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CLEAN ENERGY JUSTICE: CHARTING AN EMERGING AGENDA

Shelley Welton & Joel Eisen***

The rapid transition to clean energy is fraught with potential inequities. As clean energy policies ramp up in scale and ambition, they confront challenging new questions: Who should pay for the transition? Who should live next to the industrial-scale wind and solar farms these policies promote? Will the new "green" economy be a fairer one, with more widespread opportunity, than the fossil fuel economy it is replacing? Who gets to decide what kinds of resources power our decarbonized world? In this article, we frame these challenges as part of an emerging agenda of "clean energy justice." Mapping this agenda highlights the equity challenges that will attend the transition to clean energy, and allows for more comprehensive, creative approaches to legal and policy solutions.

A cleaner energy economy does not ineluctably translate into a more just economy. We identify four considerations that will be critical to ensure that clean energy does not entrench widening inequalities in wealth and power: (1) how to fund the transition; (2) who benefits from the upsides of the new clean energy economy, including green jobs and new technologies like rooftop solar panels; (3) who participates in decisions about the shape of the new clean energy economy; and (4) how and where new clean energy infrastructure is sited. Drawing from available data, we describe why there are real risks that the gains of clean energy might be unequally distributed, while the costs fall on rural communities and non-adopters of new technologies, thus exacerbating inequality while greening the grid. And through original empirical research, we highlight the challenges of full and equal participation in the esoteric, technocratic procedures of energy law.

The present moment is a critical one for bringing these diverse considerations together into this overarching agenda. The U.S. energy system is in the early days of a long transition away from fossil fuels towards clean energy. It is time for energy lawmakers and energy law scholars to better anticipate the distributive and procedural justice concerns that will attend this transition, and to forge new ways to address them.

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I. Introduction

The rapid transition to clean energy is fraught with potential inequities. As clean energy policies ramp up in scale and ambition, they confront challenging new questions: Who should pay for the transition to clean energy? Who should live next to the industrial-scale wind and solar farms these policies promote? Will the new "green" economy be a fairer one, with more widespread opportunity, than the fossil fuel economy it is replacing? Who gets to decide what kinds of resources power our decarbonized world?

In this Article, we assert that it is useful to understand these challenges as part of an emerging agenda of "clean energy justice." We argue that the present moment is a critical one for bringing these diverse considerations together into this overarching agenda. The U.S. energy system is in the early days of a long transition away from fossil fuels towards clean energy.[1] It is time for energy lawmakers and energy law scholars to better anticipate the distributive and procedural justice concerns[2] that will attend the transition to a clean energy economy, and to forge new ways to address them.

The concerns addressed in this article grow out of policy reforms that are, in many ways, very good news. In 2018, California became the second state to

1. *See generally* Joel B. Eisen & Felix Mormann, *Free Trade in Electric Power*, 2018 Utah L. Rev. 49 (observing that it will take decades of progress to achieve a fully interactive electric grid); Shelley Welton, *Grasping for Energy Democracy*, 116 Mich. L. Rev. 581 (2018).

2. For an explanation of these terms, see *infra* Part II.

pledge to receive 100% of its energy from clean sources by 2045 (joining Hawaii, which made a 100% renewable energy promise in 2015).[3] In total as of October 2018, twenty-nine states have promised to increase the amount of energy they receive from renewable resources,[4] and laws to promote "clean energy"—from wind turbines, solar panels, hydropower, biomass, energy efficiency, and reduced peak demand[5]—are proliferating,[6] often in a surprisingly bipartisan fashion.[7] These laws have been so successful in boosting clean energy industries that even absent federal support, analysts predict that clean energy will continue a meteoric rise over the next several decades.[8] And should the excitement around the "Green New Deal" ultimately translate into federal legislation, the U.S. transition to clean energy might accelerate significantly.[9]

Clean energy brings significant benefits for the global climate and local air quality. Nevertheless, a cleaner energy economy does not ineluctably translate to a more just economy. Instead, if the clean energy transition is funded largely

3. 100 Percent Clean Energy Act of 2018, ch. 312, 2018 Cal. Stat. 2763; Act 97, 2015 Haw. Sess. Laws 245 (amending HAW. REV. STAT. § 269-92); Press Release, Governor of State of Hawaii David Y. Ige, Governor Ige Signs Bill Setting 100 Percent Renewable Energy Goal In Power Sector (Jan. 8, 2015).

4. States promote renewables through laws setting renewable portfolio standards and establishing other incentive programs, as discussed further in Part II. *See* DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, https://perma.cc/G5N6-UF9K [hereinafter DSIRE DATABASE] (listing the various programs for each state).

5. For a discussion of demand reduction techniques (including "demand response" and others) and their historical uses, see Joel B. Eisen, *Demand Response's Three Generations: Market Pathways and Challenges in the Modern Electric Grid*, 18 N.C. J.L. & TECH. 351 (2017) [hereinafter Eisen, *Demand Response's Three Generations*].

6. Shelley Welton, *Electricity Markets and the Social Project of Decarbonization*, 118 COLUM. L. REV. 1067, 1069 (2018) [hereinafter Welton, *Social Project*].

7. Two recent examples of bipartisan cooperation in promoting clean energy are Nevada's restoration of near-full retail rates for net metering through legislative and regulatory actions, and New Jersey's legislative package in 2018 that supports the state's aging nuclear plants while setting ambitious goals for renewable energy. A.B. 405, 2017 Leg., 69th Reg. Sess. (Nev. 2017); Order Granting in Part and Denying in Part Joint Application by NV Energy on Assembly Bill 405, Pub. Utils. Comm'n of Nev., No. 17-07026, Sept. 1, 2017; A.B. 3723 & S. 2313, 2018–2019 Leg. Sess. (N.J. 2018).

8. In 2018, the U.S. Energy Information Administration predicted that renewable energy sources will see explosive growth in the United States between now and 2050. *See infra* notes 40–41 and accompanying text. The National Renewable Energy Laboratory's (NREL) Renewable Electricity Futures Study details how renewables could meet eighty percent of the nation's electricity demand by 2050. NAT'L RENEWABLE ENERGY LAB., RENEWABLE ELECTRICITY FUTURES STUDY (2012), https://perma.cc/2WAN-XLXU.

9. *See* Dino Grandoni, *The Energy 202: Lots of People Support the 'Green New Deal.' So What Is It?*, WASH. POST (Dec. 19, 2018), https://perma.cc/J534-XG57 (reporting that a survey by Yale and George Mason University found that eighty-one percent of registered voters backed the Green New Deal when it was described as "a plan to generate all of the nation's electricity from renewable sources within 10 years while providing job training for those displaced from traditional energy sector jobs").

by the poor, and results primarily in new gadgets and lower electric bills for the rich, it could exacerbate inequality. This potential is all too painfully familiar for scholars and practitioners of environmental law. Environmentalists came late to understand the ways in which central environmental statutes ignore—and perhaps amplify—unequal distributions of environmental harms.[10]

To stave off a similar fate for clean energy laws and policies, this Article articulates why justice matters in the clean energy transition and examines the central justice concerns beginning to arise. Our approach is both theoretical and data-driven. In Part II, we explain why attention to the justice implications of clean energy is important. We articulate normative and pragmatic theories that highlight the centrality of energy to modern conceptions of a decent life, the importance of coalition-building to advance the project of decarbonization, and the opportunities that clean energy's technological transformation of the U.S. electric grid creates for addressing inequality. The remainder of the Article explores four concerns central to promoting justice during the clean energy transition. Here, we supplement our theoretical examination with data on rooftop solar participation, data on the demographics of clean energy jobs, and two original empirical studies of the challenges of participating in clean energy proceedings.

The first clean energy justice concern is the question of how to fund the transition. Right now, electricity bills fund most new energy infrastructure. But as certain electricity consumers become electricity producers by adopting rooftop solar, electricity storage, or other emerging technologies, funding a clean energy buildout through these volumetric bills may come to feel less fair. If more affluent consumers are best able to lower their electricity bills through clean energy investments, a class divide could emerge in who funds the clean energy buildout. Part III takes up this question of "who pays," describing the

10. Jedediah Purdy, *The Long Environmental Justice Movement*, 44 ECOLOGY L.Q. 809, 825–35 (2018) (exploring why environmental statutes lack distributive considerations). Many scholars have observed mainstream environmentalism's inattention to the distributional inequities of environmental protection and harm. *See, e.g.*, Eileen Gauna, *The Environmental Justice Misfit: Public Participation and the Paradigm Paradox*, 17 STAN. ENVTL. L.J. 3, 9 (1998); Alice Kaswan, *Environmental Justice: Bridging the Gap Between Environmental Laws and "Justice,"* 47 AM. U. L. REV. 221, 262–63 (1997); Richard J. Lazarus, *Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787, 787 (1993) (noting that policymakers have largely ignored "the potential for distributional inequities" of environmental protection); Gerald Torres, *Environmental Burdens and Democratic Justice*, 21 FORDHAM URB. L.J. 431, 435–36 (1994) (explaining a range of "distributional inequities" in environmental law, including increased hazardous waste siting, elevated blood lead levels, increased occupational exposure to chemicals, and reduced air quality in minority areas). In the decades since these critiques were raised, principles of environmental justice have been integrated into environmental protection, although not as thoroughly as many would desire. *See generally* THE LAW OF ENVIRONMENTAL JUSTICE: THEORIES AND PROCEDURES TO ADDRESS DISPROPORTIONATE RISKS (Michael Gerrard & Sheila Foster eds., 2007); Purdy, *supra*, at 818.

challenging empirics of cross-subsidization arguments and the ways in which utilities use these arguments for self-serving ends.

The flip side of asking who pays for clean energy is the question of who benefits from it. Clean energy advocates have amassed support for their policies by promising revolutionary economic possibilities, including the creation of a slew of stable, domestic jobs and widespread opportunities for consumers to become energy producers.[11] How these potential benefits of clean energy are distributed thus becomes a critical component of how Americans perceive the transition's fairness. Part IV examines the distribution of the upsides of the burgeoning clean energy economy, analyzing the distribution of clean energy jobs and new technologies such as electric vehicles across class and race. As we show, the data suggest that significant inequities exist in the clean energy workforce and the adoption of clean energy technologies.

The third major component of a clean energy justice agenda concerns how individuals participate in decisionmaking during the transition. Much climate change policy to date has focused on how much we should decarbonize, and how fast. But as states cement their objectives in this regard, a new question comes into focus: What do we want decarbonization to look like? Should it include new nuclear plants, waste-to-energy, or other controversial technologies? Should we devote significant open space to industrial-scale wind and solar farms? Should we require significant and intrusive conservation efforts? In Part V, we consider the modes through which persons can participate in these decisions—and the potential challenges that energy law presents to equal participation—with support from our empirical studies. We conclude that energy law fora present particularly challenging arenas for broad-based participation.

Fourth, a concern that has dogged traditional energy infrastructure persists in the shift to clean energy: Where should it be built? One focus of the environmental justice movement over the past fifty years has been the unequal distribution of polluting industrial facilities.[12] Although clean energy facilities are in most instances less polluting than those they replace, they carry their own downsides as neighbors.[13] For this reason, the question of where renewable energy is sited—and how siting decisions are made—will also be important to ensure a just clean energy transition. Part VI explores these issues.

Each of these four concerns has been discussed in the academic literature and in policy debates,[14] but not in a holistic fashion. Our more comprehensive

11. *See infra* Part IV; *see also* Sharon B. Jacobs, *The Energy Prosumer*, 43 ECOLOGY L.Q. 519, 520 (2017). *See generally* VAN JONES, THE GREEN COLLAR ECONOMY: HOW ONE SOLUTION CAN FIX OUR TWO BIGGEST PROBLEMS (2008); *Just Transition: A Framework for Change*, CLIMATE JUSTICE ALL., https://perma.cc/7XEG-7W76.

12. *See* Kaswan, *supra* note 10, at 272; Lazarus, *supra* note 10, at 801–05 (discussing the foundational studies documenting this inequity).

13. *See* Jeanne Marie Zokovitch Paben, *Green Power & Environmental Justice — Does Green Discriminate?*, 46 TEX. TECH L. REV. 1067, 1093–96 (2014).

14. *See* Cecilia Martinez, *Environmental Justice and the Clean Power Plan: The Case of Energy Efficiency*, 41 WM. & MARY ENVTL. L. & POL'Y REV. 605 (2017); Uma Outka, *Environ-*

analysis helps highlight where we are lacking sufficient and important data in each of these areas—a critical first step in building a clean energy justice agenda. Indeed, these research gaps themselves arguably constitute an additional clean energy injustice, because as Gwen Ottinger has explained: "The systematic non-production of knowledge represents an injustice in that the resulting knowledge gaps tend to correlate with the same low-income, high-minority areas that bear the brunt of industrial pollution."[15]

Much of our goal in framing the contours of "clean energy justice" is to illustrate why it is important to understand these issues as a distinct and comprehensive agenda. This agenda fits within the emerging field of "energy justice," but forms a distinct subcomponent of it.[16] Energy justice often spotlights the injustices associated with traditional, fossil fuel energy sources,[17] and the need for electrification in developing nations.[18] Clean energy justice focuses on inequities in the energy system that may persist or worsen after sustainable energy becomes a driving goal.[19]

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mental Justice Issues in Sustainable Development: Environmental Justice in the Renewable Energy Transition, 19 J. ENVTL. SUSTAINABILITY L. 60 (2012) [hereinafter Outka, *Environmental Justice in Renewable Energy*] (addressing the environmental justice implications of siting renewable energy by defining the concept legally, and discussing access to, and inclusion in, green economy benefits).

15. Gwen Ottinger, *The Winds of Change: Environmental Justice in Energy Transitions*, 22 SCI. AS CULTURE 222, 226 (2013).

16. *See generally* BENJAMIN SOVACOOL & MICHAEL DWORKIN, GLOBAL ENERGY JUSTICE: PROBLEMS, PRINCIPLES, AND PRACTICES (2014) (exploring the potentially sweeping dimensions of an international energy justice agenda).

17. *See* Shalanda H. Baker, *Mexican Energy Reform, Climate Change, and Energy Justice in Indigenous Communities*, 56 NAT. RESOURCES J. 369, 379 (2016); Karen Bickerstaff, Gordon Walker & Harriet Bulkeley, *Introduction* to ENERGY JUSTICE IN A CHANGING CLIMATE: SOCIAL EQUITY AND LOW-CARBON ENERGY 2 (Karen Bickerstaff et al. eds., 2013). Most sources date the emergence of the academic literature on "energy justice" back only to 2013. *See, e.g.*, Kirsten Jenkins, *Setting Energy Justice Apart from the Crowd: Lessons from Environmental and Climate Justice*, 39 ENERGY RES. SOC. SCI. 117, 117 (2018).

18. *See* Baker, *supra* note 17, at 382; Lakshman Guruswamy, *Energy Justice and Sustainable Development*, 21 COLO. J. INT'L ENVTL. L. & POL'Y 231, 255 (2010); *see also* Kandeh Yumkella, *Keynote Address, Energy Justice Conference, October 23, 2009*, 21 COLO. J. INT'L ENVTL. L. & POL'Y 277, 279 (2010) (stating that energy justice "simply means access to energy services to meet basic needs such as for cooking, heating, and preserving food").

19. Energy justice is often presented as involving a "trilemma" of competing concerns: "energy security, energy equity and environmental sustainability." Alister Forman, *Energy Justice at the End of the Wire: Enacting Community Energy and Equity in Wales*, 107 ENERGY POL'Y 649, 649 (2017); *see also* Raphael J. Heffron, Darren McCauley & Benjamin K. Sovacool, *Resolving Society's Energy Trilemma through the Energy Justice Metric*, 87 ENERGY POL'Y 168, 168 (2015). Several scholars have undertaken more targeted work on the topic of ensuring affordability during the energy transition. *See* Rosie Day & Gordon Walker, *Household Energy Vulnerability as 'Assemblage,' in* ENERGY JUSTICE IN A CHANGING CLIMATE: SOCIAL EQUITY AND LOW-CARBON ENERGY, *supra* note 17, at 14–16, 24–25; Diana Hernández, *Sacrifice Along the Energy Continuum: A Call for Energy Justice*, 8 ENVTL. JUST. 151, 154–55

Framing a clean energy justice agenda also highlights its debts to, as well as differences from, the traditional environmental justice agenda. Scholars approaching questions of clean energy and equity often approach them from an environmental justice angle, examining how that movement might inform these new debates.[20] This approach is useful, as there is much to be learned from the venerable history of the environmental justice movement—including the importance of combining procedural and distributive justice concerns into a united agenda.[21]

But a fuller exploration of clean energy justice illustrates that many of its concerns implicate a different legal framework: energy law. By "energy law," we mean the laws and policies that govern the exploitation of energy resources and the production and distribution of electricity.[22] Generalizations about this body of law are difficult, because the disparate doctrines that make it up developed over more than a century, with different law and policy focuses in each era. At a broad level, however, some observations are possible. Although scholars often discuss a growing nexus between energy law and environmental law,[23] there are some critical differences. Many provisions of energy statutes are preoccupied with economic regulation of monopolies and promotion of market solutions to supply and demand.[24] And the centrality of new technologies and geopolitical events (such as oil crises) to the development of energy law has little parallel in environmental law. We contend that some of these differences have a unique impact on establishing a foundation for clean energy justice: The economic focus of energy law, and in particular, its history of attempting to ensure that consumers are treated fairly, means that energy law pays more attention to distributive concerns than U.S. environmental statutes.[25]

Also unique to clean energy justice is a more insistent focus on potential benefits: because it involves the growth of a new economy, the clean energy transition offers the potential for more equally distributing the gains of this

(Aug. 2015); Tony Gerard Reames, *Targeting Energy Justice: Exploring Spatial, Racial/Ethnic and Socioeconomic Disparities in Urban Residential Heating Energy Efficiency*, 97 ENERGY POL'Y 549, 549 (2016) (using GIS to map fuel poverty in Kansas City, Missouri and recommending community-based targeting of energy efficiency assistance programs); Benjamin K. Sovacool, *Fuel Poverty, Affordability, and Energy Justice in England: Policy Insights from the Warm Front Program*, 93 ENERGY 361, 362–64 (2015) (analyzing the ability of England's "Warm Front" program to reduce fuel poverty, cut greenhouse gas emissions, and increase customer savings and satisfaction).

20. *See generally* Outka, *Environmental Justice in Renewable Energy*, *supra* note 14; Paben, *supra* note 13.
21. *See* Kaswan, *supra* note 10, at 251–52.
22. *See* JOEL B. EISEN ET AL., ENERGY, ECONOMICS, AND THE ENVIRONMENT: CASES AND MATERIALS 1–29 (4th ed., 2015).
23. *See, e.g.*, Alexandra B. Klass, *Climate Change and the Convergence of Environmental and Energy Law*, 24 FORDHAM ENVTL. L. REV. 180, 182 (2013).
24. An example of this, to which we return later, is the central command in both federal and state electricity law that rates for power be "just and reasonable." *See infra* Part II.
25. *See infra* Parts II & VI.A.

burgeoning sector, as well as the harms.[26] Conversely, procedural justice concerns may be especially acute in the clean energy transition, as the deeply technocratic nature of energy law raises unique challenges to participation.[27] Mapping more thoroughly clean energy justice's unique landscape of upsides and downsides helps to reveal creative legal and policy approaches, which we discuss in Part VII. But this Article is only a first step in understanding this complex terrain, and thus we conclude by identifying several questions in need of scholarly attention.

A few caveats are in order. First, as energy law scholars approaching issues of justice, we are distinctly attuned to the perils of losing or transforming the voices of affected communities as we channel their concerns into academic, analytical frames. We nevertheless hope that articulating the significant justice challenges that we observe percolating into clean energy debates might help to more thoroughly and rapidly incorporate these concerns into legal and policy conversations.[28] In performing this task, however, we do not profess to have identified the full range of clean energy justice concerns that communities across the United States are experiencing.

Second, the clean energy transition presents several additional justice-related challenges that we intentionally do not address here for reasons of space and analytical clarity. We set aside the unique justice implications of pursuing nuclear power as important but well explored.[29] Two more novel issues that we leave for separate discussions are the justice implications of transitioning away from fossil fuels—and in particular, the question of duties owed to miners and mining communities[30]—and the ways in which clean energy justice might intersect with other climate justice concerns, including climate change's inequitable impacts on low-income and minority communities within and beyond the

26. In contrast to energy justice, environmental justice primarily focused at the outset on the ways in which people of color and poor people are unequally exposed to environmental harms. *See* Luke W. Cole, *Empowerment as the Key to Environmental Protection: The Need for Environmental Poverty Law*, 19 ECOLOGY L.Q. 619, 621 (1992). *See generally* ROBERT D. BULLARD, DUMPING IN DIXIE: RACE, CLASS, AND ENVIRONMENTAL QUALITY (1990).

27. *See infra* Part V.

28. *Cf.* Marc R. Poirier, *Environmental Justice/Racism/Equity: Can We Talk?*, 96 W. VA. L. REV. 1083, 1103 (1993–1994) (observing how lawyerly and technocratic support can prove helpful in the environmental justice context).

29. *See* Paben, *supra* note 13, at 1086; Valentina Vadi, *Energy Security v. Public Health? Nuclear Energy in International Investment Law and Arbitration*, 47 GEO. J. INT'L L. 1069, 1073 (2016).

30. Shalanda Baker et al., *Beyond Zero-Sum Environmentalism*, 47 ENVTL. L. REP. 10,328, 10,343–44 (2017) (discussing issues related to miners); Sanya Carley et al., *Adaptation, Culture, and the Energy Transition in American Coal Country*, 37 ENERGY RES. & SOC. SCI. 133, 138 (2018) (arguing for moving beyond a focus on coal jobs in these communities); Karl S. Coplan, *Fossil Fuel Abolition: Legal and Social Issues*, 41 COLUM. J. ENVTL. L. 223, 262–64 (2016) (arguing no duty is owed to fossil fuel industries to protect stranded fossil fuel assets against obsolescence); Annie Eisenberg, *Just Transitions*, 92 S. CAL. L. REV. 101, 107 (2018) (surveying the literature on this topic).

United States.[31] These are worthy questions, but would lead us too far astray of our focus on the particular equity implications that the rapid expansion of clean energy raises. Finally, we also do not tackle the equity considerations associated with carbon cap-and-trade programs. Although these programs engender substantial debate about equity concerns,[32] we view these as separate from the more embedded distributional consequences of policies aimed directly at promoting clean energy.

II. Why Justice Matters in the Transition to Clean Energy

In this section, we consider why policymakers, scholars, and activists focused on clean energy should prioritize considerations of justice, and why those focused on justice should prioritize clean energy. It is worth exploring this issue carefully because for many, focusing on the justice implications of a clean energy transition may seem superfluous, or at least secondary. If we are moving away from fossil fuels towards clean energy, aren't we necessarily getting more "just"?

The answer to this question depends on the aperture of your lens. To be sure, movement towards clean energy helps to alleviate the challenge of climate change, which harms the lowest income people most severely.[33] And if fossil fuel electricity generation is reduced, the communities that have borne the brunt of its impacts should see improved health outcomes. Nevertheless, one can imagine a clean energy transition that further concentrates wealth and power in certain groups, while shunting off the burdens of new industrial infrastructure to other, historically disadvantaged communities. Similarly, one can imagine a clean energy transition that is insufficiently attentive to how the costs of infrastructure change are distributed, thus exacerbating ongoing challenges of energy poverty in the United States.[34]

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31. *See, e.g.*, Randall S. Abate & Elizabeth Ann Kronk, *Commonality Among Unique Indigenous Communities: An Introduction to Climate Change and Its Impacts on Indigenous Peoples*, 26 Tul. Envtl. L.J. 179, 180 (2013); Michael B. Gerrard, *What Does Environmental Justice Mean in an Era of Global Climate Change?*, 19 J. Envtl. & Sustainability L. 278, 286 (2013) ("The single greatest adverse impact of climate change on poor populations around the world is likely to be mass migration.").

32. *See, e.g.*, Richard Schmalensee & Robert N. Stavins, *Lessons Learned from Three Decades of Experience with Cap and Trade*, 11 Rev. Envtl. Econ. & Pol'y 59, 67–69 (2017) (describing the "political pressures" to use auction revenues in California under the AB32 program); Lara J. Cushing et al., A Preliminary Environmental Equity Assessment of California's Cap-and-Trade Program (2016), https://perma.cc/YDB9-5PHT (discussing localized pollution concerns with cap and trade).

33. Experts broadly agree that climate change will harm the poor within the United States more than the affluent. *See, e.g.*, U.S. Nat'l Climate Assessment, Highlights: Climate Change Impacts in the United States 34 (2014); Anthony Leiserowitz & Karen Akerlof, Yale Project on Climate Change, Race, Ethnicity and Public Responses to Climate Change 4 (2010), https://perma.cc/778R-ZJD9.

34. *See infra* notes 45–48 and accompanying text.

When we talk about "justice" in this Article, it is not our intent to put forth a specific definition of "clean energy justice," nor to outline a definitive theory of what would count as a "just" transition to clean energy. Instead, we aim to highlight and analyze the myriad injustices that may arise in the clean energy transition. We hope this articulation will provoke a broader conversation about what should, and should not, be accepted as a "fair" outcome in a cleaner energy society. In crafting our categories of concern, we draw on two conceptions of justice that are well developed in the existing literature: distributive justice, which asks how the benefits and burdens of a policy or program should be shared among a community, and procedural justice, which focuses on the right to equal voice and representation during decisionmaking processes.[35]

Understanding the distributive consequences of the clean energy transition—and the procedural fairness of the institutions directing it—is critical in part because of the accelerating pace of U.S. clean energy development. Taking seriously the science and international commitments surrounding climate change[36] would require eighty percent decarbonization of the United States economy by 2050, complete decarbonization by 2100,[37] and electrifying the entire economy. As a result, electricity consumption would have to double at the same time that its production shifted entirely to carbon-free sources.[38] This would require U.S. renewable energy infrastructure to increase perhaps as much as twenty times over.[39]

Our current political reality offers reason to doubt that such a rapid transition will occur. But even low-end estimates of renewable energy development project a substantial increase in the next several decades. Under current state legal commitments and present market dynamics—assuming no new policies are adopted in the coming decades—the U.S. Energy Information Administra-

35. *See, e.g.*, Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 ENVTL. L. REP. 10,681, 10,683–92 (2000).

36. Nations have agreed to limit planetary warming to two degrees Celsius to avert the worst consequences of climate change. U.N. Framework Convention on Climate Change, *Report of the Conference of the Parties on its Fifteenth Session*, at 5, U.N. Doc. FCCC/CP/2009/11/Add.1 (Mar. 30, 2010) (reproducing the Copenhagen Accord of Dec. 18, 2009). Nations have since committed to "pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change." U.N. Framework Convention on Climate Change, *Adoption of the Paris Agreement*, U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015).

37. JAMES H. WILLIAMS ET AL., ENERGY & ENTVL. ECON., INC., PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES 1 (2015), https://perma.cc/7VRN-3H5X.

38. *Id.* at xiv.

39. The total installed solar and wind capacity in the U.S. in March 2018 was 124 gigawatts (GW). FERC, OFFICE OF ENERGY PROJECTS, ENERGY INFRASTRUCTURE UPDATE FOR MARCH 2018, at 6 (2018), https://perma.cc/H63K-E35P. In 2015, the Deep Decarbonization Pathways Project found that 80% decarbonization by 2050 will require "the deployment of roughly 2,500 gigawatts (GW) of wind and solar generation," or roughly 20 times the 2018 installed capacity. WILLIAMS ET AL., *supra* note 37, at xiv; *see also* NAT'L RENEWABLE ENERGY LAB., *supra* note 8, at 19 (making similar findings).

tion projects that renewable energy will account for "64% of the total electric generation growth" in the United States through 2050.[40] Under this scenario, wind power installations would increase by about twenty percent, while utility-scale solar installation would more than double.[41]

In all likelihood, the scale of the transition will be somewhere between current trends and deep-decarbonization-level projections. In any event, our economy and society will transition to significantly more renewable energy in the coming decades, and spending on renewable energy infrastructure will continue to rapidly increase.[42] Therefore, if clean energy policies serve to redistribute wealth or power, they are likely to do so on a substantial scale.

In this section, we offer five reasons beyond the scale of the transition that prioritizing justice is important, each of which might persuade a different set of readers. In brief, we argue: (1) there is a moral case for continuing to ensure widespread, affordable access to the foundational good of electricity during a time of transition; (2) there is a formal, legal commitment to fairness within utility law that regulators continue to apply as an important principle in energy decisionmaking; (3) there are instrumental reasons why those in favor of clean energy should join in common cause with those concerned about its justice implications in order to move clean energy forward; (4) the technological transformation required to decarbonize energy presents an opportunity to shift ownership and employment patterns; and (5) this transition also creates opportunities to address structural and political inequality by giving communities and households more control over their energy supply. We develop these points in turn.

First, there is a ***moral argument*** for paying attention to the distributive impacts of clean energy policies. Although there is no constitutional right to energy, it is foundational to participation in the modern economy and in modern communities.[43] Energy's importance has prompted every state in the coun-

40. U.S. Energy Info. Admin., Annual Energy Outlook 2018 with Projections to 2050, at 20 (projection in the reference case, incorporating assumptions described above).

41. *Id.* at 96 ("From 2020 to 2050, utility-scale wind capacity is projected to grow by 20 gigawatts (GW), and utility-scale solar photovoltaic capacity is projected to grow by 127 GW."); *Wind Energy Facts at a Glance*, Am. Wind Energy Ass'n, https://perma.cc/FAU9-GEJE (showing 96.5 GW operating currently); *Solar Industry Research Data*, Solar Energy Industries Ass'n, https://perma.cc/ELK7-CT8Y (showing approximately 60 GW operating currently).

42. *See, e.g.*, Bloomberg New Energy Fin., New Energy Outlook 2017, at 4 (June 15, 2017), https://perma.cc/AL8V-M5V4 (predicting $1.5 trillion in investment in renewables in the Americas between 2017–2040, including $10 billion per year in PV solar).

43. Eisen et al., *supra* note 22, at 5) (noting that "modern life as we know it would be impossible without large quantities of electricity"); *cf.* John Rawls, A Theory of Justice 62 (1971) (describing "primary goods" that "every rational man is presumed to want").

try to designate its electricity providers as "public utilities," each governed by a "public utility commission" ("PUC") that sets the rates they can charge.[44]

Yet tens of millions of Americans still live in energy poverty, which is often measured in terms of households that must spend more than 6% of income on energy bills.[45] This measure—while useful—understates the problem: In several places in the country, "energy expenditures breach 50 percent of household incomes."[46] Although some federal programs subsidize energy bills, low funding levels mean that only 20–22% of eligible Americans actually receive federal funding assistance.[47] And the problem appears to be worsening, with many states reporting increasing numbers of residents losing electricity due to non-payment of utility bills.[48]

Given the persistent challenges of providing affordable electricity to Americans, there is good reason to insist that clean energy not exacerbate energy poverty. That's not to say it will. Many predict that we can dramatically clean up the U.S. grid *without* having much of an upward impact on energy prices—and that the concomitant gains in health might more than account for any additional costs associated with clean energy.[49] If that's the case, so much the better—but we should at least be carefully tracking the distributional impli-

44. EISEN ET AL., *supra* note 22, at 77–79 (describing the basic elements of public utility regulation); *id.* at 455–60 (describing rate regulation by PUCs); *see also* William C. Boyd & Ann Carlson, *Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law*, 63 UCLA L. REV. 810 (2016). *See generally* William C. Boyd, *Public Utility and the Low Carbon Future*, 61 UCLA L. REV. 1614 (2014) (discussing the historical origins of public utility law and its applicability to electric grid decarbonization). In the nineteen states that have partially or fully implemented "retail competition," some aspects are "fully regulated by the states, and others are governed by new, market-oriented regimes." EISEN ET AL., *supra* note 22, at 699–708 (describing states' retail competition efforts).

45. *See* Shelley Welton, *Grid Modernization and Energy Poverty*, 18 N.C. J.L. & TECH. 565 (2017); Dan Boyce & Jordan Wirfs-Brock, *High Utility Costs Force Hard Decisions for the Poor*, INSIDE ENERGY (May 8, 2016), https://perma.cc/9W44-CH3U; *see also* Adam Chandler, *Where the Poor Spend More Than 10 Percent of Their Income on Energy*, ATLANTIC (June 8, 2016), https://perma.cc/NXG9-GK5Z; Michael Isaac Stein, *The Uneven Gains of Energy Efficiency*, WIRED (Feb. 13, 2018), https://perma.cc/NM7C-QNFG (describing how a factor in energy poverty is that "low-end housing is significantly less energy-efficient than other housing stock").

46. Chandler, *supra* note 45.

47. *See* Boyce & Wirfs-Brock, *supra* note 45 (citing research by the Congressional Research Service on the Low Income Home Energy Assistance Program); KETURAH A. BROWN, JOINT CTR. FOR POLITICAL & ECON. STUDIES, ENSURING ENERGY FOR LOW-INCOME HOUSEHOLDS OF COLOR 2 (2017), https://perma.cc/B2AX-7US8 ("LIHEAP funding is inadequate. Only 20 percent of the households eligible for LIHEAP actually receive energy assistance.").

48. *See* Jim Polson, *More Americans Are Getting Their Electricity Cut Off*, BLOOMBERG BUS. (Oct. 13, 2017), https://perma.cc/R4LW-7TRG. According to one consumer group, "10 percent to 15 percent of people who are disconnected never get reconnected." *Id.*

49. The Deep Decarbonization Pathways Project conservatively estimates that the costs of 80% decarbonization of the grid range from negative $90 billion to $730 billion in 2050, compris-

cations of the clean energy transition to understand whether these universal gains are materializing. Rosy predictions alone cannot pay the electricity bills of those forced to choose between "heating and eating."[50]

Of course, we recognize that some readers may not be persuaded by moral arguments alone—or may think that parsing "energy poverty" from the general challenges of poverty is not a useful intervention. But one need not accept an internal moral imperative to address energy poverty to find the issue salient, because the relevant regulators *already care*. That is to say, there is a ***formal, legal argument*** for paying attention to clean energy justice that arises from the structure of energy law, which is comprised predominantly of Progressive-Era statutory frameworks that have endured into modern times. We contend that these Progressive roots result in a set of laws that is considerably more attuned to justice considerations than environmental law. These laws, in turn, make energy regulators responsive to arguments framed in terms of justice or fairness.

The United States' overarching framework for regulating electricity exists in the public utility laws referenced above.[51] States enacted these framework statutes in the early 1900s and 1910s, during the height of the Progressive Era.[52] The structure and language of these laws thus reflect the substantial preoccupation that Progressive Era intellectuals had with considerations of justice and economic power.[53] Public utility statutes speak of "universal service," "just and reasonable" prices, and "nondiscrimination" in energy access at both the state and federal levels.[54] Even after decades of movement in energy law away

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ing somewhere around 0.8% of GDP. WILLIAMS ET AL., *supra* note 37, at xiii. That calculation does not include health benefits from reducing reliance on fossil fuels. *Id.*

50. *See* Sovacool, *supra* note 19, at 362 (quoting Jonathan Bradshaw & Sandra Hutton, *Social Policy Options and Fuel Poverty*, 3 J. ECON. PSYCHOL. 249, 249 (1983)); *see also* Sovacool & Dworkin, *supra* note 16, at 231–32 (reporting income concentration related to energy consumption for various countries including the United States).

51. *See* EISEN ET AL., *supra* note 22 and accompanying text.

52. New York and Wisconsin passed the first state public utility statutes in 1907. Boyd, *supra* note 44, at 1640. Public utility laws remain the central framework for utility rate regulation today. EISEN ET AL., *supra* note 22, at 456.

53. *See* William C. Boyd, Essay, *Just Price, Public Utility, and the Long History of Economic Regulation in America*, 35 YALE J. ON REG. 721, 729–49 (2018) (discussing the origins of "just and reasonable" pricing and grounding them in considerations of justice dating back centuries); Boyd, *supra* note 44. Railroads' economic power motivated rate regulation, which served as a model for public utility laws. Boyd, *supra* note 44, at 1639–40; Joel B. Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, 49 U.C. DAVIS L. REV. 1783, 1797–806 (2016) [hereinafter Eisen, *FERC's Expansive Authority to Transform the Electric Grid*].

54. *See* EISEN ET AL., *supra* note 22, at 78–79 (discussing key aspects of public utility regulation); Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, *supra* note 53, at 1812 (discussing the historical origins of "undue discrimination"); Douglas N. Jones & Patrick C. Mann, *The Fairness Criterion in Public Utility Regulation: Does Fairness Still Matter?*, 35 J. ECON. ISSUES 153, 158–59 (2001) (listing these and additional concepts within public utility regulation that have to do with "fairness").

from direct price regulation and toward more market-based mechanisms for controlling prices,[55] "fairness" remains a central concern of energy regulators.[56] For this reason, arguments that raise fairness concerns gain traction in front of these regulators—a point we return to below.[57]

Because of these origins, energy law may prove a substantially more useful tool than environmental law for addressing distributional concerns. Indeed, the histories of environmental and energy law diverge here in important ways. In his 2017 article *The Long Environmental Justice Movement*, Jedediah Purdy contextualizes an observation long apparent to environmental justice scholars and advocates: U.S. environmental law, at least as institutionalized in the 1970s and early 1980s, is strikingly unconcerned with matters of equality, or the distribution of benefits and harms.[58] Purdy suggests the predominant reason for environmental law's justice lacuna is the *timing* of modern U.S. environmental law's birth. As Purdy argues, the United States adopted its major environmental statutes during a time when "economic inequality was a problem [that appeared to be] substantially solved," which "supported a certain complacency about the distributional consequences of environmental law."[59] This embedded complacency has led to heartaches and dead ends in trying to use these laws to prevent unequal burdens of environmental pollution. Environmental law's shortcomings feel all the more acute now that we understand mid-century trends towards greater equality as anomalous rather than preordained.[60] In contrast, energy law's long-standing commitments to fair distribution and equal access create space in which to construct legal arguments in favor of some elements of energy justice—a point we develop in Part VI.

There is yet a third reason to be concerned about clean energy justice, even if one is unmoved by either moral pleas or formalist fairness commitments: **instrumentalism.** At the moment, large utilities and their allies dominate clean energy proceedings, with predictable results: Utilities use equity arguments—

55. *See generally* Emily Hammond & David B. Spence, *The Regulatory Contract in the Marketplace*, 69 VAND. L. REV. 141 (2016).

56. Jones & Mann, *supra* note 54, at 167 (finding that even as utility regulators have increasingly employed markets to manage prices, 58% of utility regulators continue to prioritize fairness over efficiency in regulatory decisionmaking); *see also* Darryl Biggar, *Fairness in Public-utility Regulation: A Theory*, 17 AGENDA: J. POL'Y ANALYSIS & REFORM 5, 5 (2010) ("Regulators routinely and systematically depart from policy prescriptions that are soundly based in conventional economic theory. In doing so, they often appeal to notions of fairness, justice, or reasonableness."). For several recent examples of PUC Commissioners raising fairness concerns in clean energy proceedings, see *infra* Part II.

57. *See* Alexandra B. Klass, *Regulating the Energy "Free Riders*," 100 B.U. L. REV. (forthcoming 2019); *see also* Troy Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115, 125 (2015) (observing how utilities exploit fairness arguments in rooftop solar compensation debates).

58. Purdy, *supra* note 10, at 813–14.

59. *Id.* at 815–16.

60. *Id. See generally* THOMAS PIKETTY, CAPITAL IN THE TWENTY-FIRST CENTURY (2013) (discussing the profound wealth inequalities currently prevailing).

about who pays for clean energy and who benefits from it—as a lever *against* pursuing ambitious clean energy goals. They contend that policies like retail-rate-level compensation for rooftop solar energy, or ratepayer funding for smart grid investments, cross-subsidize richer ratepayers (who are best able to take advantage of new technologies) at the expense of lower-income ones.[61] Consumer advocates—the presumed "voice of the people" in utility proceedings—often echo these concerns, focusing on keeping present-day rates as low as possible.[62] These arguments typically ignore the many ways in which clean energy benefits all consumers, making the equity tradeoffs of clean energy more complex than utilities would have regulators believe.[63]

This oversight creates room to forge alliances capable of defeating self-serving or shortsighted utility arguments grounded in justice or fairness. A clean energy justice agenda gives clean energy advocates the ability to find common cause with advocates focused on issues of poverty, economic power, and social and racial justice. These are, of course, many of the same alliances that environmentalists of the 1970s and 1980s failed to foster, precipitating the environmental justice movement.[64] Clean energy advocates can avoid the same decades-long mistake by partnering with groups focused on economic and racial justice to forge a common agenda to push back against utility antipathy to clean energy.[65] To create and maintain these partnerships, however, will require clean energy advocates to ensure that clean energy policies *do not in fact* threaten justice in the ways that utilities claim. In other words, these advocates will have to embrace the goal of clean energy justice.

The three arguments this section has sketched so far—moral, formal, and instrumental—provide reasons that those who care about clean energy should pay close attention to its justice implications. The final two arguments invert this relationship, examining why those focused on economic and social justice might find particular reasons to care about clean energy policy.

The first argument relates to the nature of the transition: Clean energy's rise presents a ***moment of striking technological change***, centering on a series of technological advances potentially as significant as the computer revolution.[66] This rapidly shifting technological landscape includes new and different kinds of large-scale power facilities, small-scale distributed generation, vehicles,

61. *See infra* Part III.A.

62. *See infra* notes 228–230 and accompanying text.

63. *See* Shelley Welton, *Clean Electrification*, 88 U. COLO. L. REV. 571, 576 (2017) [hereinafter Welton, *Clean Electrification*] (explaining the tensions between addressing climate change and ensuring present-day affordability that energy regulators face).

64. Purdy argues that environmental justice has a longer arc, and that early twentieth century activists saw these issues as more unified. Nevertheless, the later twentieth century "Environmental Agenda" "represented the consolidation of the environmental movement into a particular [white, upper-middle class] version of itself . . . ." Purdy, *supra* note 10, at 850.

65. *See infra* Part IV.

66. *See* Joel B. Eisen, *Smart Regulation and Federalism for the Smart Grid*, 37 HARV. ENVTL. L. REV. 1, 2–3 (2013) [hereinafter Eisen, *Smart Regulation and Federalism for the Smart Grid*].

thermostats, communication devices, and energy storage. Incumbent utilities and new energy technology entrants are already battling over who should control the markets and services emerging in the changing energy sector.

The range, scale, and uncertainty of outcomes associated with technological changes sets clean energy justice concerns apart from environmental justice ones, because clean energy creates entire new industries that could be used as vehicles to alleviate inequality. But the "incumbents/new entrants" framing has meant that most conversations about managing the distributive consequences of new technologies proceed from this divide—with little attention to characteristics that might distinguish one new entrant from another in ways that are meaningful for justice considerations. Two of the many examples are standard setting for electric grid interoperability, which proceeded in a byzantine process without a mechanism for attention to justice concerns,[67] and the governance structures of regional transmission organizations ("RTOs") that operate the grid and conduct markets (to which we devote more attention below).[68]

To couple technological advances and clean energy justice will require care, as technology revolutions often do not produce greater equality. Quite the contrary, such advances often consolidate power, wealth, and influence: consider, for example, Amazon's and Google's growth and dominance.[69] But in the utility sphere, where century-old monopolies hold substantial sway, technological changes could shift the balance of power in productive ways. Conversations about transformative energy technologies can broaden to include larger questions about how opportunities to own and operate these new technologies should be distributed—and even to inform the broader scholarly conversation about how the law can and should grapple with rapid technological change.[70]

These points about the distribution of the benefits of technological innovation relate to a broader concern about ***growing inequality*** in the United States. We are in a moment of profound and growing concentration of wealth in the hands of very few persons, with limited benefits accruing to the vast majority of people who find themselves in the middle or lower class.[71] At the same time, democracy seems to have entered a period of distrust, if not de-

67. *See generally id.* (discussing this process).

68. *See infra* Part IV.

69. *See* Marc Perrone, *'Walmart on Steroids': Beware of Amazon's Growing Monopoly*, HILL (Aug. 21, 2017), https://perma.cc/W73E-J7MF; Jonathan Taplin, *Is It Time to Break Up Google?*, N.Y. TIMES (Apr. 22, 2017), https://perma.cc/8XLL-QYQ4; Danny Vinik, *Inside the New Battle against Google*, POLITICO (Sept. 17, 2017), https://perma.cc/AU7B-PP7J.

70. *See, e.g.*, CONSTITUTION 3.0: FREEDOM AND TECHNOLOGICAL CHANGE (Jeffrey Rosen and Benjamin Wittes eds., 2013) (collecting different visions of how to preserve constitutional values in times of rapid technological change).

71. *See generally* PIKETTY, *supra* note 60; Matthew Stewart, *The 9.9 Percent Is the New American Aristocracy*, ATLANTIC (June 2018), https://perma.cc/3JX4-PRLT (discussing the concentration of wealth and privilege in the "new aristocracy" and barriers to upward mobility into the wealthier classes); GANESH SITARAMAN, THE CRISIS OF THE MIDDLE-CLASS CONSTITUTION: WHY ECONOMIC INEQUALITY THREATENS OUR REPUBLIC (2017).

cline.[72] These trends in combination have prompted many scholars to call for renewed attention to pragmatic ideas for tackling economic inequality in the United States, which could operate beyond the ballot box or legislatures.[73]

The clean energy transition might be one place to look for solutions in this regard, given the scale of the changes in infrastructure and technology that it portends.[74] As we discuss more fully below, community ownership arrangements and the ability to "exit" utility service may provide forms of community economic empowerment that give localities and households newfound leverage against powerful corporate interests.[75] But such arrangements will only come to exist where sufficient pressure is put upon legislators and regulators to open up the century-old paradigm of monopoly utilities.

Altogether, there are myriad reasons that those pushing for a rapid transition to clean energy, as well as those focused on growing inequality, should pay careful attention to clean energy's justice implications. Having made this case, we now delve into what these justice implications may be.

III. Who Pays? Funding the Clean Energy Transition

We begin our analysis of clean energy justice with attention to *who pays* for the transition. This question sets clean energy justice apart from environmental justice, which largely does not involve the distributional consequences of economic expenditures.[76] Although many unknowns remain regarding the path to full decarbonization, transforming our electric grid from reliance on fossil

72. Particularly since the 2016 presidential election, there has been considerable commentary about the decline of democratic institutions in the United States and beyond. *See, e.g.*, Max Fisher & Amanda Taub, *Is There Something Wrong with Democracy?*, N.Y. Times (Jan. 24, 2018), https://perma.cc/H6N9-HBW7. *See generally* Steven Livitsky & Daniel Ziblatt, How Democracies Die (2018). *The Economist*'s Democracy Index 2016 found that the United States has become a "flawed democracy," attributing the decline to a "continued erosion of trust in government and elected officials," and not specifically to the election of President Donald Trump. *Declining Trust in Government Is Denting Democracy*, Economist (Jan. 25, 2017), https://perma.cc/3NUE-AHR5.

73. *See, e.g.*, Timothy Noah, The Great Divergence: America's Growing Inequality Crisis and What We Can Do about It 181 (2013) (proposing such measures as substituting carbon taxes and value-added taxes for payroll taxes that he believes are regressive); Sitaraman, *supra* note 71, at 298–99 (proposing such measures as campaign finance laws, implementation of compulsory voting, and restrictions on lobbying activities).

74. Of course, clean energy will not provide a comprehensive solution to inequality, and there are many debates to be had about the roles of important social determinants of success such as family inheritance, social connections, and structural discrimination. *See, e.g.*, Stewart, *supra* note 71.

75. *See infra* notes 165–168 and accompanying text (discussing community solar), and notes 315–317 and accompanying text (discussing leverage provided by "community choice aggregation" models).

76. *See* Lazarus, *supra* note 10, at 790 (explaining that the environmental justice movement does not focus on the "regressive distribution of the economic costs associated with pollution

fuels to clean energy will require billions or even trillions of dollars in new investments.[77]

We would need something akin to the New Deal or moon-landing program to completely replace fossil fuels with clean energy—which, even given the increasing attention to the idea of a "Green New Deal," is not on the current federal agenda. To be sure, federal tax credits have spurred rapid growth in utility-scale investments in solar and wind power,[78] and federal regulators have taken some steps to make markets fairer to clean energy resources.[79] Nevertheless, state policies drive most clean energy expenditures.

States' clean energy programs are curious creatures because they do not rely predominantly on state revenue for funding. Instead, most are funded through payments by consumers to their utilities—that is to say, all of us pay for them in our capacity as "ratepayers." Thus, to understand *who pays*, one must understand how electricity rate structures channel clean energy funding into monthly electricity bills. We consider two ways in which clean energy investments affect individual consumers' bills: (1) net metering programs, a popular form of state incentive for rooftop solar; and (2) added charges for capital expenditures or programs proposed by utilities and approved by state legislatures and PUCs for "grid modernization," and accompanying movement towards novel pricing structures for electricity.

We focus on these initiatives because they directly shift costs *among* various groups of energy consumers—and thus most obviously raise distributional

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control," but rather on "the prevalence of hazardous pollutants in the communities where they live and work").

77. *See* WILLIAMS ET AL., *supra* note 37, at xii (estimating that the median expected incremental energy system costs associated with decarbonization—that is, the costs above and beyond business as usual energy infrastructure development—are around $300 billion in 2050); *see also* Rachel Cleetus, Alison Bailie & Steve Clemmer, *The U.S. Power Sector in a Net Zero World: Analyzing Pathways for Deep Carbon Reductions* 9 (Union of Concerned Scientists, Working Paper, 2016), https://perma.cc/2WHL-LPXT (finding that the investments needed to decarbonize the electricity sector "will need to reach nearly $250 billion *per year*" over the next 35 years, excluding research, development, and demonstration costs (emphasis added)).

78. Felix Mormann, *Beyond Tax Credits: Smarter Tax Policy for a Cleaner, More Democratic Energy Future*, 31 YALE J. ON REG. 303, 308 (2014).

79. Reforms to promote clean energy include the recent order on storage technologies, the path-breaking order on demand response compensation, and the order on frequency regulation in ancillary markets. *See* Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 83 Fed. Reg. 9580 (Mar. 6, 2018) (codified at 18 C.F.R. pt. 35); Frequency Regulation Compensation in the Organized Wholesale Power Markets, 76 Fed. Reg. 67,260 (Oct. 20, 2011) (codified at 18 C.F.R. pt. 35); Demand Response Compensation in Organized Wholesale Energy Markets, 76 Fed. Reg. 16,657 (Mar. 24, 2011) (codified at 18 C.F.R. pt. 35). *But see* Danny Cullenward & Shelley Welton, *The Quiet Undoing: How Regional Electricity Market Reforms Threaten State Clean Energy Goals*, 36 YALE J. ON REG. BULL. 106, 121–28 (2018) (describing how FERC and certain RTOs are reforming capacity markets in ways that threaten clean energy progress).

concerns. Of course, all clean energy policies—including tax credits, renewable portfolio standards, and cap-and-trade programs—have distributional consequences, some of which are potentially regressive.[80] Nevertheless, policies that work through the state taxing power, or through generalized fees that apply to all grid-connected consumers, have more attenuated distributive consequences than the ones examined here.

An important theme unites the justice concerns related to net metering and grid modernization. Both policies serve the larger goal of a more distributed, flexible grid, where consumers participate in how electricity is made, moved, and managed.[81] But as electricity consumers become electricity producers, through adopting rooftop solar, electricity storage, or other emerging technologies, funding a massive clean energy buildout through electricity bills—at least as they are currently structured—may come to feel less fair. As technologies like rooftop solar reach significant levels of penetration, care will need to be taken to ensure that the costs of the grid are not unfairly shunted onto nonparticipants, who are more likely to be low-income and persons of color.[82] Otherwise, justice concerns may either stall the clean energy transition, or force a more fundamental rethinking of the predominant model of ratepayer-funded clean energy infrastructure.

A. Net Metering and the "Cross-Subsidization" Question

Individual consumers have tremendous power to help drive the clean energy transition by installing their own on-site energy systems—which are referred to as "distributed generation." This decentralized, bottom-up activity is often lauded as a primary benefit of clean energy, in contrast to our current reliance on centralized power plants. States promote distributed generation with incentives or tax breaks to bring down the cost of solar panels, and renewable portfolio standards that include a requirement that utilities obtain a specific percentage of their supply from distributed energy resources.[83]

None of these policies, however, have been as influential in driving the proliferation of rooftop solar as net metering, which thirty-eight states currently allow.[84] Net metering allows rooftop solar owners to export energy to the elec-

80. *See, e.g.*, Laurent Belsie, *How Regressive is a Price on Carbon?*, NAT'L BUREAU ECON. RES. (Jan. 2010), https://perma.cc/9YKN-NQR5 (arguing that both cap-and-trade programs and carbon taxes are regressive).

81. *See generally* Welton, *Clean Electrification*, *supra* note 63.

82. *See infra* note 157 and accompanying text (documenting net metering participation by income).

83. *See* Joel B. Eisen, *Residential Renewable Energy: By Whom?*, 31 UTAH ENVTL. L. REV. 339, 345 (2011); Welton, *Social Project*, *supra* note 6, at 1082; DSIRE DATABASE, *supra* note 4 and accompanying text (listing the various programs for each state).

84. *See* LORI BIRD ET AL., NAT'L RENEWABLE ENERGY LAB., REGULATORY CONSIDERATIONS ASSOCIATED WITH THE EXPANDED ADOPTION OF DISTRIBUTED SOLAR 33 (2013)

tricity grid and contemporaneously "run their electricity meter backwards" whenever their solar panels make more electricity than their house needs, effectively valuing excess solar-generated electricity at the customer retail rate. This straightforward compensation mechanism appeals to homeowners who can easily understand the benefits that a net-metered rooftop solar system provides; net metering has prompted a solar rush in many states.[85]

As successful and important as net metering has been in driving a dramatic growth in solar installations nationwide, it has also created equity concerns. There are few programs tailored to lower-income consumers, or for that matter, anyone without a suitable roof on a house that they own or those who rent housing.[86] Not surprisingly, then, solar adopters tend to be higher-income homeowners.[87]

This division between solar haves and have-nots has sparked dozens of debates across the nation about whether compensating solar generators at the full retail rate works to the disadvantage of those utility customers who lack their own solar systems. In many states, the debate has taken place in the context of a utility's request to a PUC that the amounts paid to net metering customers be lowered, in some cases dramatically. Utilities have seized upon the "cross-subsidization" argument in these proceedings to justify slowing or halting incentives for clean energy—which would particularly benefit their bottom line.[88] On the flip side, many studies suggest that net metering's retail-level compensation for customer-generated power actually *undercompensates* solar

(noting that at the end of 2012, 99% of installed solar PV was on net metering tariffs); DSIRE Database, *supra* note 4.

85. This rush has since slowed, although rooftop solar continues to grow. *See* Ivan Penn, *Rooftop Solar Installations Rising but Pace of Growth Falls*, L.A. Times (Mar. 15, 2017), https://perma.cc/FQB6-3KQH ("U.S. rooftop solar installations increased 19% in 2016 compared with an average growth of 63% year-over-year from 2012 to 2015.").

86. Ctr. for Soc. Inclusion, GRID Alternatives & Vote Solar, Low-Income Solar Policy Guide 9 (2016) https://perma.cc/3JTQ-VWTY (reviewing barriers to participating in solar programs for residents in multi-unit buildings or homes with shared roofs).

87. Ben Sigrin, Jacquelyn Pless & Easan Drury, *Diffusion into New Markets: Evolving Customer Segments in the Solar Photovoltaics Market*, 10 Envtl. Res. Letters, Aug. 2015, at 1 (finding that solar adopters overall are higher-income and better educated in a study of over 2,000 households in San Diego, California).

88. *See* Mark Muro & Devashree Saha, *Rooftop Solar: Net Metering Is a Net Benefit*, Brookings (May 23, 2016), https://perma.cc/XH6X-R4DJ (discussing numerous studies conducted by state PUCs and nonprofit groups). Some PUCs, such as those in Nevada and Louisiana, have concluded that net metering shifts costs to customers who do not use it. *See* Shalanda Baker, *Unlocking the Energy Commons: Expanding Community Energy Generation*, *in* Law and Policy for a New Economy 5 (Melissa K. Scanlan ed., 2017). Utilities consistently argue that increased penetrations of distributed solar could lead to lower revenues. *See, e.g.*, Peter Kind, Energy Infrastructure Advocates, Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business 13 (2013).

panel owners for the benefits of integrating decentralized clean energy into the grid, as distributed solar improves reliability and lowers transmission and distribution costs.[89]

There is some merit to the argument that extending the net metering incentive to first movers leaves others to foot the bill for the fixed costs of the utility's operations, since many costs are recovered through the volumetric rates that net metering lowers.[90] What remains in dispute is whether net metering also lowers these fixed costs enough to make it a good deal for non-participants. And the answer to this question depends on a state's particular context, including the rate of solar penetration, the structure of utility bills, and the nature of local grid dispatch, such that it varies state to state and shifts over time.[91]

Still, at the present moment, the empirics of net metering suggest that the equity arguments against it are often a smokescreen for more generalized utility resistance to a new technology they do not control.[92] Nevertheless, the *potential* for class-based cost shifting is worthy of attention. Until recently, the mechanisms in most state programs for dealing with this potential cross-subsidization were rudimentary, such as overall program caps that limited the total capacity of eligible systems. But these caps were designed more to constrain the overall impact on the utility than to limit impacts on lower-income ratepayers. Often, states found themselves expanding the caps when the programs proved popular and when solar panel and installation costs fell, without revisiting the underlying issues or making any assessment of the expanded programs' impacts on non-subsidized ratepayers.

More recently, recognizing that net metering is a blunt tool for accurately compensating rooftop solar, several states have embarked on "value-of-solar" proceedings to quantify the value of distributed solar to the grid.[93] A value-of-

89. Muro and Saha conclude that there is "substantial evidence that net metering is more often than not a net benefit to the grid and all ratepayers." Muro & Saha, *supra* note 88.

90. *See id.* ("If rates go too far in the direction of 'volumetric energy charges'—charging customers based on energy use—utilities could have trouble recovering costs when distributed energy sources reach higher levels of penetration.").

91. *See generally* Galen Barbose, Lawrence Berkeley Nat'l Lab., LBNL-1007060, Putting the Potential Rate Impacts of Distributed Solar into Context (2017); Paul Denholm et al., Nat'l Renewable Energy Lab., NREL/TP-6A20-62447, Methods for Analyzing the Benefits and Costs of Distributed Photovoltaic Generation to the U.S. Electric Utility System (2014) (discussing the many factors involved in this calculation); *see also* Muro & Saha, *supra* note 88 (supporting the same).

92. Muro & Saha, *supra* note 88.

93. The first state to do so was Minnesota. John Farrell, Inst. for Local Self-Reliance, Can a Northern State's New Solar Policy Defuse Distributed Generation Battles? Minnesota's Value of Solar, at i (2014). The state's methodology is explained at Div. of Energy Res., Minn. Dep't of Commerce, Minnesota Value of Solar: Methodology (2014), https://perma.cc/F6D7-P8KX.

solar tariff calculates solar's true benefits and costs, factoring in environmental, employment, and grid impacts based on the costs utilities avoid by having solar on the system in light of projected future demand.[94] By compensating rooftop solar providers at this precise rate, value-of-solar tariffs eliminate arguments that rooftop solar policies are punitive to those who cannot install their own panels. That said, they do not directly address justice concerns regarding unequal participation in rooftop solar by class or race. We take up this question of unequal rooftop solar adoption in the next part, after exploring how challenges regarding "who pays" have also plagued efforts at grid modernization.

B. Grid Modernization

"Grid modernization" has become a significant trend in the utility industry in the last decade. It, too, raises substantial questions about who is paying, and for what benefits. Grid modernization is a popular term for legislative and regulatory actions to transform the aging electric grid into the grid of the future. Across the nation, PUCs are grappling with whether to authorize their utilities to undertake the billions of dollars of expenditures necessary to "modernize" the grid.[95]

Grid modernization means different things in different states. State legislatures and PUCs are considering a host of advanced technologies that promote clean energy (such as smart meters and associated infrastructure, energy storage, microgrids and demand response) and other projects designed to make the grid more resilient, responsive and interactive (such as investments in new transmission lines and digital components on the grid).[96] Questions abound in these proceedings about the benefits these investments will bring, and whether they are cost-justified. Here, we focus on a subset of these questions: whether it is fair to make all ratepayers split the cost of grid modernization investments.

Venerable principles of state utility rate regulation, which aim to curb monopoly abuses and ensure just and reasonable rates, govern this decision. In most states, this leads PUCs to calculate the rates that utilities can charge their customers by first deciding on the utilities' "revenue requirements," that is, the amount they must take in to continue operating. These revenue requirements

94. Barbose, *supra* note 91, at 9. At times, this methodology results in a *higher* rate for distributed solar: for example, Minnesota's proceeding "affirmed that distributed solar generation is worth more than its retail price and concluded that net metering undervalues rooftop solar," and Maine reached a similar result. *See* Muro & Saha, *supra* note 88.

95. *See, e.g.*, Herman K. Trabish, *Grid Mod Policy Actions Jump 75%, With Storage Playing A Central Role*, UtilityDive (June 5, 2018), https://perma.cc/J3ZU-75U4 (reporting rapid growth in grid modernization proposals between 2017 and 2018, concentrated in thirty-seven states).

96. *See generally* N.C. Clean Energy Tech. Ctr., 50 States of Grid Modernization: Q2 2017 Quarterly Report (2017), https://perma.cc/DNL2-AEDT (noting that over half of the states are engaged in grid modernization proceedings).

are then translated into the fixed and per-kilowatt hour fees for energy that we all receive on our monthly bills.

The nature of grid modernization proceedings has led many to object to such investments on grounds related to justice. Most often, these concerns focus on the large amount of up-front spending—and therefore, rate increases—that such proposals require, in exchange for long-term and potentially uncertain benefits.[97] For example, installing a smart meter in every house may be a wise long-term investment if a PUC ultimately transitions all consumers to time-of-use rates,[98] and if rooftop solar, electric vehicles, and home energy storage proliferate. Otherwise, a state might regret mandating their rollout. Moreover, many question the fairness of using ratepayer funding to initiate a series of grid transformations that may well inure to the benefit of the wealthy while harming lower-income consumers. Critics worry that pricing changes that reward consumers for shifting their time of consumption might harm low-income and elderly consumers, since these groups might be least able to afford the technologies necessary to monitor and shift demand.[99]

These objections have received only limited consideration by PUC commissioners. To be sure, commissions are finely attuned to the question of whether grid modernization efforts are "worth it"—because a calculation of the future benefits of smart grid investments helps to determine whether the costs meet the legal standard of "just and reasonable" and can be passed on to consumers. But PUCs less frequently take notice of how grid modernization expenditures might impact different classes of consumers, particularly as technological investments impel novel pricing structures.

However, some commissions have begun to confront these distributive justice questions within grid modernization. For example, the Maryland Public Service Commission initially rejected a utility's "Smart Grid Initiative" in part because "some of the Company's most vulnerable residential customers . . . are less likely to realize the potential benefits of [time-of-use] pricing than would

97. *See, e.g.*, Dave Ress, *Va. Legislation Calls for Bigger Dominion Energy Refund, but Does it Lock in Higher Rates?*, Daily Press (Feb. 6, 2018) (quoting various objections to potential higher rates from Dominion's grid modernization effort). Based on the limited evidence from grid modernization laws that have gone into effect, the concern about potential rate increases is warranted. Ann McCabe, Orjit Ghosal & Bill Peters, *A Formula for Grid Modernization?*, Pub. Util. Fortnightly (May 2016), https://perma.cc/Z2UD-24YP (noting that Illinois' grid modernization law has resulted in rate increases that have outpaced inflation).

98. *See* Welton, *Grid Modernization and Energy Poverty*, *supra* note 45, at 575–76; Eisen, *Smart Regulation and Federalism for the Smart Grid*, *supra* note 66, at 18–20.

99. AARP et al., The Need for Essential Consumer Protections: Smart Metering Proposals and the Move to Time-Based Pricing 9 (2010), https://perma.cc/8P7L-M6L5. These concerns become more important as dynamic pricing becomes more prevalent. N.C. Clean Energy Tech. Ctr., *supra* note 96, at 35–39 tbl.4 (describing numerous states' dynamic pricing initiatives).

the 'average' residential customer."[100] More recently, as part of its major docket in "Reforming the Energy Vision," New York's Public Service Commission created an entire sub-docket devoted to impacts on low-income consumers.[101] These developments provide hints of how the legal requirement of "just rates" might provide opportunities for PUCs to scrutinize grid modernization expenditures and new rate designs more closely. And they suggest that the question of *who pays* is likely to increase in importance as PUCs undertake the ambitious reform agendas necessary to build a grid capable of managing emerging technologies and regulatory imperatives.[102]

IV. Who Benefits? Spreading the Gains of the Clean Energy Economy

In the previous section, we explored the ways in which certain clean energy policies might impose unfair costs on less affluent consumers (although as we explained, the evidence to date is mixed). In this section, we turn to the flip side of clean energy's distributive consequences, examining whether all Americans share equally in the benefits of investments in clean energy. Environmental groups, energy firms, and state policymakers celebrate clean energy policies for their ability to create new economic sectors; hundreds of thousands of stable, domestic jobs; empowered consumers; and healthier communities.[103] Such

100. *In re* Baltimore Gas & Elec., 101 Md. P.S.C. 149 (June 21, 2010) (denying utility's request for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for the Recovery of Cost). Maryland later approved the program with some modifications. *See* Md. Pub. Serv. Comm'n, Annual Report for 2017, at 21, https://perma.cc/9VLF-RXLV.

101. *See Proceeding on Motion of the Commission to Examine Programs to Address Energy Affordability for Low Income Utility Customers*, Case No. 14-M-0565, N.Y. St. Dep't Pub. Serv., https://perma.cc/SFR8-YX2G.

102. The same dynamic is at work in questions of how to fund electric vehicle infrastructure. Several states are contemplating allowing their utilities to build, own, and operate electric vehicle charging stations, passing the costs on to ratepayers. *See* Alexandra B. Klass, *Public Utilities and Transportation Electrification*, 104 Iowa L. Rev. 545, 549–50 (2019). Some have raised justice-based challenges to this ratepayer funding, arguing that wealthy customers who can afford to buy pricier electric vehicles will disproportionately benefit from such schemes. *See* David Ferris, *Utility Regulators: No Easy Road to Supporting EVs*, EnergyWire (June 21, 2018), https://perma.cc/FB9T-2B24. California has responded by requiring that a certain percentage of charging stations be built within low-income communities. *See Transportation Electrification Activities Pursuant to SB 350*, Cal. Pub. Utils. Comm'n, *Summary Table*, https://perma.cc/3SSY-6EML (documenting utility commitments to include a certain percentage of charging stations in low-income communities).

103. For some of the many examples of this, see Martin Heinrich, U.S. Cong., Joint Econ. Comm., Clean Energy: It's Where the Jobs Are (2017); Jay Inslee, Policy Brief, Securing Washington's Clean Energy Future (2018); *Benefits of Renewable Energy Use*, Union of Concerned Scientists, https://perma.cc/US46-LKUN (last revised Dec. 20, 2017); Elizabeth Noll & Derek Murrow, *State of Clean Energy Is Strong*, NRDC Expert Blog (Jan. 31, 2018), https://perma.cc/F96Q-KRHU.

promises are being realized: Advances in clean energy technologies and data management have spurred the growth of firms specializing in new technologies like demand response, data optimization, and analytics for electricity usage.[104] And the rapid year-over-year growth in industries such as wind and solar energy, that until very recently were just getting off the ground, is impressive.

This new economy offers benefits at various levels. Individuals can reduce their carbon footprints while saving money on their utility bills and improving the reliability of their electricity service. Those who obtain clean energy jobs have the economic security that accompanies stable employment. For communities, the production, operation and maintenance of distributed energy facilities or community energy projects creates direct jobs and other economic benefits.[105] When clean energy facilities are built on underutilized properties—"brownfields"—and become "brightfields," property values increase.[106] All of these benefits might be especially welcome in localities fearing the devastating economic effects of fossil fuel plant shutdowns.[107]

These potential economic benefits form a unique aspect of a clean energy justice agenda. Although environmental justice advocacy has led to measurable economic benefits (such as those resulting from lessened health risks), it never grappled as distinctly with the distribution of the benefits of entire new economic sectors. How these economic gains are distributed is likely to be a critical component of the perceived fairness of the clean energy transition.

The analytics, however, are challenging. Clean energy's tangible benefits can be divided into two basic categories: direct (immediate impacts such as

104. *See* Eisen, *Demand Response's Three Generations*, *supra* note 5, at 419–21; GTM Editors, *Grid Edge 20: The Top Companies Disrupting the US Electric Market*, Grid Edge (Apr. 23, 2015), https://perma.cc/HE8P-AAVD (listing data analytics firms and others with new business models).

105. *See, e.g.*, EPA, Assessing the Multiple Benefits of Clean Energy: A Resource for States 5–11 (2011), https://perma.cc/GF9N-Q6QA; Nat'l Renewable Energy Lab., Community Shared Solar Policy and Regulatory Considerations 1 (2014), https://perma.cc/8CVY-6GKQ ("Shared solar projects allow customers that do not have sufficient solar resource, that rent their homes, or that are otherwise unable or unwilling to install solar on their residences, to buy or lease a portion of a shared solar system.").

106. *See* Silvio Marcacci, *Solar Brightfields: Gigawatts Of Clean Energy Potential On America's Landfills And Brownfields*, Forbes (Aug. 10, 2017), https://perma.cc/F5GK-DACN; Joel B. Eisen, *Finality in Brownfields Remediation and Reuse*, 41 Sw. L. Rev. 773, 778, 785–86 (2012).

107. *See* Diane Cardwell, *What's Up in Coal Country: Alternative-Energy Jobs*, N.Y. Times (Sept. 30, 2017), https://perma.cc/A9B8-9NDH (discussing communities in Wyoming and West Virginia); Katharine McCormick, Nat. Res. Def. Council, Bridging the Clean Energy Divide: Affordable Clean Energy Solutions for Today and Tomorrow 16 (2015), https://perma.cc/MRQ4-DDDB ("[W]ind farms have revitalized rural areas that have seen stagnant or declining populations and income since 1970."); Erin Ailworth, *Wind Power Wins Converts In Rural U.S.*, Wall Street J., (Sept. 6, 2017), https://perma.cc/492L-UF8Z (discussing the impact of a wind farm on the economy of Benton County, Indiana).

lower electricity bills or the reduction in a vehicle's price due to a tax incentive) and indirect (induced impacts such as increased income and purchasing power).[108] The causal connection of many clean energy policies to both direct and indirect benefits is a matter that requires considerable speculation. For example, if a state establishes an incentive for purchase of electric vehicles, who benefits and how? Obviously the direct purchaser receives the primary economic benefit, but the residents of the neighborhoods that drivers frequent enjoy better air quality; the state moves incrementally closer to establishing an economically viable electric vehicle infrastructure; and the world benefits even more incrementally from fewer tons of greenhouse gas emissions. Similarly, if a wholesale market operator establishes a structure that facilitates distributed energy resource aggregation and bidding into wholesale energy and capacity markets, who benefits? The answers likely include solar panel owners, small businesses, retail electricity suppliers, and end-use consumers, all to varying degrees depending on how the policy is structured. For these reasons, analysis of these policies' distributional consequences is often guesswork. Even for those benefits that are quantifiable, there has been little systematic analysis, and even less attention to distributional consequences.

Nevertheless, there are several important conversations—and some attempts at policy innovations—already underway regarding the distribution of clean energy's benefits. In this Part, we highlight several of the most prominent. We begin with a discussion of "green jobs," given the central role they have played in clean energy advocacy. We then turn to emerging discussions of how to broaden participation in clean energy incentive programs, looking at the evidence regarding net metering, clean energy tax credits, and electric vehicle rebates.

A. The Distribution of "Green Jobs"

To economists, jobs are a cost, not a benefit: They view it as advantageous to reduce labor costs per unit of output, not increase them by adding more jobs.[109] But to a community, jobs are an enormous benefit of welcoming a new industry. For this reason, we treat domestic job creation as a positive component of the clean energy transition. By one account, solar PV installers are the fastest growing job category in the nation.[110] Given the projections of future solar and wind deployment outlined in Part I, renewable energy job growth is likely to persist, although it is impossible to know with precision what job sectors or positions will dominate in the future. Nevertheless, current figures provide at least a snapshot of the distribution of clean energy jobs. Developing this

108. EPA, *supra* note 105, at 134–38.

109. *See, e.g.*, Tim Worstall, *Jobs Are a Cost Not a Benefit*, FORBES (Nov. 23, 2011), https://perma.cc/J4U5-M2C8.

110. Jordan Yadoo, *These Are the Fastest Growing Jobs in the U.S.*, BLOOMBERG BUS. (Oct. 24, 2017), https://perma.cc/3UYQ-NPZ9.

snapshot is critical, as any troubling distributional patterns might more successfully be addressed in the near term, before industry trends become cemented and more difficult to reverse.

1. Threshold Data Issues

Until recently, virtually no data had been collected on the socioeconomic distribution of clean energy jobs. Indeed, there has not even been a reliable single measure of green energy jobs,[111] unlike the situation for fossil fuel industries.[112] Data was collected by individual industry trade associations (which reported employment only in their industries) and public interest groups. Any reported figures had to be taken with a grain of salt, as each dataset was compiled uniquely.[113]

Today, the data is somewhat improved, but there are still critical gaps. Most notably, there remains no consistently accepted description of a "clean energy job."[114] We take as our definition all positions associated with the production of low- or zero-carbon energy or with energy conservation (including energy efficiency, demand response, and similar sectors).[115] One useful baseline is the employment data in the U.S. Bureau of Labor Statistics ("BLS") Quarterly Census of Employment and Wages ("QCEW"), which many current measures of green jobs draw from.[116] We also rely on the 2017 Department of Energy "U.S. Energy and Employment Report" ("USEER"),[117] which aimed to

111. A 2015 assessment bemoans the piecemeal nature of the data, which relied predominantly on inadequate industry group statistics. *See* Silvio Marcacci, *1.2 Million US Green Jobs Reported in Q1. Here's Why That's a Problem*, CLEANTECHNICA (June 5, 2015), https://perma.cc/4TSA-4BWT.

112. BLS tracks jobs in oil, natural gas, and coal, which makes it much easier for proponents of fossil fuels to credibly cite potential job losses from clean energy policies. *Id.*; *see also About the U.S. Bureau of Labor Statistics*, U.S. DEP'T OF LABOR, https://perma.cc/H5TW-XWVA.

113. Daniel Lopez, *Fact Sheet—Jobs in Renewable Energy and Energy Efficiency*, ENVTL. & ENERGY STUDY INST. (Feb. 2017), https://perma.cc/9474-WCUC (noting discrepancies).

114. The U.S. Energy and Employment Report, discussed above, does not define "clean energy job." U.S. DEP'T OF ENERGY, U.S. ENERGY AND EMPLOYMENT REPORT 12 (2017), https://perma.cc/C99L-F4YJ.

115. The BLS' "Green Jobs Initiative" tracked green jobs data between 2010 and 2013 and used a similar definition. *Measuring Green Jobs*, U.S. DEP'T OF LABOR, https://perma.cc/D6GW-EXNA ("Green jobs are either: A. Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources. B. Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.").

116. *Quarterly Census of Employment and Wages*, U.S. DEP'T OF LABOR, https://perma.cc/JL6T-RG5J (measuring green jobs through an "output approach" focused on firms producing green goods, and a "process approach" focused on firms that use environmentally friendly production processes and practices).

117. U.S. DEP'T OF ENERGY, *supra* note 114. In 2018, the Department of Energy chose not to publish this report, leaving it to a private sector organization to pick up the slack. Robert

close "major gaps in existing energy employment data."[118] Still, USEER coverage likely undercounts green energy jobs, as it omits indirect or induced jobs such as positions at a steel company created when the company received an order to make wind turbines.[119]

We also must acknowledge the vigorous debate underway about the permanence and pervasiveness of employment impacts in clean energy. For every story about a locality in recovery due to wind and solar farm development or celebration of opportunities to assist displaced miners in Appalachia,[120] there is a critique that wind and solar do not generate enough long-term jobs to offset fossil-fuel job losses.[121] There are other uncertainties about the reported data. Clean energy jobs are tracked and collapsed into several ill-fitting traditional job categories, making it difficult to separate out, for example, solar installers from electrical contractors more generally.[122] Finally, many clean energy jobs are in small firms that do not report job data, which skews the picture still further.

Still, these data with their attendant uncertainties present the fullest picture possible of clean energy employment trends. And while there are numerous line drawing problems, some have recently been addressed,[123] which increases confidence in the available data.

2. Clean Energy Employment Demographics

Available data show that the participation rate of women and people of color in clean energy jobs lags well behind that of the workforce in general and representation in the general population. Indeed, the renewable energy industry is less diverse even than the electric utility industry as a whole, which itself is

Walton, *The Energy Sector Is Driving Job Growth, But Not Where You Think*, UTILITY DIVE (June 7, 2018), https://perma.cc/868L-W5JP.

118. U.S. DEP'T OF ENERGY, *supra* note 114, at 7.

119. Indirect employment includes jobs created via supply or contracting services. Induced jobs are a result of the economic impact of direct and indirect employees spending their earnings. U.S. DEP'T OF ENERGY, *supra* note 114, at 11 n.4. The USEER only includes direct manufacturing jobs associated with production of ENERGY STAR certified energy efficiency products, and therefore would not include the indirect employment generated at, e.g., the steel firm. *Id.* at 14–15.

120. Cardwell, *supra* note 107.

121. *See, e.g.*, ROBERT MICHAELS & ROBERT P. MURPHY, INST. FOR ECON. RES., GREEN JOBS: FACT OR FICTION? (Jan. 2009), https://perma.cc/ZD2B-PK6W.

122. U.S. DEP'T OF ENERGY, *supra* note 114, at 10.

123. As one example, an electrician may string wires on a clean energy project one day, and on a house the next. The USEER classifies this as a "green job" if a worker spends a majority of their time on green energy. U.S. DEP'T OF ENERGY, *supra* note 114, at 14 n.7.

not diverse.[124] Representation in positions requiring professional training, such as engineering, lags as well.[125]

The USEER found that 1.9 million workers were directly employed in the "Electric Power Generation and Fuels" sector in 2017.[126] This includes all electric generating technologies (fossil fuels, nuclear, or renewable energy technologies), and firms engaged in facility construction, turbine and other generation equipment manufacturing, and wholesale parts distribution.[127] Almost 800,000 of these jobs were in renewables, nuclear, and advanced or low emission natural gas positions, with wind and solar making up roughly half of that figure.[128] Most of the 13% year-over-year increase in jobs is attributable to clean energy growth, specifically construction employees installing and building new facilities.[129] Solar and wind employment increased by 25% and 32% in 2016, respectively.[130] Finally, in December 2016, there were 2.2 million energy efficiency-

124. The Solar Found., National Solar Jobs Census 2016, at 15 (2017) [hereinafter Solar Jobs Census 2016], https://perma.cc/4RT6-4Y9U ("The percent of women and minorities [in the solar industry] are within about 1 to 2% of that of the electric power generation industry."). Women make up only 22% of jobs in the electric utility industry, compared to 47% participation in the overall workforce. U.S. Dep't of Energy, Quadrennial Energy Review: Transforming the Nation's Electricity Sector: The Second Installment of the QER 5-9 (2017), https://perma.cc/4PC5-XPUG.

125. In drawing these conclusions, we rely upon the USEER, *see* U.S. Dep't of Energy, *supra* note 114, existing BLS QCEW jobs datasets, *see Quarterly Census*, *supra* note 116, and three individual sector reports: the Solar Foundation's National Solar Jobs Census; the American Wind Energy Association's Market Report; and the report by E4TheFuture titled "Energy Efficiency Jobs in America." *See* Solar Jobs Census 2016, *supra* note 124; Am. Wind Energy Ass'n, 2016 U.S. Wind Industry Market Reports (2016), https://perma.cc/K8SM-2YEF [hereinafter AWEA 2016 Report]; E4TheFuture, Envtl. Entrepreneurs & BW Res. Partnership, Energy Efficiency Jobs in America (2016), https://perma.cc/84ZY-AADH. In addition, the International Renewable Energy Agency reports on summary figures and draws useful comparisons with workforce participation by women and people of color in other countries. Int'l Renewable Energy Agency, Renewable Energy and Jobs Annual Review 2017 (2017), https://perma.cc/MM49-TFAZ.

126. U.S. Dep't of Energy, *supra* note 114, at 8.

127. *Id.* at 20. The report also evaluates jobs in "Transmission, Distribution and Storage" and "Energy Efficiency." The first of these is difficult to analyze, as it includes a large number of workers at traditional utilities who have nothing to do with clean energy, and 100,000 jobs in energy storage and smart grid. As the overall conclusions with respect to demographics are basically the same as in the generation sector, we have not analyzed this category separately.

128. Just under 380,000 individuals work, in whole or in part, for solar firms, with more than 260,000 of those employees spending the majority of their time on solar. U.S. wind farms employ over 100,000 workers. U.S. Dep't of Energy, *supra* note 114, at 8; *see also* AWEA 2016 Report, *supra* note 125, at 100; Envtl. Def. Fund, Now Hiring: The Growth of America's Clean Energy & Sustainability Jobs 4 (2017), https://perma.cc/H7UX-K7MK (stating that there are 769,000 jobs in the renewable energy sector).

129. U.S. Dep't of Energy, *supra* note 114, at 22.

130. *Id.* at 8.

related jobs in the United States,[131] with 880,000 of these in firms whose principal function is energy efficiency.[132]

The numbers presented above suggest a total of around 1.3 million wind, solar, and energy efficiency jobs in the United States at most recent count. This dwarfs the 160,000 coal jobs in the United States,[133] and it is likely that clean energy has added several hundred thousand more jobs since these data were collected. But the particular question of interest to us is *who* holds these jobs—and whether clean energy industries make efforts at workforce diversity that could spread clean energy's benefits more widely.

The available data help illuminate the demographics of clean energy employment writ large, but do not allow for the kind of granular analysis that would prove most helpful. Although the USEER classifies workers into subsectors,[134] it does not include demographic information about who is employed in each subsector.[135] Only the solar report collects subsector demographic data,[136] which it began to do in 2013.[137]

Even with these limited data, one can discern that the clean energy sector is considerably less diverse than the economy as a whole, across both gender and race. The USEER notes:

> Women are a smaller portion of the workforce in these sectors, ranging from 22 to 34 percent, compared to the overall economy, where women make up 47 percent of the workforce. The percentage of ethnic and racial minorities is slightly lower than the national average for Hispanic or Latino workers (14 percent versus 16 percent) and Black or African American workers (eight percent versus 12 percent).[138]

131. *Id.*

132. E4THEFUTURE ET AL., *supra* note 125, at 19.

133. Nadja Popovich, *Today's Energy Jobs Are in Solar, Not Coal*, N.Y. TIMES (Apr. 25, 2017), https://perma.cc/9K5M-R345.

134. "The largest proportion of workers in Electric Power Generation in the USEER are classified as installation or repair positions (27%), followed by administrative positions (24%), and management/professional positions (20%)." U.S. DEP'T OF ENERGY, *supra* note 114, at 32.

135. Similarly, the E4 report only lists overall demographic trends in the sector. *See* E4THEFUTURE ET AL., *supra* note 125 at 3–5.

136. The American Wind Energy Association does not collect or report this data. E-mail from Celeste Wanner, Res. Analyst, Am. Wind Energy Ass'n to Joel B. Eisen, Austin Owen Res. Fellow, Univ. Richmond Sch. of Law (June 19, 2017, 10:17 EST) (on file with author). Accordingly, the only data on the wind industry is contained in the USEER, which notes that the wind subsector "has a nearly identical demographic distribution as the solar sector." U.S. DEP'T OF ENERGY, *supra* note 114, at 39.

137. In 2012 and preceding years, the Solar Jobs Census lacked this breakdown. *Compare* THE SOLAR FOUND., NATIONAL SOLAR JOBS CENSUS 2012 (Nov. 2012), https://perma.cc/8FXE-VWVY (no breakdown in 2012 census), *with* SOLAR JOBS CENSUS 2016, *supra* note 124, at 16 (demographic data provided).

138. U.S. DEP'T OF ENERGY, *supra* note 114, at 9.

Until recently, the picture was even less favorable. The 2013 solar census—the first that collected demographic data—noted that women made up just 18.7% of the solar workforce.[139] Participation by people of color is still well below overall numbers for participation in the workforce.[140]

In two solar industry subsectors that require specialized skills—installation and project development[141]—women are more severely underrepresented, and the picture with respect to people of color is mixed at best. Women made up 25.2% of the solar installation subsector in 2016, compared to 46.8% of the overall workforce. African-Americans held 7.1% of installation jobs, compared to 11.7% of the overall workforce.[142] Only Latinos were equally represented in solar installation jobs and the general workforce.[143]

In project development, which includes utilities and companies that work on utility-scale solar projects, the picture is comparable. Project developers rely on employees with a wider range of higher paid administrative and professional skills, including civil engineers, land surveyors, and power plant operators. Nevertheless, participation in this subsector by women and people of color was no better than in the installation subsector.[144]

3. Suggestions for Research and Policy

Scholars and journalists are just beginning to take note of the inequitable distribution of clean energy jobs.[145] In their article titled "Toward A Gender Diverse Workforce in the Renewable Energy Transition," Professor Jennie Stephens and co-author Rebecca Pearl-Martinez confirm the analysis above that women are underrepresented in skilled positions in renewable energy firms.[146] But considerably more work remains to be done to understand these disparities and potential remedies for them.

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139. The Solar Found., National Solar Jobs Census 2013 (Jan. 2014) [hereinafter Solar Jobs Census 2013], https://perma.cc/P33E-R63E.

140. Latino/Hispanic solar workers increased from 15.6% of the solar workforce in 2013 to 17.2% in 2016. African-American workers increased from 5.9% to 6.6%. Solar Jobs Census 2016, *supra* note 124, at 14.

141. *See* Solar Jobs Census 2013, *supra* note 139 (dividing solar jobs into the categories of Installation, Sales and Distribution, Manufacturing, Project Development, and Other); *accord* James Hamilton, U.S. Bureau of Labor Statistics, Careers In Solar Power (2011), https://perma.cc/3SLY-PHKA.

142. Solar Jobs Census 2016, *supra* note 124, at 22 tbl.9.

143. *Id.*

144. *See id.*

145. *See, e.g.*, Rebecca Pearl-Martinez & Jennie C. Stephens, *Toward a Gender Diverse Workforce in the Renewable Energy Transition*, 12 Sustainability 8 (2016); Kate Rosow Chrisman, *Women Apply Here: The Solar Industry Is Trying To Fix Its Gender Issue*, CNBC (Dec. 4, 2014), https://perma.cc/RZJ7-WH6U.

146. Pearl-Martinez & Stephens, *supra* note 145, at 4.

Better data will be critical in these efforts. At the very least, the USEER or comparable private-sector analyses[147] should be expanded to provide more granular presentations of data from industry subsectors. Others have called for a more widespread effort "to capture and track the gender employment trends and statistics for women globally [in solar]."[148] Similar efforts should be expended in collecting more systematic, robust data for clean energy employment by race and class. More work should also be done to understand how the gender dynamics in clean energy employment relate to disparities in race and income.[149]

In addition, no employment report discusses *how* to address the disparities that research is uncovering, causing a dearth of informed strategies as to how to improve the participation of women and people of color in clean energy jobs. Even though individual industries are quick to tout their overall employment statistics, their analyses have been slow to discuss efforts to diversify their workforces. As an example, none of the four Solar Jobs Census proposals for solar job growth through 2017 addressed increasing participation by women and people of color in solar jobs, and the only mention of diversity in the workforce was in a recommendation about training veterans for solar jobs.[150] The first Solar Industry Diversity Study, which includes recommendations to address racial and gender diversity, was issued in 2017.[151] Outside pressure on these companies also remains scant: Only a handful of organizations target the challenges of increasing the participation of women and people of color in clean energy industries, principally through networking, outreach, and raising awareness of the underlying issues.[152]

The data we do have suggest that the overall trend of underrepresentation of women and people of color in clean energy is comparable to historical underrepresentation in the construction, engineering, and project development sectors of the economy. As such, addressing the inequities may require policy prescriptions that go beyond clean energy, such as programs and incentives increasing the participation of women and people of color in STEM professions.[153] To date, however, this broader discussion has not been meaningfully

147. *See supra* note 117 and accompanying text (noting that the 2018 report was done by a private sector group).

148. *About WISE*, Women In Solar Energy ("WISE"), https://perma.cc/G72G-MJ2W.

149. *See* Sonali Jain-Chandra, *Why Gender and Income Inequality Are Linked*, World Econ. F. (Oct. 27, 2015), https://perma.cc/X5EX-MNUX (finding "that gender inequality is strongly associated with income inequality across time and countries of all income groups").

150. Solar Jobs Census 2016, *supra* note 124, at 47–48.

151. The Solar Found., 2017 U.S. Solar Industry Diversity Study (2017), https://perma.cc/5JJ4-NL54.

152. Women of Renewable Industries and Sustainable Energy ("WRISE"), https://perma.cc/6T5C-22JG.

153. Pearl-Martinez & Stephens, *supra* note 145, at 4.

linked to clean energy employment, and the issues require considerably more attention. Particularly given the rhetoric regarding the community development potential of clean energy, the industry has a responsibility to do more to deliver on its promises.

B. Reaping the Benefits of New Technologies

In Part II of this article, we explored how to ensure that the costs of the grid do not fall disproportionately on those who do not adopt new technologies. But guarding against overpayment by non-participants does not fully address the challenges of the emerging haves-versus-have-nots divide in clean energy. Less affluent customers should also have access to the suite of technologies that affluent consumers use to lower their bills.[154] To put it more colloquially, there is a need to ensure that solar panels are not "the next granite countertop,"[155] available only to those who can afford them. The same can be said about access to a host of other benefits, most prominently clean energy tax credits and electric vehicle rebates. Evidence to date shows that the distribution of benefits from these clean energy policies diverges substantially by class.[156] And while states and localities are attempting to broaden participation, they have not always addressed this fundamental class divide.

Net Metering: The most comprehensive and up-to-date study of net metering participation in the United States finds that participation varies substantially by class. Across the thirteen states studied, the authors found that rooftop PV adopters have a median income that is fifty-four percent higher than the overall median household income.[157] That said, this gap appears to be closing as more owner-occupied homes install solar panels,[158] due in part to falling panel costs and the rise of third-party leasing arrangements, and in part to concerted state efforts to expand access.[159]

State programs to expand rooftop solar adoption take several shapes—from mandatory set-asides of a certain percentage of state funding for low-

154. *See* Welton, *Clean Electrification*, *supra* note 63, at 576 (making this case).

155. Justin Doom, *Solar Panel Is Next Granite Countertop for Homebuilders*, BLOOMBERG (Sept. 11, 2013), https://perma.cc/2HJ5-S6D8.

156. Data that disaggregate participation by race are considerably more sparse. That said, race and class are correlated in unfortunate ways in the United States. *See* JESSICA L. SEMEGA, KAYLA R. FONTENOT & MELISSA A. KOLLAR, U.S. CENSUS BUREAU, INCOME AND POVERTY IN THE UNITED STATES: 2016, at 5 fig.1 (2017), https://perma.cc/QZK5-AT6Q (showing a persistent trend in lower incomes for Black and Latino families than for White or Asian families in the United States).

157. *See* GALEN BARBOSE ET AL., LAWRENCE BERKELEY NAT'L LAB., U.S. DEP'T OF ENERGY SOLAR ENERGY TECHNOLOGIES OFFICE, INCOME TRENDS OF RESIDENTIAL PV ADOPTERS: AN ANALYSIS OF HOUSEHOLD-LEVEL INCOME ESTIMATES 12 (2018).

158. *Id.* at 15.

159. *Id.* at 18.

income households,[160] to experiments in allowing utility ownership of rooftop solar only in low- and middle-income homes,[161] to higher payments to low-income solar adopters.[162] It is too early to evaluate the efficacy of these programs, but their proliferation confirms a basic point at the heart of our article: States are beginning to recognize and act upon some of the clean energy justice concerns we identify here, in ways that suggest the tractability of these concerns within the frameworks of energy law.[163]

Nevertheless, programs that enable more low-income households to install solar panels still exclude the large percentage of the population who are not homeowners.[164] In light of this continued disparity, fifteen states have now adopted "virtual net metering" and "community solar" programs to broaden the ability of all residents to earn a "cut" of the solar revolution.[165] In these programs, utilities or other third-party providers develop larger solar arrays, and community members can purchase a "share" of the output of the project, which then gets credited against their bill in a fashion similar to net metering.[166] In theory, these programs might reduce class disparities in solar ownership because they eliminate the need for a suitable roof and as much upfront capital. But in practice, low-income consumers may not be able to take advantage of such programs, due to credit requirements and prohibitive subscription fees.[167] More

160. *See, e.g.*, *GoSolar California*, *Single Family Affordable Solar Housing (SASH)*, CAL. ENERGY COMM'N (2019), https://perma.cc/M753-23LQ.

161. *See* Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, 319 P.U.R.4th 45–46 (N.Y. Pub. Serv. Comm'n Feb. 26, 2015) (order).

162. For example, Mississippi offered an "additional 2 cents per kWh credit" for the first 1,000 low-income rooftop solar installers. MISS. ATTY. GEN., A CONSUMER'S GUIDE TO SOLAR POWER AND NET METERING IN MISSISSIPPI 3, https://perma.cc/97DN-GDPE. Massachusetts similarly plans to offer a new incentive program that rewards extra renewable energy credits to low-income, small solar projects. *See Massachusetts*, GRID ALTERNATIVES, VOTE SOLAR & CTR. FOR SOC. INCLUSION, LOW-INCOME SOLAR POLICY GUIDE, https://perma.cc/6A9U-NQZ9.

163. *See infra* Part VI.

164. Americans homeowners make up 64.2% of the population, *see* Press Release, U.S. Census Bureau, Quarterly Residential Vacancies and Homeownership, First Quarter 2019 tbl.1 (Apr. 25, 2019), https://perma.cc/Q5RH-7W93, but only 46.8% of "all minorities" own their home, *see* Carmel Ford, *Homeownership by Race and Ethnicity*, EYE ON HOUSING (Dec. 15, 2017), https://perma.cc/LGR8-DUWF. Households with greater than the U.S. median income have a home ownership rate of 78%, whereas households below the median income have an ownership rate of only 50.5%. U.S. Census Bureau, *supra*, at tbl.8.

165. Gabriel Chan et al., *Design Choices and Equity Implications of Community Shared Solar*, 30 ELECTRICITY J. 37, 37 (2017).

166. *See id.*

167. *See id.* at 39; *see also* Baker, *supra* note 88, at 12; Julian Spector, *How to Fix Solar Power's Inequality Problem*, CITYLAB (Mar. 11, 2016), https://perma.cc/STY8-BG9F ("[V]ery few community renewables programs actively include [low-income] residents.").

work needs to be done to track community solar participation by race and class, and to understand what barriers remain for wider participation.[168]

Clean Energy Tax Credits: A second way in which the ability to benefit from clean energy may be segregated by race and class comes from the widespread use of tax credits to promote clean energy's adoption. In a 2016 study, Severin Borenstein and Lucas Davis focused on the equity implications of federal clean energy tax credits. Of the $18 billion in federal clean energy tax credits disbursed since 2006, they found that "the bottom three income quintiles have received about 10% of all credits, while the top quintile has received about 60%."[169] Consequently, they conclude, tax credits—for all of their political appeal—are a poor choice of instrument if one is concerned about the equity implications of promoting clean energy.[170] Whether tax credits could be designed to be more equitable—or should instead be avoided—is a question worthy of considerably more discussion, now that these findings are in.[171]

Electric Vehicles: Nowhere is the tax credit disparity more glaring than when it comes to electric vehicles: Borenstein and Davis report that federal electric vehicle credit programs are the most inequitable of all, with the top 20% of earners receiving 90% of all related credits since 2006.[172] Consequently, there have been a few recent moves to target subsidy programs for electric vehicles specifically to lower-income consumers. For example, California's "Clean Vehicle Rebate Project" ties rebate amounts to the purchaser's income and precludes those with incomes over $150,000 from participation.[173] In a different vein, other California energy providers issue rebates for used as well as new electric vehicles, to make these vehicles more accessible to a broader range of residents.[174]

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168. Chan et al., *supra* note 165, at 40 (making a similar call for more research).

169. Severin Borenstein & Lucas W. Davis, *The Distributional Effects of US Clean Energy Tax Credits*, *in* TAX POLICY AND THE ECONOMY 191 (Jeffrey R. Brown ed., 2016).

170. *Id.* at 192.

171. *See* Lynsey Gaudioso, *A Billion Grains of Truth: Distributional Impacts of Household-Level Climate Change Tax Subsidies in the United States*, 18 VT. J. ENVTL. L. 667, 698–705 (2017) (suggesting ways these tax credit programs could be reformed rather than abandoned).

172. Borenstein & Davis, *supra* note 169, at 191; *see also* RYAN C. BOSWORTH & GRANT PATTY, THE CURRENT STATE OF ELECTRIC VEHICLE SUBSIDIES: ECONOMIC, ENVIRONMENTAL, AND DISTRIBUTIONAL IMPACTS 14 (2017) (arguing that these effects are compounded by the fact that "the environmental benefits of electric vehicles are also mostly captured by those with higher than average incomes").

173. *See Income Eligibility*, CAL. CLEAN VEHICLE REBATE PROJECT, https://perma.cc/Q78T-4X33.

174. *See* Brandon Brooks, *Charge Up Crenshaw: LADWP Launches New Rebate Program for Used Electric Vehicles*, L.A. SENTINEL (Apr. 19, 2018), https://perma.cc/S9RN-6JHK.

We close this section by noting the controversy that surrounds decisions to expand the benefits of clean energy incentive programs in the ways discussed here. Decisions to design around distributional impacts often involve challenging tradeoffs between program efficacy and program fairness—at least, if you assume that program funding is fixed.[175] If a program has $100,000 to spur uptake of electric vehicles, it could get 100 such vehicles on the road if it offered rebates of $1000 to all comers. If the program administrators instead award $2000 to lower-income purchasers, then they may get as few as 50 vehicles on the road with the same amount of funding—thus reducing the program's efficacy.[176] These criticisms are numerically accurate, but they miss a broader point: one can view the second hypothetical program above as less effective *only if* the only goal of the program is to deploy electric vehicles. If, instead, it is politically determined (for moral or instrumental reasons) that the program should also have an aim of equalizing the benefits of clean energy, then its effectiveness can only be judged by whether it accomplishes these dual aims.[177]

Still, a broader point obtains: it may be that there are *better* ways of broadening access to clean energy than through the types of consumer-centered policies detailed here. We return to this point in Part V, where we discuss lessons to be gleaned from assembling the clean energy justice agenda.

V. Procedural Justice

Thus far, this Article has focused on the distribution of the substantive benefits and burdens of clean energy. This Part focuses on the procedures through which these concerns can be raised, vetted, and addressed. Here again, clean energy justice has an antecedent in the environmental justice movement, whose participants describe a growing understanding of the importance of ensuring procedural justice as a precursor to advancing substantive concerns.[178] To

175. This assumption may well not be a fair one. Designing a more just program might create greater political buy-in, such that more funding could be secured.

176. *See* David M. Schizer, *Energy Subsidies: Worthy Goals, Competing Priorities, and Flawed Institutional Design*, 70 Tax L. Rev. 243, 293–94 (creating a similar example and arguing that "the social benefit is comparable, whether the subsidy is claimed by someone with a high or low income"). *But see* Gaudioso, *supra* note 171, at 678 (arguing that targeting lower-income consumers may be more cost-effective if higher-income consumers would choose to invest regardless of the subsidy).

177. For example, as one California report notes, programs focused on expanding access to clean energy can "result in substantially larger multipliers for economic development." Cal. Energy Comm'n, CEC-300-2016-009, Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities 1 (2016).

178. *See* Sheila Foster, *Race(ial) Matters: The Quest for Environmental Justice*, 20 Ecology L.Q. 721, 746–49 (1993); Kaswan, *supra* note 10, at 251.

create a more just energy transition, clean energy justice advocates will similarly have to attend to procedural conditions and constraints.

We use the phrase "procedural justice" in a classic sense: "the fairness of the process by which goods are allocated and decisions made," with a particular focus on "the opportunity for all interested parties to participate in the decision process."[179] Our procedural justice analysis therefore focuses on the institutions and decisionmaking processes that govern clean energy.[180]

In this Part, we present the key institutional structures and evidence to date regarding the state of procedural justice in the field. We find that there are acute challenges to participation in energy governance, for two reasons. First, the legal frameworks and proceedings in which clean energy justice concerns arise are particularly technical and adjudicative in nature. Second, energy proceedings are dominated by sophisticated regulated utilities or merchant energy companies with longstanding regulatory relationships and substantial financial interests that cut against clean energy justice concerns.

The data we present below suggest the persistence of century-old challenges in designing regulated industries laws in ways that do not converge into a "grand compromise" of regulators and regulated parties.[181] Clean energy proceedings contend with outsized influence of repeat player utilities, and the few community groups that invest the time to participate often find their input marginalized by the dominance of technical issues.

A. Energy Law Fora as Challenging Venues

Clean energy lawmaking and policymaking occur in a few predominant venues: state legislatures, the Federal Energy Regulatory Commission (FERC), the regional grid operators that FERC oversees, and state PUCs.[182]

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179. Susan Clayton, *Models of Justice in the Environmental Debate*, 56 J. Soc. Issues 459, 461 (2000); *see also* William A. Shutkin, *The Concept of Environmental Justice and a Reconception of Democracy*, 14 Va. Envtl. L.J. 579, 585 (1995); Kaswan, *supra* note 10, at 233.

180. We do not consider here the broader choice presented in climate change policy between markets and regulators as the key drivers of decarbonization decisionmaking. On this broader question, see, e.g., Ann E. Carlson, *Designing Effective Climate Policy: Cap-and-Trade and Complementary Policies*, 49 Harv. J. on Legis. 207, 210 (2012); Alice Kaswan, *Energy, Governance, and Market Mechanisms*, 72 U. Miami L. Rev. 476, 509 (2018); Welton, *Social Project, supra* note 6, at 1069.

181. *See* Richard Hirsh, Power Loss: The Origins of Deregulation and Restructuring in the American Electric Utility System 9 (1999) (describing the twentieth century "utility consensus" in which "utility managers controlled" the electricity system through public utility commissions); Horace M. Gray, *The Passing of the Public Utility Concept*, 16 J. Land & Pub. Util. Econ. 8, 16 (1940).

182. Many of EPA's actions also implicate clean energy, including most obviously the Obama Administration's now-defunct Clean Power Plan, which would have incentivized states to build out their clean energy infrastructure. But even under the Clean Power Plan, state-level institutions would have had primary responsibility for determining *how* to orchestrate such a

As state legislatures increase their activity relating to clean energy, some have considered the distributional implications of these new laws. Most notably, California's legislature has explicitly instructed the California Air Resource Board—the state's primary climate regulator—to take into account distributional impacts as it designs the state's decarbonization strategy, and in some cases has demanded that particular percentages of program resources go to disadvantaged communities.[183] But legislatures often do not prescribe clean energy laws at this level of detail.[184] Instead, distributional implications are often worked out through policies set at the sub-legislative level—most often, in state PUCs.[185] Nowadays, in addition to performing the rate setting duties described in Part II, PUCs have responsibility for implementing state clean energy goals—including renewable portfolio standards, net metering policies, "smart grid" investments, energy efficiency standards, and energy storage policies. These programs combine highly technical areas of grid management with significant political, value-laden choices about balancing the interests of consumers, investors, and the public.[186]

PUCs most frequently operate through adjudication rather than rulemaking—in other words, in piecemeal fashion.[187] "Rate cases" focus on setting the rates for each utility in the state based on the utility's investment landscape and

buildout. *See* Michael A. Livermore, *The Perils of Experimentation*, 126 YALE L.J. 636, 690–91 (2017).

183. *See* Alice Kaswan, *A Broader Vision for Climate Policy: Lessons from California*, 9 SAN DIEGO J. CLIMATE & ENERGY L. 83 (2018) (describing many California laws that require CARB to explicitly address distributional implications); *see also* Ill. Future Jobs Act, S.B. 2814 (effective June 1, 2017) (creating, *inter alia*, a "Solar for All" program aimed at bringing solar to low-income communities).

184. *See* Welton, *Grasping for Energy Democracy*, *supra* note 1, at 592; *see also* William T. Gormley, John Hondley & Charles Williams, *Potential Responsiveness in the Bureaucracy: Views of Public Utility Regulation*, 77 AM. POL. SCI. REV. 704, 705 (Sept. 1983) [hereinafter Gormley et al., *Potential Responsiveness*] ("Legislative mandates governing utility regulation are typically vague, ambiguous, and unconfining.").

185. *See* Welton, *Grasping for Energy Democracy*, *supra* note 1, at 592–93.

186. Stefan H. Krieger, *An Advocacy Model for Representation of Low-Income Intervenors in State Public Utility Proceedings*, 22 ARIZ. ST. L.J. 639, 648 (1990) [hereinafter Krieger, *Representation of Low-Income Intervenors*] (observing how the issues considered by commissions "by their very nature require balancing of different political, social, and economic interests").

187. *See* William J. Hausman & John L. Neufeld, *How Politics, Economics, and Institutions Shaped Electric Utility Regulation in the United States: 1879-2009*, 53 BUS. HIST. 723, 724–25 (describing commissions as "quasi-judicial agencies" that operate through fact-specific hearings); Stefan H. Krieger, *Problems for Captive Ratepayers in Nonunanimous Settlements of Public Utility Rate Cases*, 12 YALE J. ON REG. 257, 278–79 (1995) [hereinafter Krieger, *Problems for Captive Ratepayers*] (describing the trial-like nature of PUC proceedings); *see also* Adam R. Fremeth, Guy L.F. Holburn & Pablo T. Spiller, *The Impact of Consumer Advocates on Regulatory Policy in the Electric Utility Sector*, 161 PUB. CHOICE 157, 161 (2014) ("Regulatory policy in the utilities sector is determined primarily by periodic rate reviews conducted by PUCs.").

its customer base.[188] Some PUCs have moved in recent years toward greater use of more flexible and open procedures, including rulemaking proceedings, often to set the overall tone and structure for modernization of the grid.[189] Nevertheless, PUCs still tend to implement new policies on a utility-by-utility basis. So, for example, Minnesota's ambitions to change the way that utilities earn money—so as to incentivize more clean energy and energy efficiency—is beginning with a rate case devoted specifically to the state's largest utility.[190] Even New York—which began a major utility reform in 2016 with a commission-driven rulemaking—is now implementing its sweeping policy changes by having utilities file utility-specific "distributed system implementation plans."[191]

Participating in the clean energy transformation thus often requires detailed involvement in utility-specific adjudicatory processes. Nominally, most who wish to participate in these rate cases can.[192] But practically, this fragmented space for policymaking, with its dense, technical, and time- and resource-intensive processes, presents a challenge for broad participation.[193]

Indeed, these features of clean energy policymaking suggest that procedural justice within this field may face even more hurdles than procedural justice

188. *See* Fremeth et al., *supra* note 187; Hausman & Neufeld, *supra* note 187, at 723–24.

189. *See* Douglas N. Jones, *Agency Transformation and State Public Utility Commissions*, 14 UTIL. POL'Y 8, 11 (2006) [hereinafter Jones, *Agency Transformation*] (observing that PUCs have modified their "core missions" to "make greater use of collaborative processes, mediation skills, pre-litigation resolution, stipulations, [and] utility/regulator public roundtables (as against formal adjudicatory hearings)"); *see also* examples of rulemaking collected in *infra* Appendix.

190. *See, e.g.*, In The Matter Of A Commission Investigation To Identify And Develop Performance Metrics And, Potentially, Incentives For Xcel Energy's Electric Utility Operations, Docket No. 17-401 (Minn. Pub. Utils. Comm'n Sept. 22, 2017).

191. *See* Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision — Distributed System Implementation Plan for New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation, Case 14-M-010, (N.Y. Pub. Serv. Comm'n June 30, 2016).

192. Hausman & Neufeld, *supra* note 187, at 724–25. Commissions typically have latitude in determining who should be allowed to intervene in a utility rate case, and tend to allow all persons with an interest to participate. *See* Krieger, *Problems for Captive Ratepayers*, *supra* note 187, at 276; Robert B. Leflar & Martin H. Rogol, *Consumer Participation in the Regulation of Public Utilities: A Model Act*, 13 HARV. J. ON LEGIS. 235, 244–45 (1976) (noting that commissions have liberalized the rules regarding who can participate in proceedings). Intervenors "have a right to appear in person or through an attorney, to introduce evidence, and to cross examine witnesses." Krieger, *Problems for Captive Ratepayers*, *supra* note 187, at 276. Nevertheless, Holburn and Bergh found that without consumer advocates, "consumers faced hurdles in accessing ratemaking procedures." Guy L.F. Holburn & Richard G. Vanden Bergh, *Consumer Capture of Regulatory Institutions: The Creation of Public Utility Consumer Advocates in the United States*, 126 PUB. CHOICE 45, 47 (2006).

193. *See* Krieger, *Representation of Low-Income Intervenors*, *supra* note 186, at 650; Leflar & Rogol, *supra* note 192, at 236 ("Residential utility consumers often have found the obstacles to effective public participation in the regulatory process overwhelming.").

within environmental law. Both fields deal with challenging scientific issues, but environmental regulators use rulemaking more often than adjudication,[194] which allows for more streamlined participation. Much environmental lawmaking is also concentrated at the federal level,[195] whereas the state-centered nature of clean energy policies presents an additional challenge for clean energy justice advocates. For a group to have a regional or national impact, it has to participate in multiple proceedings across multiple states.

That said, federal- and regional-level proceedings also raise clean energy justice concerns. State proceedings govern "retail" electricity sales—that is, localized interactions between a utility and its customers.[196] States also oversee the siting of energy infrastructure within their borders.[197] In contrast, FERC is in charge of matters related to sales of power at "wholesale" between utilities, or between merchant generators and utilities.[198] Since moving from its historic role of adjudicating prices to its modern role of ensuring the smooth and fair functioning of markets,[199] FERC has entered into rulemakings that impact the clean energy transition far more frequently.[200] In the last several years, FERC has made rules on how to compensate demand response, energy storage, and energy efficiency in wholesale markets,[201] and on how to ensure that the buildout of transmission infrastructure matches state renewable energy goals.[202] These rules all implicate distributive justice, but less overtly than state proceedings, given the attenuated link between energy users and wholesale markets.[203] So although FERC rulemaking follows the familiar and more economical notice-and-comment process, it can be challenging even for sophisticated parties to understand the distributional implications of FERC's policies. For example, Sharon Jacobs

194. Jeffrey J. Rachlinski, *Rulemaking Versus Adjudication: A Psychological Perspective*, 32 FLA. ST. U. L. REV. 529, 530–31 (2005).

195. *See* Lazarus, *supra* note 10, at 820 (noting the national focus of environmental protection policy).

196. *See* 16 U.S.C. §§ 824(a)–(b)(1) (2012).

197. *See* Conn. Dep't of Pub. Util. Control v. FERC, 569 F.3d 477, 481 (D.C. Cir. 2009).

198. *See* 16 U.S.C. §§ 824(a)–(c).

199. *See* Hammond & Spence, *supra* note 55, at 143.

200. *See Major Orders & Regulations*, FERC, https://perma.cc/4AJ8-PZ6S.

201. *See supra* note 79.

202. *See* Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, Order 1000, 76 Fed. Reg. 49,841, 49,846 (Aug. 11, 2011) (to be codified at 18 C.F.R. pt. 35).

203. A new analysis based on an examination of actual dispatch in the markets over a 10-year period finds that markets produce savings over traditional regulation. *See generally* Steve Cicala, *Imperfect Markets Versus Imperfect Regulation in U.S. Electricity Generation* (Nat'l Bureau of Econ. Res., Working Paper No. 23,053, 2017), https://perma.cc/53K9-A487. But exactly how the end-use retail rates of various utilities are affected by policy changes in the markets remains opaque. For example, FERC's order requiring demand response to be fairly compensated in wholesale markets clearly caused rates to go down, *see* FERC v. Electric Power Supply Ass'n, 136 S. Ct. 760, 774 (2016), but by how much is not clear.

suggests that individual "prosumers"—that is, persons generating some of their own power, often through rooftop solar—are inadequately represented in the "regulatory dialogue" at FERC.[204] And if prosumers—the most sophisticated consumers—are underrepresented, it is even more likely that disadvantaged groups do not have a substantial voice.[205]

Finally, in areas of the country representing two-thirds of the population,[206] those who wish to ensure a fair transition to clean energy must engage with yet another type of entity: Regional Transmission Organizations ("RTOs").[207] These regional scale organizations—of which there are seven across the United States—jointly plan for and administer each region's electricity grid and electricity dispatch. RTOs have been called "Frankenstein-like"[208] because of their hybrid structure as private membership organizations under government control.[209] FERC oversees RTOs,[210] but their membership is comprised largely of utilities and other industry players.[211]

RTO governance occurs through board oversight, guided by complex internal stakeholder committees and membership-only voting rules.[212] These byzantine decisionmaking processes are similar to those of standards setting organizations, as an action taken by the RTO may be passed upon by several

204. Jacobs, *supra* note 11, at 550–51.

205. *See* Jason Pinney, *The Federal Energy Regulatory Commission and Environmental Justice: Do the National Environmental Policy Act and the Clean Air Act Offer a Better Way?*, 30 B.C. Envtl. Aff. L. Rev. 353, 353 (2003) (arguing that FERC has inadequately incorporated environmental justice considerations into its decisionmaking processes).

206. *About the IRC*, ISO/RTO Council, https://perma.cc/P29T-LZ9R ("Nine ISOs/RTOs serve two-thirds of electricity consumers in the United States and more than 50 percent of Canada's population.").

207. In states without RTOs, utilities remain vertically integrated monopolies and are in charge of arranging any outside purchases on their own, without the aid of a coordinated regional market. *See* Boyd & Carlson, *supra* note 44, at 836.

208. John P. Hughes, President & CEO, Elec. Consumers Res. Council (ELCON), Statement at FERC Technical Conference: State Policies and Wholesale Markets Operated by ISO-New England, Inc., New York Independent System Operator, Inc. and PJM Interconnection L.L.C., at 325 (May 2, 2017), http://perma.cc/R7MN-B7EZ.

209. Christina Simeone, *PJM Governance: Can Reforms Improve Outcomes?*, Kleinman Ctr. For Energy Pol'y 22 (May 19, 2017), https://perma.cc/X56X-FXWU ("As organizations, RTO's are unique in structure, authority, and function.").

210. *See* 16 U.S.C. § 824d (2012) (setting forth a requirement that all rates for the sale of electric energy be "just and reasonable").

211. *See* Daniel Greenfield & John Kwoka, *The Cost Structure of Regional Transmission Organizations*, 32 Energy J. 159, 163 (2011); Michael H. Dworkin & Rachel Aslin Goldwasser, *Ensuring Consideration of the Public Interest in the Governance and Accountability of Regional Transmission Organizations*, 28 Energy L.J. 543, 548 (2007) (explaining that RTOs are "between government and business"); ISO/RTO Council, *About 60% of the U.S. Electric Power Supply is Managed by RTOs*, U.S. Energy Info. Admin. (Apr. 4, 2011), https://perma.cc/LYU7-JWEG (explaining the types of members that RTOs have).

212. *See* Welton, *Social Project*, *supra* note 6, at 1109–12.

task forces and committees before its ultimate approval.[213] Simply discerning the importance of a particular committee, or the ultimate path to approval of a particular policy proposal, would be a demanding task for would-be participants who are not already RTO members.[214] Moreover, the highly technocratic issues that RTOs decide in these settings—including, for example, rules regarding dispatch order, bidding, and resource compensation in markets[215]—tend to be hard to connect directly to justice issues, even though they necessarily have implications for how the benefits and burdens of clean energy are spread.[216] Thus, as one seasoned industry participant put it, to engage successfully "you have to be a combination of an economist and a math wizard."[217]

In sum, energy governance is fragmented across scales and across issues, with adjudication remaining the dominant form of decisionmaking. For all of these reasons, the myriad institutions responsible for clean energy decisionmaking are challenging spaces in which to summon the bandwidth necessary to ensure that justice considerations receive their due.

B. The Participants in Energy Proceedings

The second challenge to achieving procedural justice in the clean energy transition relates to the parties that participate in energy proceedings. Utilities, clean energy companies, large environmental groups, and consumer protection advocates take center stage, and have interests often at odds with those advocating for clean energy justice.

Utilities dominate energy proceedings with their expertise and resources, allowing them to wield outsized influence in many cases.[218] They have com-

213. *See* Seth Blumsack et al., *Can Capacity Markets Be Designed by Democracy?*, 50 PROC. HAW. INT'L CONF. SYSTEM SCI. 3075, 3076 (2017) (describing PJM's multi-layered committee structure).

214. *See* Benjamin A. Stafford & Elizabeth J. Wilson, *Winds of Change in Energy Systems: Policy Implementation, Technology Deployment, and Regional Transmission Organizations*, 21 ENERGY RES. & SOC. SCI. 222, 229–30 (2016) (describing the complex norms and tacit knowledge that permeate stakeholder processes at MISO, the Midwestern grid operator).

215. Hammond & Spence, *supra* note 55, at 153–57.

216. To take just one current example, FERC's recent order approving a new structure for New England's capacity market has caused many to object that markets will shortchange state clean energy goals through the use of a complex two-stage auction mechanism, which provides a "severance payment" to retiring fossil fuel generators at the expense of regional ratepayers. *See* Order on Tariff Filing, ISO-NE, 162 FERC ¶ 61,205, para. 7 (Mar. 9, 2018).

217. Stafford & Wilson, *supra* note 214, at 230 (quoting an interviewee in their project).

218. *Cf.* William T. Gormley, Jr., *Statewide Remedies for Public Underrepresentation in Regulatory Proceedings*, 41 PUB. ADMIN. REV. 454, 454 (1981) [hereinafter Gormley, *Statewide Remedies*]; Leflar, *supra* note 192, at 241 ("Utility commission staffs are traditionally undermanned and underfunded. Consequently, staffs frequently exhibit a tendency to subject the carefully prepared analyses of the data submitted by the utility company to less than critical scrutiny. . . .").

mand of the complex technical and economic aspects of the proceedings, and the ability to develop the necessary supporting evidence.[219] In state proceedings, consumers are by no means unrepresented, but many "consumer" participants represent large businesses and industrial consumers, whose interests frequently diverge from those of residential consumers in general and low-income consumers in particular.[220] Environmental groups—particularly "big green" groups—now also often participate in front of PUCs, RTOs, and FERC, given the importance of energy law to combatting climate change.[221] Sometimes—no doubt having learned from experiences in the environmental justice movement—these groups partner with smaller community environmental groups and raise concerns of distributive justice.[222]

But unlike environmental justice, there is an enormous for-profit angle to clean energy advocacy, as solar, wind, and energy storage companies all amplify support for clean energy.[223] These companies provide powerful corporate voices in favor of the rapid expansion of clean energy that can often have substantial impacts on state and federal policies.[224] But these companies are often not attuned to justice concerns related to clean energy, given that their aim is to maximize profits and create economic and job growth.[225]

That said, many PUCs do have an institutionalized role for consumer protection. Forty-three states have some form of "consumer advocate,"[226] tasked

219. *See* Leflar, *supra* note 192, at 241.

220. *See* Gormley, *Statewide Remedies*, *supra* note 218, at 454; *see also About IECA*, INDUSTRIAL ENERGY CONSUMERS OF AM., https://perma.cc/QZ99-SF5R (describing trade group specifically representing industrial customers).

221. *See, e.g.*, Order on Tariff Filing, *supra* note 216 (showing filings by joint clean energy advocates on reforms affecting New England's clean energy policy); Earthjustice, Comment on Transforming Maryland's Electric Distribution Systems, PC 44 (Md. Pub. Serv. Comm'n Oct. 28, 2016) (on file with author) (filing on behalf of a coalition of environmental groups).

222. *See* Earthjustice, *supra* note 221.

223. *See* Eric Biber, Nina Kelsey & Jonas Meckling, *The Political Economy of Decarbonization: A Research Agenda*, 82 BROOK. L. REV. 605, 625 (2017) (describing the political winners likely to support decarbonization policies).

224. For example, Tesla's and Sunrun's decision to pull out of Nevada after the state ended its support for rooftop solar reportedly played a significant role in the legislature's decision to reinstate the policy less than a year later. *See Nevada Reinstates Key Solar Policy*, REUTERS (June 15, 2017), https://perma.cc/ZH96-2C2P.

225. *See* Herman K. Trabish, *Sunrun CEO: Why Utilities Are Attacking Net Metering*, GREENTECHMEDIA (June 12, 2013), https://perma.cc/V59E-CPD4 ("Net metering is a key component of the value proposition through which [solar installers] benefit, a value proposition that has dramatically driven the growth of solar.").

226. *Who We Are*, NAT'L ASS'N OF STATE UTIL. CONSUMER ADVOCATES, https://perma.cc/GX2V-TQTA. These can be standalone offices (as in the case of Maryland's Office of Public Counsel), or branches of Attorneys General offices tasked with this responsibility. *See id.*; *see also* PUC Commissioners and Consumer Advocates and Meetings Attended Full List (spreadsheet on file with authors) (listing the consumer advocates in states, together with lists of meetings attended).

with ensuring that consumers' interests are considered during ratemaking proceedings.[227] Problematically, consumer advocates are often bound by statute, tradition, or both to push specifically for lowest rates,[228] and are unlikely to provide nuanced advocacy regarding the distributive challenges of clean energy.[229] Quite the contrary: to the extent a PUC is committed to renewable energy goals, consumer advocates are likely to push for achieving them in the most cost-effective way possible, with limited attention to the justice implications of the lowest-cost solutions.[230] And while consumer advocates typically focus on matters of concern to residential consumers, their charge is usually to lower rates for all consumers, not a particular subset.

In recent years, the PUCs' purviews have extended beyond rate cases involving traditional utility investments to broader proceedings focusing on new technologies and new business models (such as grid modernization proceedings discussed in Part II), and to stakeholder get-togethers designed to inform policy development. Particularly in these settings, it seems inappropriate to vest the sole participatory role for the "public" in consumer advocates, given the wide-ranging nature of the inquiries. For that matter, consumer advocates may not have any more specialized expertise necessary to evaluate transformative changes in the industry than other would-be advocates.

C. The Empirics of Clean Energy Participation

Thus far, we have described the challenges of participation mainly at the level of theory. In this subsection, we describe the results of empirical work that confirms the challenges of participation at state PUCs. We focus on PUCs as the most fruitful forum for raising clean energy justice concerns: Because of PUCs' focus on the relationship between ratepayers and their utilities, state utility regulators have more cause to consider the disparate impacts of clean energy policy on particular groups. Moreover, the issues considered by state PUCs tend to be at least somewhat more accessible than the complex market rules negotiated in RTOs and approved by FERC.

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227. *See* Holburn & Vanden Bergh, *supra* note 192, at 46; Krieger, *Representation of Low-Income Intervenors*, *supra* note 186, at 644 (detailing the history of consumer advocates).

228. *See* Gormley, *Statewide Remedies*, *supra* note 218, at 456 ("Grassroots advocates pursue a much more diverse range of values than proxy advocates. . . . [P]roxy advocates focus their attention unequivocally on utility company rate hike requests when they regard such requests as excessive (which is most of the time)."); Jacobs, *supra* note 11, at 554.

229. *Cf.* Leflar, *supra* note 192, at 235 (observing that consumer advocate representation of consumer interests faces many challenges, including the fact that these institutions are not "sufficiently accountable to the people on whose behalf they appear").

230. Jacobs, *supra* note 11, at 554–55 (explaining why consumer advocates often fail to represent the interests of customers self-generating electricity for similar reasons—because their primary goal is "keeping the quality of utility service high while keeping consumer prices low").

Given the challenges to full and fair participation at PUCs we have discussed so far, it is logical to ask what we know about participation in these forums. The short answer is not much—most studies on PUC participation are now decades old.[231] For this reason, we undertook several empirical analyses regarding participation at PUCs. These analyses focused on three aspects of PUC participation: the role of consumer advocates in policymaking; the participation of community groups in PUC rulemakings; and the backchannel methods that utilities use to curry favor with PUC commissioners. In this subsection, we describe the ways in which our empirical findings confirm the utility-dominated PUC landscape described above.

Our research suggests that most states continue to rely on consumer advocates as the primary representatives of electricity consumers. We analyzed participation in 20 meetings of the Critical Consumer Issues Forum ("CCIF"), a group formed in 2010 to discuss transformative matters such as integrating distributed energy resources into the electric grid.[232] None of its meetings have included "consumer" attendees other than state consumer advocates.[233] This is not surprising, given that its stated purpose is "to provide an opportunity for state commissioners, consumer advocates, and energy company representatives to collectively tackle tough consumer issues through unique, highly interactive discourse."[234] CCIF summits often take place concurrently with major meetings of electric utility regulators, most notably meetings of the National Association of Regulatory Utility Commissioners ("NARUC"), which ordinary citizens cannot attend (at least not without paying substantial fees). The group has produced reports on grid modernization policy, and while it explicitly disclaims a connection to individual PUC cases, some PUC proceedings cite its reports as a purportedly unbiased source of information.[235]

Another forum in which consumer advocates are increasingly taking part is proceedings at the RTOs. The PJM RTO, for example, has had a "Consumer Advocates of the PJM States" since 2013 comprised of the consumer advocates

231. *See infra* note 237 and accompanying text.

232. Katrina J. McMurrian, *Including the Consumer in the Grid*, HILL (June 9, 2014), https://perma.cc/2MZ2-FR9P.

233. Critical Customer Issues Forum Annual Meeting Attendees 2011–16 (spreadsheet on file with authors).

234. CRITICAL CONSUMER ISSUES FORUM, https://perma.cc/VC9F-YAPK.

235. *See, e.g.*, Tucson Elec. Pwr. Co. and UNS Electric, Inc. Comments to Staff Report and Proposed Order, Ariz. Corp. Comm'n, No. E-O1345A-13-0248, at 4–5 (Nov. 4, 2013) (citing and attaching the CCIF report on principles for setting rates related to distributed generation). The CCIF receives funding from the Edison Electric Institute, the major trade association for large investor-owned utilities. *See, e.g.*, Fla. Pub. Serv. Comm'n, Advisory Op., Critical Consumer Issues Forum Spring Summit, Apr. 6. 2015 (on file with authors) (noting that the EEI provided all of the funding for a CCIF meeting). As such, there may also be reason to believe that its reports are skewed toward positions favored by utilities.

from all states in the region.[236] As a regional group, it faces distinct challenges in representing the "public" of the region: If the state advocates disagree with one another about RTO policies or proposals, they may not be able to present a unified voice, further diluting their potential impact.

Beyond utilities and consumer advocates, we know little about participation rates or experiences in PUC proceedings. The last substantial studies on this topic occurred in the 1970s and 1980s.[237] Unsurprisingly, these studies confirm our conclusions that utilities and large industrial customers tended to dominate proceedings and obtain favorable results.[238] Consumer advocates and "grassroots" groups were perceived as "influential" in some states—but remained entirely inactive in others.[239]

To obtain a more contemporary understanding of citizen group participation at PUCs, we analyzed major proceedings in twelve states in fall 2017.[240] The results from this snapshot analysis should be taken as a best-case scenario, as we focused on significant public policy dockets most likely to attract citizen attention, not utility-specific rate case adjudications. All of the dockets we examined were rulemaking efforts to promote clean energy.

Our analysis showed that community groups[241] comprised 45 of 815 filing parties across these twelve proceedings—around 5.5%.[242] Is that a lot? It is hard to establish a baseline against which to compare. Studies of federal rulemakings have found participation rates in similar ranges, and have largely considered

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236. Consumer Advocates of the PJM States, https://perma.cc/J4RC-HCYW.

237. *See* Jones, *Agency Transformation*, *supra* note 189, at 9; Krieger, *Problems for Captive Ratepayers*, *supra* note 187, at 279–80. *See generally* William T. Gormley, *Public Advocacy in Public Utility Commission Proceedings*, 17 J. Applied Behav. Sci. 446 (1981) [hereinafter Gormley, *Public Advocacy*]; Gormley, *Statewide Remedies*, *supra* note 218; Gormley et al., *Potential Responsiveness*, *supra* note 184 (finding that citizen activists and PUC commissioners care about many of the same issues, but do not concur on the relevant "values"); Leflar & Rogol, *supra* note 192. Before this time, consumer participation in ratemakings was considerably rarer, as declining electricity rates through the 1960s created little appetite for reform.

238. *See* William T. Gormley, *Alternative Models of the Regulatory Process: Public Utility Regulation in the United States*, 25 W. Pol. Q. 297, 298 (1982).

239. Gormley finds that consumer advocates are typically perceived to be "either moderately influential or very influential." *Id.* at 306–11. A 2002 study found that the participation of a consumer advocate reduced the rate of return that utilities were allowed to earn "by approximately 0.19 to 0.37 percentage points." Holburn & Vanden Bergh, *supra* note 192, at 49; *see also* Fremeth et al., *supra* note 187, at 157.

240. *See infra* Appendix.

241. We included any state or local not-for-profit or loosely formed group of local residents within the category of "community group." We did not include comments filed exclusively by large environmental not-for-profits, except in those instances where they were joined by a community group fitting the above definition.

242. Community group participation rates ranged from 0% in Texas, to 10.9% in New York. *See* Appendix tbl.3.

such levels inadequate.[243] Whether we should be more or less demanding in terms of participation levels at the state level, as compared to the federal, is a normative question that empirics alone cannot answer. Many arguments in favor of state regulation seem to presume that it should engender greater citizen participation[244]—suggesting that our 5.5% figure should provoke skepticism as to whether states have achieved full and fair participation in PUC proceedings.

Perhaps more useful are our qualitative findings regarding the issues that community groups raise to their PUCs. Thirty-four of the forty-five participating community groups articulated concerns relating to distributive justice in their comments.[245] Twenty-six groups also raised concerns specifically about procedural justice—that is, how the proceedings themselves facilitated (or failed to facilitate) wide participation.[246] Many comments confirmed long-standing observations about the deeply technical nature of PUC proceedings, even on topics of interest to the wider community. For example, the group "Cooperative Energy Futures" had this to say about Minnesota's "Commission Inquiry into Grid Modernization":

> Proceedings tend to focus extensively on technical parameters, often with little consideration of what (and who) our energy system is for. To the extent that they do so, they eliminate most of the scope of issues that many grassroots groups representing energy users are interested and qualified to comment on and avoid the most fundamental questions around how our system should be regulated.[247]

Groups in other states expressed similar sentiments.[248]

The evidence is not all grim. One of us elsewhere has detailed how New York's commission, when prompted by ratepayers to consider how the issues of energy poverty and energy regulatory reform intersected, engendered substantial participation and attendant reforms.[249] There, through public hearing testimony

243. *See* Marissa Martino Golden, *Interest Groups in the Rule-Making Process: Who Participates? Whose Voices Get Heard?*, 8 J. Pub. Admin. Res. & Theory 245, 253, 256 (1998) (finding citizen participation in federal rulemaking between 0 and 11%, with particularly little representation of "the poor").

244. *See* Miriam Seifter, *Further from the People? The Puzzle of State Administration*, 93 N.Y.U. L. Rev. 107, 111 (2018).

245. *See infra* Appendix.

246. *See id.*

247. Coop. Energy Futures, Comments on 11/20/2015 Stakeholder Meeting on Grid Modernization Panel, at 4 (on file with authors).

248. *See* Comments of D.C. Climate Action, Re: Formal Case No. 1130, D.C. Pub. Serv. Comm'n 6 (Apr. 10, 2017); Comments of DC Solar United Neighborhoods, Re: Formal Case No. 1130, D.C. Pub. Serv. Comm'n (Mar. 6, 2017); Virginia Lyons et al., Recommendations to Promote Increased Ease of Citizen Participation in PSB Proceedings 30 (2016), https://perma.cc/V855-3GHA.

249. *See generally* Welton, *Grid Modernization and Energy Poverty*, *supra* note 45.

of 100 predominantly low-income residents—totaling 600 transcribed pages—the Commission was able to capture a considerably deeper understanding of New Yorkers' lived experiences of energy poverty.[250] The Commission explained that this understanding helped to fuel its decision to substantially expand New York's commitment to assisting low-income ratepayers, and to link more closely its proceedings related to clean energy and energy affordability.[251] We will return in the final section of the paper to consider what lessons experiences like New York's might offer to the broadening clean energy justice movement.

But New York may be an outlier—access to proceedings does not always translate into the ability to influence decisionmakers. Regulatory capture remains a perennial problem in energy regulation.[252] Utility commissioners continue to receive free travel and other financial benefits from the companies they regulate—with unknown and largely unknowable impacts on commissioners' decisions.[253] The full extent of this practice is difficult to discern, but a survey of outside groups' funding of commissioners' conference travel expenditures in more than twenty states offers one measure of the problem. Attention has been called to this sort of activity in the press, and for good reason: The coziness that comes from unfettered access to regulators in a resort or other comfortable setting, away from public scrutiny, almost inevitably will have policy ramifications.

To understand the extent to which such purchased access continues, we examined public records regarding two different types of conferences: those sponsored by individual utilities and by the CCIF. A number of these meetings are scheduled in conjunction with the regular national and regional meetings of utility commissioners, for which travel is normally reimbursed by the states. To that end, we compiled lists of attendees at all NARUC meetings from 2010 to 2016, the meetings of its regional affiliates, CCIF meetings, and other relevant conferences for which attendance lists were available.[254] We then made public records requests in more than twenty states for travel records from individual commissioners to determine when some or all travel was underwritten by a third party for attendance at a separate event.[255]

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250. *See id.* at 600–01.

251. *See id.* at 601.

252. On capture generally, see Richard A. Posner, *Theories of Economic Regulation*, 5 BELL J. ECON. & MGT. SCI. 335, 341–42 (1974); George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971).

253. Opinion, *Too Cozy with Regulators*, POST & COURIER (Jan. 3, 2018), https://perma.cc/32CT-X4MZ.

254. Full list of PUC Commissioners and Consumer Advocates and Meetings Attended (unpublished spreadsheet) (on file with authors).

255. On some occasions, the records indicate that commissioners attended standalone meetings wholly sponsored by utilities or the CCIF. We analyzed those as well.

While the analysis is currently ongoing, some preliminary conclusions may be drawn. Third parties have indeed provided travel reimbursement, hospitality and other benefits to commissioners to attend conferences and meetings. Individual commissioners occasionally obtain ethics memos from state attorneys general or comparable entities that describe the reimbursement by third parties as permissible, usually because the conferences did not involve specific matters currently pertaining before the commissions.[256] This strikes us as overly hair-splitting, as commission proceedings are almost entirely made up of repeat utility players. Hospitality provided today could make commissioners more trusting and accepting of utility positions raised in future proceedings. Moreover, most PUCs tend to have one or more members who attend policy conferences disproportionately more than their colleagues. And so, we can expect that the influence of compensating "frequent flyers" for attendance at conferences will be magnified by the fact that they can subsequently influence their colleagues.

Utility-funded travel and hospitality is just one way in which these entities dominate proceedings, but it provides a telling window into the ways in which utilities maintain their influence with the commissions charged with regulating them. And outsized utility influence should be particularly worrisome in the clean energy rulemaking proceedings we discuss here, given that utilities are wielding power over matters of considerably broader import to society than mere nickel-and-diming over per-kilowatt-hour rates.

D. Litigation as an Antidote?

We have not painted a rosy picture of the potential for robust procedural justice in clean energy proceedings. Although routes exist for intervention into the largely adjudicatory world of clean energy policymaking, they remain challenging for the reasons discussed above.[257] A lawyer's instinct under these conditions is often to turn to the courts to remedy deficiencies perceived in the administrative process. But as in the environmental justice context, litigation is an unlikely remedy here.

Many in the environmental law world have long seen litigation as an important antidote to the challenges of getting agencies to take environmental considerations seriously. Particularly during the 1970s, prominent environmental nonprofits famously shaped the character of newly passed iconic federal en-

256. *See, e.g.*, Fla. Pub. Serv. Comm'n, *supra* note 235 (concluding that Commissioner Lisa Polak Edgar's attendance at a CCIF meeting fully reimbursed by the EEI was in "full compliance with the gift, public comment, and ex parte provisions of Florida law").

257. *Cf.* Susan Webb Yackee, *Sweet-Talking the Fourth Branch: The Influence of Interest Group Comments on Federal Agency Rulemaking*, 16 J. PUB. ADMIN. RES. & THEORY 103, 104 (2006) (observing that "law provides the public the right to participate in—but not the right to influence—rulemaking").

vironmental statutes through the courts.[258] But litigation worked considerably less well for environmental justice concerns.[259] Courts quickly foreclosed the use of antidiscrimination laws to remedy disparate impacts, including the disparate siting of environmental hazards.[260] Environmental justice plaintiffs could instead attempt to stop particular projects by litigating analytical deficits under general environmental laws—particularly the National Environmental Policy Act.[261] But even when successful in stopping particular actions, such suits did little to advance the cause of environmental justice as a national concern, since the disparate impacts of these actions played no role in the outcome of the litigation.[262] For these reasons, environmental justice advocates came to understand that engaging deeply in political and bureaucratic processes was critical to secure substantive consideration of the disparate impacts of environmental harms.[263]

The same is almost certainly true when it comes to clean energy justice. As we have explained, energy decisionmaking operates largely under the mantras of "just and reasonable" and "not unduly discriminatory" rates.[264] As interpreted by courts since the 1940s, these broad standards give commissions wide latitude to strike the appropriate balance between utilities and consumers, and among different types of consumers.[265] The technical intricacy of commission proceedings makes courts extremely reluctant to second-guess commission decisions as to what constitutes a "just and reasonable" rate or practice.[266] Accordingly, it is

258. *See* Cole, *supra* note 26, at 635–36.

259. *See* Torres, *supra* note 10, at 436.

260. *See id.* at 439; Bean v. Sw. Waste Mgmt. Corp., 482 F. Supp. 673, 677 (S.D. Tex. 1979) (refusing preliminary injunction for discrimination in siting of waste facility based on Supreme Court precedent requiring a showing of discriminatory purpose, rather than just disparate impact); *see also* Vill. of Arlington Heights v. Metro. Hous. Dev. Corp., 429 U.S. 252, 264–65 (1977) ("[O]fficial action will not be held unconstitutional solely because it results in a racially disproportionate impact.").

261. *See* Kaswan, *supra* note 10, at 246, 250.

262. *See* Torres, *supra* note 10, at 450 ("[A] claim that relies upon a traditional environmental statute often does not necessarily affect the underlying decisionmaking process through which environmental benefits and burdens are distributed.").

263. *See id.* at 452 ("[B]ecause decisions which determine environmental law and policy are often made at the administrative level (as regulatory decisions), federal, state, and local administrative processes offer unique and invaluable opportunities for assessing and addressing distributional inequities.").

264. *See supra* Part II.

265. *See* Duquesne Light Co. v. Barasch, 488 U.S. 299 (1989); Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591 (1944).

266. *See* Jim Rossi & Christopher Serkin, *Energy Exactions*, 104 CORNELL L. REV. (forthcoming 2019) ("Since the New Deal, courts have consistently subjected utility rate setting decisions (including decisions regarding the allocation of costs among customers) to a fairly deferential standard of constitutional review."); *see also* Janice A. Beecher, *The Prudent Regulator: Politics, Independence, Ethics, and the Public Interest*, 29 ENERGY L.J. 586 (2008) (describing the

unlikely that litigants unsatisfied with a commission's treatment of distributive justice concerns would be able to convince a court that the commission had strayed beyond its mandate.[267] For this reason, clean energy justice concerns will have to be raised and vetted within existing bureaucratic channels—or structural reforms will have to move the locus of energy decisionmaking away from these longstanding regulatory bodies.[268]

VI. Siting Clean Energy

The final pillar of clean energy justice that we consider in this Article is clean energy siting. Even though wind and solar energy are often celebrated as "clean" energy sources because they are both carbon-free and eliminate other air pollutants,[269] they have their own environmental, health, and community consequences.[270] For this reason, siting the amount of renewable energy necessary to decarbonize the electricity sector also raises procedural and distributive justice concerns. That said, the siting concerns raised by clean energy do not differ substantially from traditional siting disputes and are well covered in the existing literature.[271] For these reasons, this Part is the shortest of our analysis.

In the subsections that follow, we briefly describe the legal framework governing clean energy siting before observing how clean energy siting differs

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"institutional autonomy" provided to commissions by "regulatory discretion within a 'zone of reasonableness'").

267. In the environmental justice context, Luke Cole has gone beyond this practical point to suggest that even those battles that *could* be won in court might do a disservice to the movement, by empowering lawyers at the expense of community voices. *See* Cole, *supra* note 26, at 650.

268. *See infra* Part VI (discussing alternative, more localized decisionmaking fora).

269. Outka, *Environmental Justice in the Renewable Energy Transition*, *supra* note 14, at 81 ("Apart from site objections, emissions-free electricity from wind and solar energy serves environmental justice goals at the policy level and, in most cases, at the community level as well, offering local environmental justice benefits, not environmental harm.").

270. Richard Cowell et al., *Acceptance, Acceptability and Environmental Justice: The Role of Community Benefits in Wind Energy Development*, 54 J. Envtl. Plan. & Mgmt. 539, 539 (2011); John Copeland Nagle, *Green Harms of Green Projects*, 27 Notre Dame J.L. Ethics & Pub. Pol'y 59, 59–61 (2013); Outka, *Environmental Justice in the Renewable Energy Transition*, *supra* note 14, at 70.

271. *See generally* Uma Outka, *Siting Renewable Energy: Land Use and Regulatory Context*, 37 Ecology L.Q. 1041 (2010) [hereinafter Outka, *Siting Renewable Energy*]; Nagle, *supra* note 270. In particular, Outka's article comprehensively catalogs many of the concerns we touch upon here. *See* Outka, *Siting Renewable Energy*, *supra*, at 1067–1104; *see also* Ottinger, *supra* note 15, at 222 (observing that renewable energy technologies, "as they are currently being designed . . . share key characteristics with their predecessors that raise similar environmental justice concerns—and present the possibility that we will reproduce old patterns of injustice even as we transition to new energy technologies."); Paben, *supra* note 13, at 1077–87.

from conventional siting in ways that might prove relevant for developing a clean energy justice agenda.

A. New Problems, Old Legal Frameworks

For the most part, the same legal frameworks govern renewable energy siting as govern traditional energy infrastructure siting.[272] Most siting decisions occur at the state level, with varying degrees of local input.[273] Proposed project developers must typically first obtain a "certificate of public need" from the PUC, certifying that the project is necessary to help satisfy the state's electricity demand.[274] Then, the commission proceeds to make a determination about where to site the proposed facility. Most processes for making these determinations do not take distributive consequences explicitly into account.[275] Sometimes, when a project requires a permit from a federal agency—in the case of renewable energy, typically because it is being constructed on federal land—federal statutes requiring consideration of environmental and cultural impacts also apply.[276]

In contesting the siting of fossil fuel generators and other more traditional large industrial facilities, environmental justice advocates have long worked to crack open all of these processes to greater consideration of local voices and potential disparate impacts.[277] The lessons and tactics learned from these ad-

272. On the environmental justice concerns raised by facility siting more generally, see Vicki Been, *What's Fairness Got to Do With It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001 (1993); LUKE W. COLE & SHEILA R. FOSTER, FROM THE GROUND UP: ENVIRONMENTAL RACISM AND THE RISE OF THE ENVIRONMENTAL JUSTICE MOVEMENT 17 (2001) (focusing on the siting of hazardous waste facilities).

273. *See* Alexa Burt Engelman, *Against the Wind: Conflicts Over Wind Energy Siting*, 41 ENVTL. L. REP. 10,549, 10,562–64 (2011) (noting how Minnesota handles siting almost exclusively at the state level, while New York has highly localized processes); Uma Outka, *The Renewable Energy Footprint*, 30 STAN. ENVTL. L.J. 241, 258 (2011) [hereinafter Outka, *Renewable Energy Footprint*] (cataloguing the many states that have moved to a state-centric siting model, although noting that processes for local input are still the norm).

274. *See* Outka, *Siting Renewable Energy*, *supra* note 271, at 1060.

275. Outka, *Environmental Justice in Renewable Energy*, *supra* note 14, at 105.

276. The National Environmental Policy Act ("NEPA") requires specific analysis of environmental justice concerns before a federal permit can be issued, although it does not require an agency to act upon the results of that analysis. Kaswan, *supra* note 10, at 250–51. The National Historic Preservation Act serves as the main source of protection for religious and cultural concerns, but also functions predominantly in a procedural vein. *See* Allison M. Dussias, *Room for a (Sacred) View? American Indian Tribes Confront Visual Desecration Caused by Wind Energy Projects*, 38 AM. INDIAN L. REV. 333, 346 (2014) (describing the Act's tribal consultation requirements).

277. *See* George K. Foster, *Community Participation in Development*, 51 VAND. J. TRANSNAT'L L. 39, 41 (2018).

vances can now be applied to renewable energy, offering communities some time-tested methods of voicing their concerns.

That said, there is one noteworthy development in siting renewable energy that may diminish the possibility of utilizing these well-known processes. The urgent need to site more renewable energy has led many states, and the federal government, to craft expedited permitting processes for renewables.[278] Through these processes, renewable resources are allowed to skip or shorten several of the steps that conventional energy resources must go through—thus eliminating key venues for vindicating the values of procedural justice.[279]

Appeals to permitting agencies are not the only means of affecting energy siting decisions. Largely out of frustration with formal processes, communities have increasingly negotiated private settlements.[280] As Professor George K. Foster reports, it is now relatively common for communities to participate in industrial developments as "economic actors," by serving as business partners with private developers or exacting concessions from such developers.[281] Such concessions can take the form of "Community Benefits Agreements," which promise the provision of certain community "goods" in exchange for community support of a project,[282] or "Good Neighbor Agreements," which "focus on mitigating the impacts of industrial activities."[283]

These tools that were developed to allay concerns about fossil-fuel powered industrialization appear adaptable for the clean energy era. Recent research focused in the United Kingdom—a country further along in its clean energy transition—has identified these types of contracting mechanisms as "a prominent feature of discussions about renewable energy."[284] That said, as these pro-

278. *See* Outka, *Renewable Energy Footprint*, *supra* note 273, at 268, 270–74 (describing this "dominant regulatory trend"); *see also* Dep't of Interior, Order No. 3285, Renewable Energy Development by the Department of the Interior (2009) (streamlining the development of renewable energy projects on federal lands); Robert L. Glicksman, *Solar Energy Development on the Federal Public Lands: Environmental Trade-Offs on the Road to a Lower-Carbon Future*, 3 San Diego J. Climate & Energy L. 107, 146 (2011) (suggesting that expedited processes should "raise red flags . . . given the tendency to paper over environmental concerns"); Nagle, *supra* note 270, at 88.

279. *See* Engelman, *supra* note 273, at 10,563 (observing how these processes eliminate key opportunities for public involvement).

280. *See* Foster, *supra* note 277, at 42–43.

281. *Id.* at 41.

282. Daniel P. Selmi, *The Contract Transformation in Land Use Regulation*, 63 Stan. L. Rev. 591, 597 (2011) ("In these contracts, developers agree to provide negotiated benefits to a municipality, such as increased infrastructure, that the city often could not require under its regulatory authority. In return, the city agrees to allow a specific development and to 'vest' the developer's right to build against any future land use changes.").

283. Foster, *supra* note 277, at 84 ("For example, a GNA may require the developer to meet specified emissions standards, make disclosures to the public, and establish a monitoring role for community groups.").

284. Cowell et al., *supra* note 270, at 539.

liferate, many raise concerns about whether these essentially private agreements distribute benefits equally within affected communities, and whether communities have sufficient bargaining power to reach fair terms.[285]

B. The Justice Challenges of Siting Clean Energy

The "not-in-my-backyard" phenomenon, whereby a community objects to certain necessary social infrastructure being placed near it rather than another community, can feel particularly unsympathetic in the case of clean energy. Whereas one can readily understand the reasons for a community rejecting a trash incinerator or a hazardous waste dump, it is harder to understand the rejection of clean energy resources.[286] But as wind and solar continue their meteoric growth, they will increasingly raise siting concerns of their own.

Much of the community impact of wind and solar energy turns upon *scale*—that is, the size of the proposed installation. The smallest-scale installations—rooftop solar panels—present limited justice concerns, because a property owner typically self-selects to install distributed generation. Larger installations of both wind and solar, however, come with substantial downsides. Perhaps most glaringly, major wind and solar farms often disrupt the aesthetics of what was previously a more rural, pastoral landscape.[287] Wind turbines can be two-hundred meters in height, and large farms have hundreds of turbines that cover up to thirty square miles of space.[288] Solar arrays can also be enormous; for example, the Agua Caliente solar array in Arizona "comprises more than five million solar panels that span the equivalent of two Central Parks in the desert

285. *See* Foster, *supra* note 277, at 98.

286. That said, certain "clean" energy resources create hazards similar to fossil fuel generation. Many states include biomass—the burning of organic feedstocks including trees, crops, animal waste, and sometimes trash—as a component of their renewable portfolio standard. These "clean" sources of energy release many of the same toxic air pollutants as conventional power plants—as well as often producing noxious odors that reduce quality of life for surrounding communities. *See* Outka, *Environmental Justice in Renewable Energy*, *supra* note 14, at 81–83.

287. *See* Patrick Devine-Wright & Yuko Howes, *Disruption to Place Attachment and the Protection of Restoration Environments: A Wind Energy Case Study*, 30 J. ENVTL. PSYCHOL. 271, 271 (2010) (reporting survey results indicating that local opposition to one project stemmed from worries of industrialization and the despoiling of scenic landscape); Engelman, *supra* note 273, at 10,552 ("Aesthetic impacts and viewshed impacts have been continuously identified as a central concern to local residents facing wind development."); Nagle, *supra* note 270, at 68.

288. *See Ten of the Biggest Turbines*, WIND POWER MONTHLY (July 5, 2017), https://perma.cc/32DC-UUYS (reporting that the largest onshore wind turbine has a rotor diameter of 167 meters, with a total height over 200 meters); Praveen Duddu, *Top 10 Biggest Wind Farms*, POWER TECHNOLOGY (Sept. 29, 2013), https://perma.cc/45G7-JBNB (chronicling the ten biggest wind farms in the world, eight of which are in the United States).

between Yuma and Phoenix."[289] Moreover, large solar and wind farms rarely come alone—they also require the siting and construction of transmission lines to transport their electricity to demand-heavy population centers.[290]

These expansive land requirements create distinctive challenges, particularly because appropriate sites are not evenly distributed among U.S. communities.[291] The need for large parcels leads to frequent siting of renewables on federal land,[292] creating tensions with Native American tribes worried about cultural impacts.[293] Because a single renewable project can affect one hundred archeological sites, its cultural footprint may be higher than that of coal, even as other concerns are diminished.[294]

Similarly, the urban-rural divide is more pronounced when it comes to renewable energy siting.[295] Renewable facilities—unlike conventional generation—can rarely be sited near major population centers. Instead, they must be located where physical conditions are best—which for wind, means the sparsely populated Great Plains states, and for solar, the desert Southwest.[296] Because of these geographies of renewable energy, rural populations are often asked to accept the localized burdens of renewable energy and transmission built to serve distant coastal cities.[297] These burdens include not just aesthetic transformation,

289. Roni Jacobson, *World's Largest Solar Array Set to Crank Out 290 Megawatts of Sunshine Power*, Sci. Am. (May 9, 2014), https://perma.cc/DD64-JY3G.

290. Engelman, *supra* note 273, at 10,552 ("The installation and operation of utility-scale wind turbines requires the building of infrastructure, such as roads and transmission lines to transport energy to the utility grid."); Outka, *Renewable Energy Footprint*, *supra* note 273, at 243–44 (describing the "energy sprawl" that will accompany the renewable buildout).

291. Joseph Rand & Ben Hoen, *Thirty Years of North American Wind Energy Acceptance Research: What Have We Learned?*, 29 Energy Res. & Soc. Sci. 135, 136 (2017) ("[T]he rapid growth of North American wind energy has increased the footprint of wind developments, increasing local conflicts and bringing the issue of community acceptance to the forefront."); *see also* Roopali Phadke, *Public Deliberation and the Geographies of Wind Justice*, 22 Sci. as Culture 247, 247 (2013) ("Across the industrialized world, from the UK to New Zealand, utility and community scale renewable energy projects are increasingly struggling to get their environmental permits because of local protests.").

292. Outka, *Renewable Energy Footprint*, *supra* note 273, at 280; Glicksman, *supra* note 278, at 110.

293. *See* Dussias, *supra* note 276, at 335; Glicksman, *supra* note 278, at 151 (describing the potential benefits and drawbacks to tribes of siting renewables on their lands); Nagle, *supra* note 270, at 71–72.

294. *See* Nagle, *supra* note 270, at 72.

295. *See* Phadke, *supra* note 291, at 248.

296. *See Wind Maps*, Nat'l Renewable Energy Lab. (Apr. 6, 2019), https://perma.cc/PTS6-5XXP; *Solar Energy Potential*, U.S. Dep't of Energy (Apr. 6, 2019), https://perma.cc/U8BK-VVLE.

297. *See* Rand & Hoen, *supra* note 291, at 139; Phadke, *supra* note 291, at 248 ("Rural communities at the forefront of new energy development are asking why they are disproportionately being asked to carry the weight of the new carbon economy while urban residents continue their conspicuous use of energy.").

but several health and safety concerns. Rotating wind turbine blades can produce "shadow flicker," creating enervating "intermittent shadows on adjacent lands and buildings."[298] Although the noise created by wind farms typically does not exceed EPA-established acceptable decibel levels, residents living nearby often complain about noise pollution.[299] More controversially, many residents also report a combination of uncomfortable health symptoms, sometimes called "Wind Turbine Syndrome," that stem from living too close to wind farms.[300]

Is the rural/urban divide in clean energy a consideration of "justice"? We understand why it might feel unfair to rural communities to bear these burdens for their urban neighbors. It remains unclear whether those rural communities likely to be most burdened with renewable energy are also low-income and/or minority.[301] Empirical work on this point—especially as renewable energy development continues to accelerate—should be a research priority.

Finally, communities often complain about being shut out of decisionmaking processes regarding the location and size of renewable projects.[302] These concerns overlap with the larger issues of procedural justice raised by clean energy, discussed in Part V. But they can become particularly acute at the siting stage, once a community feels it is being targeted for an undue share of infrastructure. And these participatory challenges are exacerbated by expedited siting processes.[303] The final part, to which we now turn, explores how understanding these siting concerns as part of a more unified clean energy justice agenda might open up new possibilities for advancing clean energy justice.

VII. Moving Clean Energy Justice Forward

In this final Part we assemble the pieces, asking what good it does to collect this litany of concerns about the justice of clean energy in a single law review article. To date, most elements of the agenda outlined in this Article

298. Engelman, *supra* note 273, at 10,552.

299. *Id.* at 10,552, 10,555; Nagle, *supra* note 270, at 71.

300. *See* Engelman, *supra* note 273, at 10,552–53 (noting reports of this phenomenon and studies disputing its existence).

301. On the whole, "rural Americans have lower household median incomes than urban households, but people living in rural areas have lower poverty rates than their urban counterparts." Alemayehu Bishaw & Kirby G. Posey, *A Comparison of Rural and Urban America: Household Income and Poverty*, U.S. Census Bureau (Dec. 8, 2016), https://perma.cc/9S7T-7QT8.

302. Engelman, *supra* note 273, at 10,561 ("These concerns may be better explained in a procedural justice paradigm."); Cowell et al., *supra* note 270, at 543 (suggesting that Demark and Germany have had lots of success in siting renewables because of community control over the shape of development, not merely the offer of ownership shares); Mhairi Aitken, *Wind Power and Community Benefits: Challenges and Opportunities*, 38 Energy Pol'y 6066, 6067 (2010); Phadke, *supra* note 291, at 251 (describing use of "landscape symposium" to obtain more meaningful local input on siting and scale).

303. Outka, *Environmental Justice in Renewable Energy*, *supra* note 14, at 114.

have been discussed in discrete, siloed proceedings: a net metering fight here, a siting dispute there, a push at the state legislature for more green jobs in low-income communities, or a plea to RTOs for more transparent procedures. But these issues intersect and tackling them in concert might prove more successful. We offer below a few observations on the synergies that a united clean energy justice agenda presents, and hope that readers may have noticed more of their own.

A. A Broader Conception of Energy Law's Justice Rhetoric

As we have noted throughout this Article, energy law's Progressive-era roots produced federal and state statutes with key terms that sound in justice, including the requirements of universal access, "just and reasonable rates," and no undue discrimination.[304] Historically, the "just and reasonable" standard has gotten the most attention, and it has predominantly been interpreted to put a lower bound on rates, requiring that they be non-confiscatory vis-à-vis the utility.[305] Undue discrimination has gotten less attention in utility rate-setting, except as it concerns the balance struck in rates and tariff conditions among industrial, commercial, and residential consumers.[306]

But PUCs have broad latitude in how they interpret these terms,[307] opening up space for creative arguments about their relevance in the clean energy transition. The concept of "no undue discrimination" has gotten traction in the net metering context, where regulators have amended compensation rates to reverse unfair subsidization from lower-income to more affluent consumers on this basis. Similarly, it undergirded New York's Public Service Commission's concern about energy poverty in its major grid modernization proceeding—and

304. Boyd, *supra* note 44.

305. *See* Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591, 600–01 (1944); Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va., 262 U.S. 679, 690 (1923).

306. *See, e.g.*, Pub. Util. Comm'n of State of Cal. v. FERC, 24 F.3d 275, 282 (D.C. Cir. 1994) (rejecting a challenge that a FERC-approved natural gas funding plan would unfairly burden residential customers); Transwestern Pipeline Co. v. FERC, 820 F.2d 733, 739 (5th Cir. 1987) (describing "undue discrimination" as asking whether "similarly situated customers were treated differently without justification"). Prohibiting "undue discrimination" is also the foundation of virtually all modern FERC actions to establish and oversee market mechanisms, but in this context it guarantees that industry participants are not treated unfairly vis-à-vis one another. *See* Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, *supra* note 53, at 1812.

307. Indeed, Justice Frankfurter's dissent in the iconic *Hope* case suggests that the significant problem raised by the modern "just and reasonable" inquiry is that it leaves rates entirely "to the unguided discretion of the Commission." 320 U.S. at 626 (Frankfurter, J., dissenting); *see also* Duquesne Light Co. v. Barasch, 488 U.S. 299, 310 (1989) ("Today we reaffirm these teachings of Hope Natural Gas: '[I]t is not theory but the impact of the rate order which counts. If the total effect of the rate order cannot be said to be unreasonable, judicial inquiry . . . is at an end.'").

its ultimate determination to increase funding of low-income energy assistance during the clean energy transition.[308]

These legal standards could be interpreted to support further efforts to broaden who receives the benefits of clean energy. For example, the idea of "no undue discrimination" arguably supports arrangements like community solar and other efforts to make participation in the new clean energy economy more widespread—otherwise, programs that prove over time to be accessible only to certain classes of customer might well be considered "discriminatory." Or, legislators and regulators might be moved by an argument that "just and reasonable" rates must, during times of transitions to pricing systems based on time of consumption, include a guarantee against extreme volatility in low-income consumers' rates.[309] More broadly, as the clean energy transition gathers speed, regulators and legislators may become open to arguments that the fundamental concept of "just and reasonable" rates requires spreading the costs of a society-wide clean energy transition *society wide*, such that volumetric electricity rates no longer make sense as the primary way to fund clean energy policy.

B. Thinking Structurally About Expanding Clean Energy's Benefits

In our section on the distribution of clean energy's benefits, we focused on several common equity complaints lodged against clean energy incentive programs such as net metering and electric vehicle rebates. And we discussed how states are attempting to widen access through programs like community solar and tiered rebates. But there remains a fundamental challenge to these band-aids: They are still designed around consumer choices, such that the most they can do is provide clean energy benefits to *some* low-income subscribers who choose to take advantage of them. They continue to leave many out of their gains.

For this reason, and with a fuller view of clean energy's justice implications in hand, it may be worthwhile for clean energy justice advocates and policymakers to angle their lens towards broader structural fixes that do not operate consumer by consumer. For example, take the case of electric vehicle rebates: The ultimate goal of these programs is to improve air quality and reduce greenhouse gas emissions. To spread these benefits widely, policymakers are now beginning to focus on expanding low-income consumers' electric vehicle ownership.[310] But research suggests that these consumer-by-consumer approaches may not reap the biggest gains for low-income communities. Instead, electrify-

308. *See* Welton, *Grid Modernization*, *supra* note 45, at 601.

309. *See* Severin Borenstein, *Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing*, 42 REV. IND. ORGAN. 127, 131 (2013) (describing "minimizing volatility" as a core principal of residential rate design).

310. *See supra* Part IV.

ing diesel buses that pass through local communities would bring much greater air quality gains.[311]

Similarly, electrifying vehicles is only one component of the larger challenge of tackling emissions from transportation. Expanding access to public transportation is another component, and one that is much more likely to broadly benefit low-income residents, given that "more than 70 percent of public transit commuters earn less than $25,000 per year."[312] In the same vein, cities might be able to contract for renewable energy on behalf of all their residents more thoughtfully and at prices lower than community solar rates, thereby creating a net gain that extends beyond the reach of any solar subscription program.[313]

Accordingly, as researchers, lawmakers, and advocates strategize how to achieve the goals of clean energy justice, we should conscientiously grapple with the distributive tradeoffs among various climate strategies, rather than just the quintile distributions of particular clean energy incentives.

C. Looking Beyond Traditional Regulatory Participation

A resounding theme of our evaluation of procedural justice in the energy field is that traditional citizen participation is challenging across energy's governing institutions. For this reason, it may not be realistic—or fruitful—to expect community groups to participate much more than they currently do in state clean energy proceedings.[314] Frustration at the barriers to participation in such proceedings has driven growing demands for "energy democracy," which might decentralize decisionmaking away from PUCs and RTOs.[315] In particular, many groups have turned their attention to "community choice aggregation" ("CCA") arrangements, which allow communities—after successful referenda or city council votes—to take control of their energy purchasing decisions (while leaving their local utility in charge of distribution and billing).[316]

311. *See* Dan Welch, Ctr. for Climate & Energy Solutions, Electrified Transportation for All: How Electrification Can Benefit Low-Income Communities 1 (2017).

312. *Id.* at 3.

313. *See, e.g.*, Lorenzo Kristov, Comments in Response to the October 31, 2017, Informal Public Workshop on California Consumer Choice, at 4–5 (Nov. 28, 2017) (unpublished comment) (on file with authors) (arguing that models that allow cities to enter these contracts—known as "Community Choice Aggregation"—provide benefits beyond those that can be achieved by "consumer choice").

314. *See supra* Part V.

315. *See* Welton, *Grasping for Energy Democracy*, *supra* note 1, at 585 (noting that energy democracy is a freighted term without clear boundaries, but observing that more local ownership and control forms one key strategy within the movement).

316. California provides the most striking example of the potential profusion of CCAs: A 2018 article reports that "85 percent of California's retail load could be served by CCAs or direct

Similarly, arrangements where local communities *actually own or control* renewable energy resources (as compared to merely purchasing subscriptions in utility projects) might provide new means of meaningful participation in energy decisionmaking, while contributing to economic development and local job growth.[317]

Local renewables thus provide an example of how addressing issues in concert might be fruitful. A fuller understanding of clean energy's procedural justice challenges—coupled with an appreciation of its substantial economic benefits—counsels for more attention here. Clean energy justice advocates might prioritize partnerships with groups focused on developing new modes and models of local energy control and ownership, where justice concerns can be more easily raised and attended to.[318] Such localization of energy decisionmaking might also ease siting burdens, as communities are substantially more likely to accept the siting of projects over which they feel they have sufficient control.[319]

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access providers by 2025." Jeff St. John, *California Sets New Rules for Community Choice Aggregators*, GreenTechMedia (Feb. 14, 2018), https://perma.cc/MYP9-Z2BA. CCAs are currently allowed in seven states: California, New York, Massachusetts, Illinois, New Jersey, Ohio, and Rhode Island. *Id.* It is worth noting, however, that CCA arrangements present some justice challenges of their own (akin to net metering) if exiting communities do not pay their fair share of legacy grid costs. The California Public Utility Commission has just concluded a contentious set of proceedings on this topic, and its administrative law judges endorsed a revised "Power Charge Indifference Adjustment" to appropriately distribute utility costs to exiting communities. *See* Cal. Pub. Util. Comm'n, Order Instituting Rulemaking to Review, Revise, and Consider Alternatives to the Power Charge Indifference Adjustment, Rulemaking 17-06-026, at 5, 70, 85 (Cal. Pub. Utils. Comm'n Aug. 18, 2018), https://perma.cc/79MN-HACG.

317. Jarr Hicks & Nicola Ison, *An Exploration of the Boundaries of 'Community' in Community Renewable Energy Projects: Navigating between Motivations and Context*, 113 Energy Pol'y 523, 523–24 (2018) (noting that community energy is a "'vague' . . . and sometimes 'problematic'" term because it at times includes projects developed by external corporate entities, with limited community benefit).

318. *See* Shalanda H. Baker, *Unlocking the Energy Commons: Expanding Community Energy Generation* 16–17 (Ne. Pub. Law & Theory Faculty Research Papers Series No. 318-2018), https://perma.cc/G5JL-FYHP (advocating a "new energy commons" as a framing concept for such models); Shelley Welton, *Public Energy*, 92 N.Y.U. L. Rev. 267, 308 (2017) (describing the growth of "Community Choice Aggregation" as a means of local energy control); Uma Outka, *Cities and the Low-Carbon Grid*, 46 Envtl. L. 105, 145–55 (2016) (exploring emerging local strategies to decarbonize the grid).

319. *See* Emmanuel Songsore & Michael Buzzelli, *Ontario's Experience of Wind Energy Development as Seen Through the Lens of Human Health and Environmental Justice*, 13 Int'l J. Envtl. Res. & Pub. Health 684, 695 (2016) (highlighting procedural justice challenges of wind siting in Ontario); Maarten Wolsink, *Wind Power Implementation: The Nature of Public Attitudes: Equity and Fairness Instead of "Backyard Motives,"* 11 Renewable & Sustainable Energy Rev. 1188, 1204 (2005) (reporting that local, collaborative decisionmaking is the best way to ease siting challenges in Europe).

D. Clean Energy Siting Burdens: Mandating More Systematic Evaluation

As we noted in our siting section, attention to distributive justice challenges in the siting of clean energy projects is limited. Claims against clean energy raised at the time of siting often succumb to the argument that "the few should stand aside for the many"[320]—even if the same few are continuously and disproportionately standing aside. Perhaps, though, earlier intervention—at the stage where legislators or regulators are developing or revising clean energy goals—might better forestall inequitable siting burdens. If addressed at this stage, a program could build in parameters to avoid overburdening particular communities.[321] It might do so by denying expedited permitting to facilities located in overly burdened areas, or by rewarding extra credits or incentives for building in less developed parts of a state. Alternatively, in traditionally regulated states where utilities remain in charge of generation, utilities might be required to integrate considerations of renewable siting demographics into their mandatory long-term planning.[322] This would force companies to comprehensively map renewables' concentrations in ways that could further our understanding of whether renewable energy disproportionately burdens certain lower-income communities or communities of color.

Of course, to effectively advocate for attention to renewable energy's geographic distribution at earlier policy stages will require effective intervention at the PUC. Our analysis of energy's procedural justice challenges does not suggest that this task will be easy. However, *one* systematic intervention in a PUC rulemaking about clean energy is certainly easier than multiple siting proceedings, each occurring once development is essentially preordained.

VIII. Conclusion: A Call to the Academic Community

This Article's formulation of a more comprehensive clean energy justice agenda highlights opportunities to tackle its challenges with renewed attention to their interrelatedness and importance. At the same time, we have been struck over the course of our research at the sparse data on clean energy's justice implications. This paucity of data may have been acceptable when clean energy still

320. Outka, *Renewable Energy Footprint*, *supra* note 273, at 305–06 (quoting Susan Lorde Martin, *Wind Farms and NIMBYs: Generating Conflict, Reducing Litigation*, 20 Fordham Envtl. L. Rev. 427, 430 (2010)).

321. Such an effort might draw from Uma Outka's similar call for more comprehensive planning of renewable energy siting to manage land use impacts. Outka, *Renewable Energy Footprint*, *supra* note 273, at 246.

322. *See* Boyd, *supra* note 44, at 1660, 1693 (discussing state processes for comprehensive planning). Alice Kaswan has also documented California's creation of an advisory committee to review the impacts of climate policies on disadvantaged communities—which is perhaps another useful model that states could draw from. *See* Kaswan, *supra* note 180, at 575.

played a bit part in the grid, but it cannot persist now that we understand clean energy's current and future growth projections.

Our project has highlighted several areas where additional research could help to develop a richer understanding of the scale and scope of clean energy's justice implications and inform policymaking priorities. Most well researched are the questions regarding who pays for clean energy, because utilities mounting cross-subsidization claims have incentives to undertake supportive empirical research. Solar companies, in response, have generated their own empirical studies.[323]

In contrast, where there is no clear corporate motive for information production, research has languished—and it will be up to the academy or government to fill in the gaps. One obvious place to begin is the demographic distribution of clean energy jobs, which will help illuminate the extent to which clean energy is failing or succeeding in providing blue collar, stable jobs for a diverse workforce—and might call attention to the need for policy reforms. Similarly, more research into whether those rural communities likely to be most burdened with renewable energy are also low-income and/or communities of color will help define the contours of clean energy's justice-related siting challenges. And as community solar and other efforts at broadening clean energy participation grow, continuing to collect and expand data on who takes advantage of these offerings will help regulators to understand whether these efforts succeed. It would also be useful to pair data on energy poverty with data on state net metering, grid modernization, and similar initiatives, to help understand whether substantial investment in these types of programs risks exacerbating the challenges of affording adequate energy.

An ideal research portfolio would not only pursue each of these questions, but also attempt to amalgamate their results, to create a deeper understanding of the ways in which clean energy policies, as implemented, contribute to or help to alleviate continued income and racial disparities in the United States. We hope this Article serves as a first step in this direction, by sharpening our understandings of clean energy's myriad justice challenges and opportunities and opening up a conversation about how and why these form an emerging agenda worthy of attention.

323. *See* LAURA HANSEN ET AL., A REVIEW OF SOLAR PV BENEFIT & COST STUDIES 22 (2d ed. 2013) (meta-study collecting seventeen recent studies of solar power's value to the grid, performed by a range of utilities, institutes, and solar providers).

Appendix: Results of State PUC Proceedings Analysis

Methodology

To better understand levels of community group participation in PUC proceedings regarding clean energy, we undertook a limited empirical analysis of some of the most relevant recent state proceedings.

We analyzed twelve state PUC proceedings from around the United States (see Table 1). Each proceeding was either underway or recently concluded as of fall 2017, so as to provide a snapshot of current-day participation rates. In selecting our proceedings, we looked for generic public utility "rulemaking" dockets that substantially touched upon clean energy concerns in the state; we did not include any adjudicatory proceedings even when they might have significant clean energy policy import. We imposed this limitation in order to understand best-case scenarios for community participation in PUC proceedings. We believe that limiting our survey to rulemakings best captures this aim, because groups with limited resources are more likely to participate in overarching rulemaking proceedings rather than case-by-case adjudications. We also chose proceedings with more than ten filing parties, a number we took to be indicative of the potential for the rulemaking to have impacts to entities beyond utilities.

We do not purport to have identified a comprehensive list of proceedings that may meet these criteria, as our goal in this project was not a definitive empirical study of participation rates in PUC proceedings. Instead, our aim was to understand whether our sense (gleaned from research and practice experience) that participation in PUC proceedings remains difficult could be confirmed through analysis of several important examples.

For each proceeding, a research assistant reviewed a list of filing parties and coded those filing parties considered a "community group" (see Table 2). We included within the category of "community group" any state-level or local-level group of citizens collectively asserting a position in a proceeding. We did not include individual filings (which tended to come from affected businesses), nor did we include national-level groups that participate across states (however, many of these national groups partnered with community groups in their filings, in which case we included the community groups that joined as part of a filing with a larger national group).

Finally, a research assistant analyzed the contents of all community group filings to determine whether the group raised (1) concerns related to "distributive justice"—that is, the substantive distribution of benefits and burdens among various groups; and (2) concerns related to "procedural justice"—that is, the fairness of the process used by the PUC during the rulemaking (see Tables 2 and 3).

We are exceedingly grateful to Advanced Energy Economy for research access to their Powersuite database, which made this analysis possible.

TABLE 1. LIST OF PROCEEDINGS ANALYZED, BY STATE

State	Docket #	Name of Docket
Cal 1	R1408013	Order Instituting Rulemaking Regarding Policies, Procedures And Rules For Development Of Distribution Resources Plans Pursuant To Public Utilities Code Section 769.
Cal 2	R1410003	Order Instituting Rulemaking To Create A Consistent Regulatory Framework For The Guidance, Planning And Evaluation Of Integrated Distributed Energy Resources.
Texas	TX:40000	Commission Proceeding To Ensure Resource Adequacy In Texas
Maryland	PC44	In The Matter Of Transforming Maryland's Electric Distribution Systems To Ensure That Electric Service Is Customer-Centered, Affordable, Reliable And Environmentally Sustainable In Maryland.
Washington DC	FC1 130	In The Matter Of The Instituting Into Modernizing The Energy Delivery Structure For Increased Sustainability
Arizona	E-00000Q-16-0289	To Open A Docket For Review, Modernization And Expansion Of The Arizona Energy Standards And Tariff Rules And Associated Rules.
Pennsylvania	PA : L-2014-2404361	Notice Of Proposed Rulemaking To Revise The Alternative Energy Portfolio Standards (Aeps) Act Regulations
Nevada	NV: 16-07001	Application Of Sierra Pacific Power Company DIR/A Nv Energy For Approval Of Its 2017-2036 Triennial Integrated Resource Plan And 2017-2019 Energy Supply Plan.
New York	14-00549/14-M-0094	Proceeding On Motion Of The Commission To Consider A Clean Energy Fund.
Minnesota	MN: 15-556	In The Matter Of A Commission Inquiry Into Grid Modernization
Massachusetts	MA: 12-76	Investigation By The Department Of Public Utilities On Its Own Motion Into Modernization Of The Electric Grid.
Missouri	EW-20 17-0245	In the Matter of A Working Case to Explore Emerging Issues in Utility Regulation

TABLE 2. COMMUNITY GROUPS' PARTICIPATION RATES AND CONCERNS SNAPSHOT ANALYSIS TAKEN IN NOVEMBER 2017

	Cal 1	Cal 2	MD	MO	NV	TX	DC	AZ	PA	NV	MN	MA	Totals
Total Filing Parties	64	69	51	15	110	21	114	29	91	44	23	184	815
Community Groups	3	4	2	1	12	0	7	1	8	1	1	5	45
Raised distributive justice concerns	3	2	2	1	10	0	5	0	4	1	1	5	34
Raised procedural justice concerns	3	2	2	1	10	0	3	0	2	1	1	1	26

TABLE 3. PERCENTAGE OF COMMUNITY GROUP PARTICIPATION AND PERCENTAGE RAISING JUSTICE CONCERNS

	Cal 1	Cal 2	MD	MO	NY	TX	DC	AZ	PA	NV	MN	MA	Totals
Percentage of Participants Identified as "Community Group"	4.7	5.8	3.9	6.7	10.9	0.0	6.1	3.4	8.8	2.3	43	2.7	5.5
Percentage of Community Groups Raising Distributive Justice Concerns	100.0	50.0	100.0	100.0	83.3	0.0	71.4	0.0	50.0	100.0	100.0	100.0	75.6
Percentage of Community Groups Raising Procedural Justice Concerns	100.0	50.0	100.0	100.0	83.3	0.0	42.9	0.0	25.0	100.0	100.0	20.0	57.8