[353]

These examples illustrate how regulators might begin to think more expansively about what "participation" in the grid means, and ways that they can engender participation beyond individual, house-by-house efforts. Commissions and lawmakers have significant roles to play in creating conditions where arrangements like community net metering and micro-grid can flourish. Simply altering legal background rules to allow each of these systems to exist would be an important first step for most states.[354] In the spirit of rural electrification, policy-makers might also think about how to extend loans and technical support to groups interested in experimenting with more collective forms of decarbonizing the grid.

Finally, it is worth remembering that despite all of the recent celebration of the participatory grid as the next frontier in electricity law, many—probably most—of the decisions that

349. Hannah J. Wiseman & Sara C. Bronin, *Community-Scale Renewable Energy*, 4 SAN DIEGO J. CLIMATE & ENERGY L. 165, 165–66 (2013); Booth, *supra* note 347, at 10591.

350. Wiseman & Bronin, *supra* note 349, at 166.

351. Kevin B. Jones et al., *The Urban Microgrid: Smart Legal and Regulatory Policies to Support Electric Grid Resiliency and Climate Mitigation*, 41 FORDHAM URB. L.J. 1695, 1697–98 (2014).

352. *Id.* at 1703–04.

353. *Id.* at 1679*; see also* Sara C. Bronin, *Curbing Energy Sprawl with Microgrids*, 43 CONN. L. REV. 547 (2010).

354. *See* Jones et al., *supra* note 351, at 1712–13; Bronin, *supra* note 353, at 547 (noting that "state laws prohibit or severely limit [microgrids'] viability").

we make about how to respond to climate change will not be at the individual scale. Instead, we are facing critical strategic questions about the future of our collective grid: whether to invest heavily in next-generation nuclear facilities, or carbon capture and storage, or an offshore transmission corridor for wind, or some combination of the above.[355] Most of us are likely to remain tied to the grid and have a stake in its future shape. Irrespective of individual ability to invest in climate change solutions, all citizens might have a voice in decisions about the future composition of large-scale U.S. electricity generation.[356] Although beyond the scope of this Article, better enabling this type of traditional citizen participation should also be one of our priorities for clean energy policy.

V. CONCLUSION: THE POLITICS OF CLEAN ELECTRIFICATION

Stripped to its barest aspirations, the clean energy transition is one of switching fuel sources, from those that emit greenhouse gases to those that don't.[357] Such a switch might alleviate or exacerbate inequality depending on the form it takes.[358] The participatory grid retains the ability to do either, depending on how it is implemented. For this reason, clean energy justice concerns raised against dominant clean energy policies deserve serious consideration.

This Article has argued that energy regulators and energy law scholars can productively reorient current debates around clean energy's distributive consequences by returning to electricity law's core equity norms. Electricity law's fundamental commitment—imperfectly realized though it has been—is to widespread, affordable power, in the service of empowering people to lead productive and meaningful lives. For lawmakers to proceed with their twenty-first century

355. *See* WILLIAMS ET AL., *supra* note 24.

356. Cf. Amartya Sen, *Global Warming is Just One of Many Environmental Threats that Demand Our Attention*, NEW REPUBLIC (Aug. 22, 2014), https://newrepublic.com/article/118969/environmentalists-obsess-about-global-warming-ignore-poor-countries [https://perma.cc/7JKM-RBW2] (urging environmentalists and the public to think beyond only the carbon externalities of various energy sources).

357. *See* Clark A. Miller, Alastair Iles & Christopher F. Jones, *The Social Dimensions of Energy Transitions*, 22 SCI. AS CULTURE 135, 140 (2013).

358. *Cf.* Sujatha Raman, *Fossilizing Renewable Energies*, 22 SCI. AS CULTURE 172, 178 (2013) (questioning whether renewable energy is "intrinsically democratic and egalitarian" in ways that some progressives seem to believe).

project of creating a participatory grid, electricity law demands a reorientation of this longstanding norm, focused on broadening the range of people able to participate in the grid and reap the attendant financial and psychological gains.

Is an agenda of clean electrification realistic? Proposals for redistributional policies are met with understandable skepticism in today's political climate.[359] Perhaps counter-intuitively, Americans' appetite for redistribution has diminished as inequality has increased over the last several decades.[360] Nevertheless, in this conclusion, I want to briefly suggest some reasons for optimism regarding clean electrification's politics.

There are two reasons that clean electrification should prove politically feasible. The first is that clean energy—a generally popular aim—cannot move forward without attending to its equity implications. Recent survey results suggest that around 87 percent of Americans think developing clean energy should be a very high (26 percent), high (32 percent), or medium government priority (28 percent).[361] At the same time, in part due to the notorious partisanship of Congress, federal funding for clean energy has fallen over the last several years.[362] In its place, states wishing to decarbonize will be forced to craft their own strategies to reduce carbon

359. *See* Suzanna Sherry, *Property is the New Privacy: The Coming Constitutional Revolution*, 128 HARV. L. REV. 1452, 1475 (2015) (warning of the perils of marginalization "[i]f liberal legal academics continue to assume the legitimacy of the New Deal and dismiss contrary conservative theory as out of the mainstream").

360. *See, e.g.*, Matthew Luttig, *The Structure of Inequality and Americans' Attitudes Towards Redistribution,* 77 PUB. OPINION Q. 811 (2013). Note, however, that this trend may now be shifting. *See* Noam Scheiber & Dalia Sussman, *Inequality Troubles Americans Across Party Lines, Times/CBS Poll Finds*, N.Y. TIMES (June 3, 2015), http://www.nytimes.com/2015/06/04/business/inequality-a-major-issue-for-americans-times-cbs-poll-finds.html [https://perma.cc/4NLB-LK3D] (finding that "the percentage of Americans who say everyone has a fair chance to get ahead in today's economy has fallen 17 percentage points since early 2014" and support for redistributive policies has risen).

361. YALE PROJECT ON CLIMATE CHANGE COMMC'N, PUBLIC SUPPORT FOR CLIMATE AND CLEAN ENERGY POLICIES IN APRIL 2013, http://environment.yale.edu/climate-communication/article/Climate-Policy-Support-April-2013#sthash.kCMlJTkh.dpuf [https://perma.cc/ZC5X-JBQH].

362. BERLIN ET AL., *supra* note 46, at 2; *see also* MEGAN NICHOLSON & MATTHEW STEPP, BREAKING DOWN FEDERAL INVESTMENTS IN CLEAN ENERGY (2013), http://www2.itif.org/2013-breaking-down-investment-energy.pdf [https://perma.cc/ZFJ8-HY75].

emissions,[363] putting more pressure on them to aggressively pursue and fund clean energy policies. As this Article has shown, "equity" can act either as a roadblock for such policies, or as a way to widen their reach. Given the depth of regulators' commitment to equity issues, it is quite likely that the only way clean energy advocates can achieve the progress they desire is to work harder on integrating equity concerns into clean energy policies.

Second, clean electrification might build broad—and odd—coalitions. Clean electrification is far from a radical solution to the equity challenges raised by the participatory grid.[364] It is rooted in the notion that increased participation in new marketplaces, incentivized by price signals, will allow a wide swath of Americans to buy down their contributions to climate change and thereby maintain affordable power. Accomplishing this vision will require the proliferation of new technologies, and in this way it closely resembles the original project of electrification.[365] It is thus unsurprising that some of the same companies that supported electrification, including General Electric and Westinghouse, show similar enthusiasm for the participatory turn in electricity management.[366] These companies would likely support efforts to extend their new technologies to a wider number of American households, as would many of the emerging "energy service companies" dedicated to helping households take advantage of participatory grid incentives.[367]

Two other political contingencies might make more surprising supporters. As the previous section suggested, even utilities, typically cast as the natural opponents of a more

363. *See supra* note 38.

364. *Cf.* Kysar, *supra* note 274, at 2115 ("[C]ampaigns to encourage publicly-oriented market behavior . . . have the great virtue of avoiding head-on confrontation between the competing theoretical conceptions of sustainable development and market liberalism.").

365. *See supra* Part I.C.

366. *See* STEPHENS, WILSON & PETERSON, *supra* note 26, at 69–70 (noting that both incumbents like General Electric and Westinghouse, as well as fledgling energy management companies, see the smart grid as a "major business opportunity"); *see also* NAVIGANT RESEARCH, SMART APPLIANCES: INTELLIGENT CONTROL, POWER MANAGEMENT, AND NETWORKING TECHNOLOGIES FOR HOUSEHOLD APPLIANCES ON THE SMART GRID: GLOBAL MARKET ANALYSIS AND FORECASTS 2 (2012) (predicting "worldwide smart appliance sales to reach nearly $35 billion by 2020").

367. STEPHENS, WILSON & PETERSON, *supra* note 26, at 69–70.

participatory grid, might be given reasons to support clean electrification if it can help their faltering business model.[368] And finally, there is a libertarian strain to consumer empowerment that makes these policies popular in unexpected locales and quarters: in Oklahoma, for example, a movement backed by Tea Party conservatives recently convinced the state's Republican governor to resist efforts to impose fees on solar panel owners.[369] Although libertarians are not likely to embrace clean electrification's redistributive dimension with open arms, they might at least come to accept it as a necessary component of an agenda of electric self-sufficiency and competition. These possible coalitions provide reason for optimism about the ability of scholars and lawmakers to create and implement clean electrification programs, once properly convinced of their place within electricity law.

Clean electrification provides a way to avoid collision between the equities of energy law and the inequities of climate change, and represents one important path forward on clean energy justice. The urgency of climate change—and the fact that none of us can help but contribute to it—suggests that never before have we needed to widen participation in a social project as much as will be necessary in reducing greenhouse gas emissions. It is fortunate, then, that U.S. electricity law provides its own way forward, from a twentieth-century focus on widespread access *to* the grid, to a twenty-first-century focus on broadened participation *in* the grid.

368. *See supra* Part IV.A.

369. Josh Voorhees, *The Tea Party Wants to Help You Go Solar*, SLATE (Apr. 23, 2014), http://www.slate.com/articles/news_and_politics/politics/2014/04/oklahoma_sb_1456_why_the_tea_party_is_fighting_for_solar_power.html [https://perma.cc/T5X3-PRZR]; Okla. Exec. Order No. 2014-07 (April 21, 2014); *see also* TUSK, Tell Utilities Solar Won't Be Killed, http://dontkillsolar.com/tusk/what-we-want/ (last visited June 3, 2015) [https://perma.cc/C7P7-WP6B] (Republican-led campaign against "monopoly utilities . . . extinguish[ing] the independent rooftop solar market in America"); John Murawski, *Republicans Push to Expand Solar Power in NC*, RALEIGH NEWS & OBS. (Apr. 7, 2015), http://www.newsobserver.com/news/business/article17789870.html [https://perma.cc/W6YG-FKHE]; Ivan Penn, *Tea Party Pushing for Florida to Step up Solar Energy Efforts*, TAMPA BAY TIMES (Oct. 17, 2014), http://www.tampabay.com/news/business/energy/tea-party-pushing-for-florida-to-step-up-solar-energy-efforts/2202617 [https://perma.cc/EW76-JDUD].