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The Energy Justice Stakes Embedded in the Net Energy Metering Policy Debates

Beyond Zero-Sum Environmentalism (Sarah Krakoff et al., eds., Environmental Law Institute 2019)

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Chapter 4
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I. Introduction

On October 29, 2012, at 7:30 p.m., a peculiar storm that shared the features of both a tropical storm and hurricane made landfall in Brigantine, New Jersey.[1] Superstorm Sandy wrought havoc in New Jersey and New York, leading to catastrophic economic losses in the United States totaling approximately $50 billion, which made the storm the "second costliest cyclone to hit the United States since 1900," and directly causing the deaths of 147 people, 72 of which occurred in the Mid-Atlantic and northeastern United States.[2]

Superstorm Sandy appeared indiscriminate in its impact; however, the most severely affected people appeared to be those with the least ability to bounce back from the storm.[3] As a study conducted by New York City Office of the Mayor notes: "More than 400 New York City Housing Authority (NYCHA) buildings containing approximately 35,000 housing units lost power, heat, or hot water during Sandy."[4] This amount of affected NYCHA units exceeds the number of total public housing units of any public housing authority in the United States, with the exception of Puerto Rico.[5] According

Author's Note: The editors of this volume provided invaluable input on the content of this chapter, as did Jennie C. Stephens and members of the Working Group in the New York Public Service Commission Value of Distributed Energy Resources Proceeding. Anastasia Doherty provided excellent research assistance.

1. City of New York, A Stronger, More Resilient New York 12 (2013), *available at* https://www.nycedc.com/resource/stronger-more-resilient-new-york [hereinafter City of New York].
2. Eric S. Blake et al., Nat'l Hurricane Ctr., Tropical Cyclone Report Hurricane Sandy 1 (2013), *available at* www.nhc.noaa.gov/data/tcr/AL182012_Sandy.pdf.
3. City of New York, *supra* note 1, at 14.
4. *Id.*
5. Furman Ctr. for Real Estate & Urban Policy et al., Sandy's Effects on Housing in New York City 4 (2013), *available at* http://furmancenter.org/files/publications/SandysEffectsOnHousingIn-

to the Furman Center for Real Estate and Urban Policy at New York University, nearly 20% of NYCHA's 178,000 total housing units were in buildings that experienced some sort of damage with the storm, and "[m]any of the nearly 80,000 residents of these [damaged] buildings were left without heat or electricity" due to basement flooding.[6] In addition, the storm impacted approximately 24,500 of the city's 178,000 privately owned affordable rental housing units and more than 40,000 rent-stabilized units.[7] The impacts to privately owned affordable housing units jeopardized valuable sources of the city's affordable housing stock, since units requiring extensive repair in the wake of the storm may no longer serve as affordable housing.[8]

The electricity and heat systems also suffered devastating damage. In New York City, home to the "world's first centralized electric generation and distribution system,"[9] nearly two million people lost power during the storm, and 84,000 natural gas customers experienced losses in service.[10] For several weeks, thousands of residents of New York City, one of the world's most sophisticated financial centers, lived without natural gas to heat homes; electricity to flush toilets and pump water through high-rise buildings; and energy to keep perishables, including vital medicines and foods that are difficult for low- to moderate-income families to replace, cold.[11]

Superstorm Sandy provided a bleak portrait of our possible climate future[12] and highlighted the ways in which the existing energy system renders low- to

NYC.pdf.

6. *Id.* at 5.
7. *Id.*
8. The Furman Center disaggregated data from the Federal Emergency Management Agency (FEMA). *Id.* at 7. The data indicated that more than 150,000 New York City households, representing 4% of all New York City households and one-half of the households in the area affected by the storm surge, had registered with FEMA, and 55% of registered households were renters. *Id*. Of registered households, the median household income for renters was $18,000, compared with $82,000 for homeowners. *Id*. at 8. Both groups were disproportionately low-income: "Nearly one-third of owners (29.9%) and two-thirds of renters (64.9%) have household incomes of less than $30,000 per year." *Id*. The study goes on to note that the "extremely low incomes of the renters" raises concerns regarding whether such renters will be able to locate new affordable housing, given that only 22% of New York City rental units would be affordable to households with an annual income of $30,000 or less. *Id.* Moreover, the homeowners impacted by Sandy lived in areas with high foreclosure rates, making them particularly vulnerable to the storm's housing impacts. *Id* at 8-9.
9. City of New York, *supra* note 1, at 108.
10. *Id*. at 15.
11. *Id.* (noting that some areas hit hard by Sandy, such as the Rockaways, were without heat and power for weeks).
12. The 2017 hurricane season provided a window into a chaotic climate future. In August and September, a string of "catastrophic" hurricanes whipped through the Atlantic and Caribbean regions. On August 25, 2017, Hurricane Harvey made landfall 30 miles northeast of Corpus Christi, Texas, as a Category 4 storm. *Major Hurricane Harvey, Aug. 25-29, 2017*, Nat'l Weather Serv., www.weather.gov/crp/hurricane_harvey (last visited Sept. 25, 2017). Over a three-day period, the hurricane dropped a record 51.88 inches of rain in America's fourth largest city, Houston, paralyzing the city and, according to the National Weather Service, causing "catastrophic, historical, devastating,

moderate-income people vulnerable to climate change impacts. The storm laid bare how inequality can exacerbate the impacts of major weather events in poor and low-income communities, because such communities are already vulnerable due to a unique combination of economics and geography. Sandy exposed these gross inequalities[13] while also highlighting our inherent interconnectedness. Sandy's most important impact, however, was to usher in a moment of unprecedented transformation of the region's energy system,[14] making the Sandy narrative a part of a global energy phenomenon unfolding at a rapid clip.

Around the world, an energy revolution that has the power to avoid many of Sandy's most devastating impacts is taking shape. The revolution, fueled by increasingly affordable access to solar energy,[15] has the potential to mitigate the impacts of climate change; render communities more resilient in the face of climate change impacts; and remedy long-standing inequities, by offering low- to moderate-income people substantial economic benefits and the ability to own and control their electricity. This revolution of the energy system has the power to transform traditional ways of generating electricity—in centralized fossil fuel-burning power plants that supply electricity to an electricity grid—and the potential to create pathways to more decentralized and nimble approaches to generation and distribution. More importantly, these changes have the profound potential to upend the power dynamics embedded within the current energy system by creating wealth for those who are most impacted by high electricity costs.

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and life-threatening flooding over Southeast Texas." *Id.* The storm caused billions of dollars worth of damage. Umair Irfan, *The Stunning Price Tags for Hurricanes Harvey and Irma, Explained*, Vox.com, Sept. 18, 2017, www.vox.com/explainers/2017/9/18/16314440/disasters-are-getting-more-expensive-harvey-irma-insurance-climate. Hurricane Irma, one of the most powerful hurricanes ever recorded in the eastern part of the Atlantic Ocean, followed shortly on the heels of Hurricane Harvey. Gregor Aisch et al., *Hurricane Irma Is One of the Strongest Storms in History*, N.Y. Times, Sept. 9, 2017, www.nytimes.com/interactive/2017/09/09/us/hurricane-irma-records.html?mcubz=3. After destroying the Caribbean island of Barbuda, the storm, measuring 425 miles wide, made landfall. Bonnie Berkowitz et al., *How Big Is Hurricane Irma?*, Wash. Post, Sept. 11, 2017, www.washingtonpost.com/graphics/2017/national/how-big-is-hurricane-irma/?utm_term=.f57aec716013. Hurricanes Jose and Maria, respectively Category 4 and Category 5 storms, also impacted the Caribbean and Atlantic regions.

13. Imara Jones, *What Hurricane Sandy Should Teach Us About Climate Justice*, Colorlines, Nov. 15, 2012, www.colorlines.com/articles/what-hurricane-sandy-should-teach-us-about-climate-justice; David Rhode, *The Hideous Inequality Exposed by Hurricane Sandy*, Atlantic, Oct. 31, 2012, www.theatlantic.com/business/archive/2012/10/the-hideous-inequality-exposed-by-hurricane-sandy/264337/.

14. State of N.Y. Pub. Serv. Comm'n, CASE 14-M-0101, Order Adopting Regulatory Policy Framework and Implementation Plan 2 (2015) (noting that "[c]limate change . . . compels reform" and the challenges to the electricity system provide the opportunity to improve the 100-year-old electricity regulatory system).

15. Robert Fares, *The Price of Solar Is Declining to Unprecedented Lows*, Scientific Am.: Plugged In (Aug. 27, 2016), https://blogs.scientificamerican.com/plugged-in/the-price-of-solar-is-declining-to-unprecedented-lows/.

Despite the remarkable potential of this energy system transformation, the policy and regulatory debates that characterize the energy transition have as yet avoided a deeper analysis of energy justice and equity.[16] Access to energy fundamentally impacts the lives of poor and low- to moderate-income people. Such populations routinely make difficult choices concerning energy use because they often pay a disproportionately high amount of their income to cover the cost of energy.[17] As illustrated by Superstorm Sandy, low- to moderate-income people are particularly vulnerable to the energy-related impacts of climate change because they lack resources to replace perishable food and medicines[18] and, for a variety of reasons, these individuals often shelter in place during major weather events.[19] Notwithstanding the importance of energy access to low- to moderate-income people, they are largely left out of important policy conversations that will shape the future of the energy system.

The current policy debates and analytical frameworks concerning rooftop solar power illustrate the foregoing dynamic. In the United States, distributed solar power is facilitating a transformation of the country's energy system from one reliant on the burning of fossil fuels in centralized locations to one in which customers generate and sell power to the electricity utility using solar panels mounted on their rooftops. In the United States, over one million homes and businesses now generate electricity from rooftop solar panels.[20] Rather than meeting household electricity needs by buying electricity from the utility, these solar customers have become electricity prosumers: Utility ratepayers who also generate electricity for their own consumption and for exporting to the electric grid.[21]

16. *Cf.* Shalanda H. Baker, *Unlocking the Energy Commons: Expanding Community Energy Generation*, *in* Law and Policy for a New Economy: Sustainable, Just, and Democratic 211-34 (Melissa K. Scanlan ed., 2017) (discussing energy justice implications of community solar policy design).

17. Adam Chandler, *Where the Poor Pay More Than 10 Percent of Their Income on Energy*, Atlantic, June 8, 2016, www.theatlantic.com/business/archive/2016/06/energy-poverty-low-income-households/486197/ (citing a string of studies indicating that energy costs routinely exceed the 5% of overall household income average for energy costs spent by middle-to-upper income households). *See also* Dan Boyce & Jordan Wirfs-Brock, *High Utility Costs Force Hard Decisions for the Poor*, Inside Energy, May 8, 2016, http://insideenergy.org/2016/05/08/high-utility-costs-force-hard-decisions-for-the-poor.

18. Michael T. Schmeltz et al., *Lessons From Hurricane Sandy: A Community Response in Brooklyn, New York*, 90 J. Urb. Health 799, 804 (2013).

19. Michael Greenberger, *Preparing Vulnerable Populations for a Disaster: Inner-City Emergency Preparednes—Who Should Take the Lead?*, 10 DePaul J. Health Care L. 291, 291 (2007).

20. Julia Pyper, *The U.S. Solar Market Is Now 1 Million Installations Strong*, Green Tech Media (GTM), Apr. 21, 2016, www.greentechmedia.com/articles/read/the-u-s-solar-market-now-one-million-installations-strong.

21. "The term prosumer is used to refer to energy customers who also produce their own power from a range of different onsite generators (e.g., diesel generators, combined heat-and-power systems, wind turbines, and solar photovoltaics (PV) systems." Wilson Rickerson et al., IEA-Renewable Energy

The fundamental shift in the economic structure of the energy system, spurred by the rapid adoption of rooftop solar power and policies that support it, has given rise to contentious regulatory and political debates concerning the value such customer-generators should receive in exchange for producing electricity. These debates, waged around the country in disparate jurisdictions such as Nevada[22] and Minnesota,[23] focus on the narrow question of the valuation of customer-produced electricity; however, this chapter argues that framing the disruption caused by customer-sited electricity generation solely as a debate regarding its monetary value masks the true stakes embedded in the current energy transition: the wholesale transformation of the energy system from one that is inherently unequal to one that is more just, equitable, and clean. Using principles of energy justice as a framework to view the larger dynamics within the NEM policy debate unmasks these tremendous stakes and reveals a remarkable opportunity to transform the existing energy system.

This chapter proceeds in several parts, including an overview of the rapidly changing regulatory and policy landscape concerning net energy metering (NEM), the policy framework that compensates electricity customers for the electricity they generate from their own rooftop solar panels. This overview examines the key issues raised by utilities concerning fairness of NEM programs as well as the range of responses thus far offered by regulators and scholars exploring the contours of NEM policies.

Following the overview, this chapter then argues that the narrow issues that have become the heart of the NEM debates—namely, the value of distributed energy generation to the electricity grid and unfairness to utility customers who do not participate in NEM programs—obfuscate the deeper equity concerns embedded within the current energy system and mask the broader transformative potential of rooftop solar power. The principal arguments relied on by NEM's critics fit within a zero-sum frame, wherein the discrete benefits offered to one group harm another group in proportionate

Tech. Deployment, Residential Prosumers: Drivers and Policy Options (Re-Prosumers) 5 n.3 (2014), *available at* www.osti.gov/scitech/servlets/purl/1163237.

22. *See* Order Granting in Part and Denying in Part General Rate Application by Sierra Pacific Power, *Application of Sierra Pacific Power Company d/b/a NV Energy for Authority to Adjust Its Annual Revenue Requirement for General Rates Charged to All Classes of Electric Customers and for Relief Properly Related Thereto*, at 2, Docket Nos. 16-06006, 16-06007, 16-06008, and 16-06009 (Nev. Pub. Utils. Comm'n, Dec. 20, 2016), *available at* http://pucweb1.state.nv.us/PDF/AXImages/Agendas/25-16/6801.pdf (referencing debate leading up to restoration of retail rate net metering for home solar customers).

23. *See* Order Approving Distributed Solar Value Methodology, *In the Matter of Establishing a Distributed Solar Value Methodology Under Minn. Stat. §216B.164, Subdiv. 10 (e) and (f)*, at 1-2 Docket No. 14-65 (Minn. Pub. Utils. Comm'n, Apr. 1, 2014), *available at* www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={FC0357B5-FBE2-4E99-9E3B-5CCFCF48F822}&documentTitle=20144-97879-01.

measure.[24] In this case, critics argue, the benefits offered to solar customers directly and proportionately harm ratepayers who do not participate in the program. These arguments have carried the day in Arizona, Hawaii, Indiana, Maine, and Nevada, states that with the exception of a mid-2017 policy reversal by Nevada, have decided to phase out NEM programs.[25] Such zero-sum framing misses the broader transformation occurring within the energy system and leaves undisturbed the features of the energy system, which themselves are unfair, unequal, and unjust. This part analyzes these equity concerns and discusses the ways in which the current transition of the electricity system fundamentally implicates equity and justice.

The last part of this chapter reengages the NEM policy debates, and offers a new lens—energy justice—from which to explore approaches to net energy policy that directly address the equity concerns implicated by the proliferation of rooftop solar power. This approach illustrates the broader pathways for equity available as the energy system undergoes this period of fundamental change. To take advantage of the unprecedented opportunities to embed justice in the energy system, policymakers should foreground equity when analyzing NEM metering policies, as well as incorporate principles of energy justice in the design of successor NEM policy frameworks. What could result is the transformation of the energy system consistent with the principles of energy justice.

II. The NEM Policy Battlefield

Thirty-eight states, including the District of Columbia, have adopted policy incentives that allow individual electricity ratepayers to receive compensation or credit on their electricity bill in exchange for generating their own energy, usually from rooftop solar panels.[26] The policies, known as "net energy metering"—NEM—have begun to usher in a new energy system and fundamentally change the relationship between the utility customer and the utility.

24. Frontier Group & Env't America Research & Policy Ctr., Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society 8 (2015), *available at* https://environmentamerica.org/sites/environment/files/reports/EA_shiningrewards_print.pdf ("Utilities and fossil fuel interests have argued that net metering represents a subsidy to solar home owners—one that comes out of the pockets of other ratepayers.").

25. Hiroko Tabuchi, *Rooftop Solar Dims Under Pressure From Utility Lobbyists*, N.Y. Times, July 8, 2017, www.nytimes.com/2017/07/08/climate/rooftop-solar-panels-tax-credits-utility-companies-lobbying.html.

26. Nat'l Conference of State Legislatures (NCSL), *State Net Metering Policies*, www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx (last visited Sept. 26, 2017).

A. What Is NEM?

From 1998 to 2015, the cost of installed residential solar panels fell from around $12 per watt to $4 per watt.[27] During the same period, as states around the country began to set increasingly aggressive goals for renewable energy use, states and the federal government offered tax incentives to encourage homeowners to invest in solar panels that could be affixed to the homeowner's rooftop and connected to the electric grid.[28] The distributed generation of electricity offered a mutual benefit to the electric grid and solar panel owners. In exchange for generating clean energy and supplying such energy to the electricity grid, solar panel owners received a credit that could be used to offset the owner's electricity bill. These programs became known as NEM, and by a 2017 estimate cited by the *New York Times*, "[o]ver the past six years, rooftop solar panel installations have seen explosive growth—as much as 900%. . . ."[29]

NEM manifests in a range of policy approaches but can be described simply as "a billing mechanism that credits solar energy system owners for the electricity they add to the grid."[30] Larry Hughes and Jeff Bell have developed a taxonomy to categorize and describe the four prevalent NEM policy designs: (1) simple net metering, in which "the customer-generator uses a single, bi-directional meter to record the amount of electricity banked, and the banking period is confined to one billing period"[31]; (2) net metering with buy-back, wherein utilities pay NEM customers for "excess electricity generated during the billing period"[32]; (3) net metering with rolling credit, where utilities allow "credit for excess electricity production" to be "banked over a period of time longer than a single billing cycle"[33]; (4) net metering with rolling credit and buy-back, in which "the extra production is credited and rolled over from one billing cycle to the next" and the utility buys remaining electricity credits from the NEM customer once the banking period is over.[34]

27. Galen Barbose & Naïm Dargouth, Lawrence Berkeley Nat'l Lab., Tracking the Sun IX, at 14 (2016), *available at* https://emp.lbl.gov/sites/default/files/tracking_the_sun_ix_report.pdf.
28. *See* Baker, *supra* note 16, at 213-14.
29. Tabuchi, *supra* note 25.
30. Lincoln Davies, *Making Sense of the Rapidly Evolving Legal Landscape of Solar Energy Support Regimes*, 6 KLRI J.L. & Legis. 92 (2016).
31. *Id.* at 92 (citing Larry Hughes & Jeff Bell, *Compensating Customer-Generators: A Taxonomy Describing Methods of Compensating Customer Generators for Electricity Supplied to the Grid*, 34 Energy Pol'y 1532, 1533 (2006)).
32. *Id.* at 92 (citing Hughes & Bell, *supra* note 31, at 1533).
33. *Id.* at 93.
34. *Id.*

The key to the foregoing schema is the rate at which customer-generators are compensated for electricity: the retail rate.[35] Given that most NEM programs credit or compensate rooftop solar customers at the retail rate (the same rate electricity customers pay for electricity), this economic incentive, coupled with falling solar costs, has led to the program's proliferation. As Lincoln Davies notes: "Without this level of support, customers would have no monetary reason to produce their own power, because buying electricity from the incumbent utility would remain a less expensive option."[36]

NEM programs experienced great success in jurisdictions where the cost of electricity is especially high. In such jurisdictions, rooftop solar panels pay for themselves over a much shorter time horizon than in jurisdictions with lower electricity costs. For example, in Hawaii, where utility customers pay nearly three times the national average for electricity,[37] home and business owners took advantage of the state's NEM program in droves, making Hawaii's program the most successful in the country.[38] By 2017, 17% of ratepayers generated electricity from rooftop solar panels, the highest rate of rooftop solar penetration in the country.[39] State NEM policies, coupled with federal and state tax incentives, made investments in rooftop solar attractive to those who could afford the initial capital outlay to purchase the panels or those who could qualify to receive financing for solar panels under an suite of financing options provided by solar companies.

NEM's success did not go unnoticed. The solar industry expanded rapidly in jurisdictions with favorable landscapes like California and Hawaii, states with high electricity costs and ample sun, as well as sunny states like Arizona and Nevada that pay closer to the national average for electricity.[40] The rapid increase in rooftop solar penetration proved disruptive to the utility sector, whose traditional economic model relies upon its volume of electricity sales and passing through the fixed costs of generating electricity and electric grid infrastructure and maintenance to electricity ratepayers through electricity

35. *Id.*
36. *Id.*
37. U.S. Energy Info. Admin. (EIA), *Rankings: Average Retail Price of Electricity to Residential Sector June 2017 (Cents/kWh)*, www.eia.gov/state/rankings/?sid=US#/series/31 (last visited Sept. 26, 2017); U.S. EIA, *Electric Power Monthly*, www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a (last visited Sept. 26, 2017).
38. Herman K. Trabish, *17% of Hawaiian Electric Customers Now Have Rooftop Solar*, UtilityDive, Feb. 1, 2016, www.utilitydive.com/news/17-of-hawaiian-electric-customers-now-have-rooftop-solar/413014/.
39. *Id.*
40. U.S. EIA, *supra* note 37; Shayle Kann et al., Solar Energy Indus. Ass'n & GTM Research, *Solar Market Insight Report 2016 Q3* (Sept. 8, 2016), www.seia.org/research-resources/solar-market-insight-report-2016-q3.

rates.[41] Distributed energy generation, specifically solar energy generated on the rooftops of ordinary ratepayers, subverted this model. In a nutshell, such customers, as generators of their own electricity, purchased less electricity from the utility, forcing the utility to consider reducing utility profits or spreading the cost of maintaining the electric grid to those customers without rooftop solar panels, which would increase electricity rates for such remaining customers and further incentivize these remaining customers to consider purchasing rooftop solar panels.

In 2013, an influential paper titled *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, published by Edison Electric Institute, the trade association for U.S. investor-owned utilities, recognized the significant industry disruption rooftop solar represented. The paper argued that as rooftop solar programs gained a foothold across the country, utilities would experience a vicious cycle of lost revenues, eventually leading to the end of the existing utility model as we know it.[42] Industry observers call this cycle the "utility death spiral." Under the utility death spiral hypothesis, the utility's fixed cost of operation is spread across an ever-smaller number of ratepayers who themselves seek to "defect" from the traditional utility-customer relationship due to high electricity rates.[43] The foregoing dynamic within the energy system has led many utilities to fight aggressively to end or modify NEM programs.[44] Relying on an equity argument, utilities and NEM program critics argue that rooftop solar is unfair to those without rooftop solar (namely, poor and low-income ratepayers, as well as condominium and apartment dwellers) because rooftop solar owners do not pay their fair share to maintain the electric grid.[45] The following section discusses the contours of this debate.

41. *See* Jim Lazar, Regulatory Assistance Project, Electricity Regulation in the U.S.: A Guide 79 (2d ed. 2016), www.raponline.org/wp-content/uploads/2016/07/rap-lazar-electricity-regulation-US-june-2016.pdf (discussing fixed costs and NEM policy debates).

42. Peter Kind, Edison Elec. Inst., Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business 17 (2013), *available at* http://roedel.faculty.asu.edu/PVGdocs/EEI-2013-report.pdf.

43. *See* William Boyd, *Public Utility and the Low Carbon Future*, 61 UCLA L. Rev. 1614, 1676 (2014) (discussing utility death spiral).

44. Tabuchi, *supra* note 25.

45. Krysti Shallenberger, *Heating Up Again: Arizona Turns to Solar Valuation After Demand Charge Decision Delayed*, UtilityDive, Aug. 15, 2016, www.utilitydive.com/news/heating-up-again-arizona-turns-to-solar-valuation-after-demand-charge-deci/424454/ (noting "utilities claim that [solar customers] do not pay their fair share for grid upkeep, forcing non-solar customers to cover their costs"); Tabuchi, *supra* note 25.

B. NEM Debate: A Zero-Sum Formulation

Although rooftop solar programs fundamentally threaten the utility business model by reducing electricity sales, utilities often avoid discussion of the ongoing viability of the utility business model by arguing that NEM policies are unfair.[46] Utilities and NEM critics typically focus on three central fairness arguments. First, the exchange rate offered to NEM customers for electricity they produce does not reflect the overall value of what is offered to the electric grid by solar customers.[47] Second, critics argue, low- to moderate-income ratepayers are harmed by NEM programs because such ratepayers are left to shoulder all of the costs of maintaining the grid.[48] Relatedly, third, NEM customers are not paying their fair share of maintaining the grid because their panels generate electricity during the day, during low-peak electricity use times, and such customers draw on the electricity system in the evening, when solar panels are not generating electricity and the grid is the most tapped for power.[49]

The zero-sum framing reflected in the foregoing arguments ignores the broader transformation occurring within the energy system and leaves undisturbed the features of the energy system, which themselves are unfair, unequal, and unjust. Before reaching these structural concerns, the next section provides an overview of the myriad analytical approaches used thus far to evaluate the cost of solar that, at worst, are locked into a zero-sum analysis of the issue and, at best, fail to foreground the important positive equity implications of rooftop solar adoption.

C. Analytical Approaches

Increasingly, states are turning to cost-benefit analysis to determine the future direction of NEM programs. This is true even in states not yet experiencing

46. *See* Mark Muro & Davashree Saha, *Rooftop Solar: Net Metering Is a Net Benefit*, Brookings, May 23, 2016, www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/ (citing utility arguments). *Cf.* Kind, *supra* note 42, at 17 (noting vulnerabilities in the utilities business model).

47. *See* Exhibit 2A Narrative and Technical Appendix, *Application of Nevada Power Company d/b/a NV Energy for Approval of a Cost-of-Service Study and Net Metering Tariffs*, at 6-7 Docket No. 15-07041 (Nev. Pub. Utils. Comm'n, Aug. 21, 2015) *available at* http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/7629.pdf.

48. *See* Order, *Application of Nevada Power Company d/b/a NV Energy for Approval of a Cost-of-Service Study and Net Metering Tariffs*, at 12, ¶ 20 Docket Nos. 15-07041, 15-07042 (Nev. Pub. Utils. Comm'n, Dec. 23, 2015), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8412.pdf (citing utility argument concerning subsidization of solar ratepayer by non-solar ratepayers).

49. *See id.* at 10, ¶ 15.

significant growth in rooftop solar.[50] In the second quarter of 2017, "there [were] 42 proceedings in 25 states plus the District of Columbia to increase fixed charges or minimum bills on residential solar customers," with 24 states "considering or [having enacted] changes to the net metering policy" in the second quarter of 2017.[51] Further, as of the second quarter of 2017, at least 17 states were "formally examining the value of distributed generation or the costs and benefits of net metering."[52] Regulators in such proceedings look both at existing NEM policies to evaluate value, and also explore "NEM 2.0" and "NEM 3.0" successor regimes.[53] The state of Minnesota and Austin Energy, the municipal power provider in Austin, Texas, have already adopted the value of solar tariffs.[54] Notably, each of these solar tariffs places solar energy provided by rooftop solar customers at values that exceed the retail rate of electricity.[55]

A full analysis of the myriad studies underway and already undertaken to evaluate the cost of solar would exceed the scope of this chapter; however, an analysis of 16 existing cost-of-solar analyses[56] concluded that "all of the studies find that solar energy brings net benefits to the grid and to society."[57] The authors of the study note that "lower values for solar energy often exclude consideration of key benefits that solar panel owners provide to the grid and society."[58] The basic value of solar analysis commonly presented by electric

50. Galen Barbose, Lawrence Berkeley Nat'l Lab., Putting the Potential Rate Impacts of Distributed Solar Into Context 1 (2017), *available at* https://emp.lbl.gov/sites/default/files/lbnl-1007060.pdf.
51. Trabish, *supra* note 38 (citing North Carolina Clean Energy Technology Center Second Quarter 2017 Report).
52. *Id.*
53. *Id.*
54. *See* NCSL, *supra* note 26.
55. *See, e.g.*, Griselda Blackburn et al., *Solar Valuation and the Modern Utility's Expansion Into Distributed Generation*, 27 Elec. J. 18, 22 (2014); *see also, e.g.*, John Farrell, Inst. for Local Self-Reliance, Minnesota's Value of Solar: Can a Northern State's New Solar Policy Defuse Distributed Generation Battles? 3 (2014), *available at* https://ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf (noting that "Minnesota utilities have been getting a sweet deal on solar power, reaping its benefits for their ratepayers and shareholders"); *see also* Karl Rábago et al., Austin Energy & Clean Power, Designing Austin Energy's Solar Tariff Using a Distributed PV Value Calculator 1 (2012), *available at* www.cleanpower.com/wp-content/uploads/090_DesigningAustinEnergysSolarTariff.pdf (noting that the "retail price paid by the customer and credited for solar energy under net metering . . . does not necessarily represent and likely under-represents the full value of distributed solar generation").
56. The authors of the study *The Value of Rooftop Solar Power for Consumers and Society*, reviewed 16 reports concerning the value of solar, dating back to November 2012 and spanning through August 2016. The studies covered various jurisdictions, including Arizona, Colorado, Massachusetts, Minnesota, Mississippi, Nevada, New Jersey, Pennsylvania, Vermont, and utility service areas in San Antonio, Austin, and the Rocky Mountain region. Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society, *supra* note 24, at 12.
57. *Id.* at 11.
58. *Id.*

utilities calculates the avoided costs of the expansion of solar, asking, "what costs do ratepayers and the utility avoid or defer as more solar energy is integrated into the grid"?[59] Such avoided costs include "avoided energy costs, avoided capacity and capital investment, costs of market price fluctuation and avoided environmental compliance costs."[60] The Environment America Research and Policy Center authors argue that "[e]quating avoided costs with the value of solar . . . does not capture all of the benefits that solar energy creates. . . ."[61] The authors further argue that value of solar calculations are more accurate when studies utilize a broader analytical frame to incorporate grid benefits, such as: (1) avoided energy costs, such as the reduction in the amount of electricity purchased or generated by the utility from fossil fuel power plants[62]; (2) reduced losses in electricity sent across vast networks of transmission lines, an estimated loss of about $21 billion in electricity in 2014, or "five percent of the total amount of electricity transmitted and distributed that year"[63]; (3) avoided investment in new power plants, transmission lines, and electricity system infrastructure[64]; (4) reduced financial risks due to fuel price volatility[65]; (5) grid resiliency due to the decentralization of the electricity grid[66]; and (6) avoided environmental compliance costs since "[i]ncreasing solar energy capacity helps utilities avoid or reduce the costs of installing new technologies to curb air and water pollution or installing renewable energy."[67] Among the environmental and social benefits that provide a more accurate assessment of the value of solar are: (1) climate change benefits; (2) reduced public health threats due to the reduced emissions of air pollutants; and (3) increased job creation and economic development.[68] The authors of the study recommend a suite of policy approaches to promote solar power, including: no fixed charges or higher costs on solar customers; implementing high and aggressive goals for solar energy on the grid, such as renewable portfolio standards; limiting policy and financial hurdles to solar adoption; supporting local government adoption of solar energy; and establishing programs that increase access to solar power.[69]

59. *Id.*
60. *Id.*
61. *Id.*
62. *Id.* at 8.
63. *Id.*
64. *Id.* at 9.
65. *Id.*
66. *Id.* at 8.
67. *Id.* at 9.
68. *Id.* at 10.
69. *Id.* at 17.

A recent study conducted by researchers at Lawrence Berkeley National Laboratory suggests that the focus on the cost of solar and the purported cost-shift between solar and non-solar customers may itself be misguided.[70] The authors found that other energy system factors, such as energy-efficiency programs and policies; natural gas prices; renewable energy portfolio standards; state and federal carbon policies; and electricity industry capital expenditures, have a bigger impact on future retail electricity prices than increased solar energy on the electricity grid.[71] Moreover, the authors note, the threshold issue in the cost-benefit analysis is "time horizon: whether to consider only short-run avoided costs from distributed solar, consisting mostly of avoided fuel and power purchase expenses, or to also consider longer-term avoided costs, including potential deferral of generation and [transmission and distribution] investments."[72] Further, broader societal benefits, "such as avoided environmental externalities[,]" also factor into the set of questions regarding threshold considerations.[73] The study examined distributed generation as the function of three basic drivers: "[I]ts penetration level, the net avoided costs to the utility, and the compensation rate provided to distributed solar customers."[74] On review of these drivers, the study concluded that

> for the overwhelming majority of utilities, current [rooftop solar] penetration levels are far too low to result in any discernible effect on retail electricity prices, even under the most pessimistic assumptions about the value of solar and generous assumptions about compensation provided to solar customers (e.g., full NEM with volumetric rates).[75]

Other policies, the Lawrence Berkeley National Laboratory study notes, have a bigger impact on retail electricity sales. For example, energy efficiency reduced U.S. retail electricity sales by approximately 14% in 2015.[76] This analysis indicates that the undue focus on NEM and its impact on retail electricity sales, and by extension, non-solar customers, masks deeper issues embedded in the solar transition.

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70. Barbose, *supra* note 50, at 28 (noting that "proposals to reform rate structures and net metering rules for solar customers . . . have been met with a great deal of contention and often absorb substantial time and administrative resources, potentially at the expense of other issues that may ultimately have greater impact on utility ratepayers").
71. *See, e.g., id.* at 16 (discussing energy efficiency); *id.* at 18 (discussing fuel price volatility); *id.* at 21 (discussing renewable portfolio standards policy requirements), *id*. at 24 (discussing carbon policies); *id.* at 28 (noting that NEM policy has relatively low impact on electricity prices compared to other policies).
72. *Id.* at 8.
73. *Id.*
74. *Id.*
75. *Id.* at 10.
76. *Id.* at 5.

The foregoing studies indicating that solar energy provides substantial social, environmental, and economic benefits to consumers and the electricity grid, and that NEM has little impact on electricity retail rates begs the question: Why are so many states engaging in analyses to evaluate the "cost of solar" if the data already illustrates that the social and environmental benefits of solar outweigh the costs, and if the forecasted impact on retail rates is negligible when compared with other energy policies? As the following part discusses, the value of solar debates mask more fundamental changes occurring within the energy system with the potential to disrupt the structure of the utility sector and forever alter the power relationship between utility and customer.[77]

III. The Stakes of NEM

The future of NEM programs around the country could prove outcome-determinative to how the energy system at large transforms, and whether such transformation allows for lasting justice or merely replicates the injustices within the existing energy system. The current myopic focus on measuring the costs and benefits of rooftop solar masks the broader dynamics unfolding within the current energy transition. Moreover, current analytical approaches to NEM avoid a deeper reckoning of the aspects of the energy system that are themselves inherently unjust, which are actually mitigated by NEM. This part teases out the equity issues embedded within the current NEM policy debates that are often left unaddressed by stakeholders analyzing questions regarding the value of solar. The discussion below addresses the structural changes taking place to transform the energy system, focusing on the changes to the utility business model brought about by the increased penetration of rooftop solar and the fundamental shift in the relationship between electricity customers and traditional utilities. The next section then unearths the equity concerns embedded within the NEM debates, and the last section notes that focusing narrowly on the value of solar without considering equity runs the risk of reifying the inequities already embedded within the energy system.

A. Power System Transformation

A bird's eye view of the skirmishes concerning NEM reveals a rapidly shifting energy landscape, wherein traditional power structures are upended,

77. *See, e.g.*, Tabuchi, *supra* note 25.

wealth is transferred, and the relationship between energy customer and utility is fundamentally altered. Industry watchers and energy stakeholders recognize as much; however, such dynamics often manifest as discussions regarding the disruptive technical innovations that will create a "smarter" electric grid. The preoccupation with technical fixes delays much-needed reforms of the energy system and the underlying business model of the majority of utilities that make up the energy system. Although some scholars have hinted that the NEM policy debates mask more fundamental shifts occurring within the energy sector,[78] none has made explicit the broader stage on which the NEM drama is unfolding and connected this drama to deeper concerns regarding equity.

This section situates NEM within this broader energy system transformation, and focuses on the fundamental structural change to the energy system brought about by the increase in rooftop solar penetration: the change in the relationship between the utility and the electricity customer, as reflected in the proliferation of rooftop solar and community solar programs. Each of these structural changes exposes the equity dynamics that underlie the current NEM debates. Energy stakeholders should take this broader context into account as the value of solar debates unfold and regulators design future regulatory pathways for solar energy.

The proliferation of rooftop solar generation challenges the fundamentals of the traditional utility business model.[79] As noted, most utility profits are tied to the amount of electricity they sell. When fewer customers purchase electricity, utilities are forced to spread their costs across a narrower band of utility customers.[80] Rooftop solar pressures this business model by steadily decreasing the number of customers within the utility rate base and forcing the utility to raise electricity rates on an ever-dwindling number of utility customers who themselves seek opportunities to exit the system and generate electricity on their rooftops.[81]

As the cost of solar panels continues to drop, the pressure on the utility business model will only increase.[82] Framing the NEM debate solely as one

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78. Davies, *supra* note 30, at 138:

> At one level, the tension between the utility death spiral and grid parity is about who produces electricity and how this product will be delivered. It is about the tension between centralization and distribution, about the implicit desire for electricity simply to be a background part of the global economic infrastructure, or instead for it to be a method of direct public participation and active democracy. In this vision, the tension points up longstanding debates between and among values in the energy system.

79. *See generally* Kind, *supra* note 42.

80. *Id.* at 17.

81. William Boyd, *Public Utility and the Low Carbon Future*, 61 UCLA L. Rev. 1614, 1676 (2014).

82. *See generally* Kind, *supra* note 42.

of determining the value of solar ignores the elephant in the room and only acts to delay the inevitable: the fundamental shift of the electric utility business model away from one in which utilities sell electricity to utility customers to one in which utilities provide a diverse array of energy services to utility customers within an energy services platform.[83]

Distributed solar energy fundamentally alters the utility customer's relationship to the utility by converting the customer from a consumer of electricity to a prosumer of electricity. Prosumers not only consume electricity sold by the utility, but also generate electricity for their own consumption as well as for the benefit of other utility customers.[84] Through energy storage and other distributed energy resources, the modern utility customer has opportunities to control energy consumption patterns in ways not contemplated within the classic utility-customer relationship.[85] This new relationship disrupts the power dynamics embedded in the energy system and redistributes wealth from utilities to energy customers. It also explains why traditional utilities have strongly resisted the rise of rooftop solar.

NEM analysis and policy responses should take into consideration the reality that distributed solar generation permanently breaches the barrier between consumer and utility. Although the value of solar analysis approach to the NEM policy debate recognizes that consumers are now moving into the realm of providing electricity, policy proposals that essentially place electricity customers who generate their own electricity on the same footing with utilities by pegging the compensation rate to the utilities "avoided costs" go too far. Prosumers of electricity differ fundamentally from utilities, since such electricity customers lack access to the same pools of capital available to utilities and utilities have benefited from nearly a century of favorable regulation.[86]

Once regulators acknowledge that rooftop solar fundamentally changes the relationship between the utility and the customer, they can design policy that mitigates the risks generated by increasing distributed generation, and

83. *See* N.Y. State Dep't of Pub. Serv., Case. No. 14-M-0101, Reforming the Energy Vision 11 (2014) (describing "utility as a Distributed System Platform Provider" as a central component of New York State's landmark reforming the energy vision docket).

84. *See supra* note 21 (defining prosumer).

85. *See* Rickerson et al., *supra* note 21, at 26-27 ("There are both policy and technological solutions to improving [prosumers'] self-consumption ratio . . . including sizing the PV system small enough to never exceed minimum household load, storage, and strategies to increase or dispatch onsite demand.") (internal citations omitted); *id.* at 29 (citing "Control" as a prosumer value: "Some consumers value the freedom to directly control all aspects of energy use.").

86. Lazar, *supra* note 41, at 6 (discussing the so-called regulatory compact wherein "the utility accepts an obligation to serve in return for the government's promise to approve and allow rates that will compensate the utility fully for the costs it incurs to meet that obligation").

also design approaches that offer opportunities for traditionally excluded individuals and communities to participate in solar energy generation. Opening pathways for low- to moderate-income ratepayers to become prosumers also has the power to change the economic circumstances of these communities, which are inherently more vulnerable to fluctuations in electricity rate increases. By creating regulatory pathways to convert these electricity consumers to prosumers, policymakers can empower communities in ways that have ripple effects beyond the energy sector. Early adopters of rooftop solar programs are already experiencing the economic and social benefits of controlling the electricity they generate; such benefits could have profound impacts on the most economically vulnerable ratepayers.

Traditional utilities might argue that broadening pathways for participation in energy generation only accelerates the utility death spiral, which could have a profoundly destabilizing impact on the electric grid, but regulators should view this argument with skepticism. Although the traditional utility business model might buckle under the weight of increased rooftop solar penetration, embracing the inevitability of the energy system transformation and the fundamental change in the relationship between the customer and the electric utility could force (or free) utilities to innovate. Such innovation could ease the transition and allow for utilities to move into new roles within the energy system of the future. For example, Green Mountain Power, Vermont's investor-owned utility, has introduced a suite of programs to increase renewable energy generation on Vermont's electric grid and provide cost savings for customers.[87] Industry watchers frequently cite the utility's CEO, Mary Powell, for her bold statements regarding the shifts afoot within the utility sector.[88] Rather than resist these changes, Powell's company has chosen to embrace the changes, finding ways for the utility to generate profits for shareholders while also ceding more control to the ratepayer through a range of innovative products and platforms.[89] As the *New York Times* notes, Powell's company recently outfitted a new low-income housing development with rooftop solar panels supported by back-up batteries, a part of Green Mountain Power's "bold experiment at turning homes, neighborhoods, and towns into virtual power plants, able to reduce the amount of energy they draw from the central electric system."[90] In an interview, Powell speaks about

87. Diane Cardwell, *Utility Helps Wean Vermonters From the Electric Grid*, N.Y. Times, July 29, 2017, www.nytimes.com/2017/07/29/business/energy-environment/vermont-green-mountain-power-grid.html?mcubz=0.
88. *Id.*
89. *Id.*
90. *Id.*

the grassroots desire in her state to move toward self-generation, and she notes that this movement provides an opportunity for the utility to "lead the transformation of an electric system that depends on power sent along big transmission lines 'to a community-, home- and business-based energy system.'"[91] In the long run, the article notes, Powell's low-income rooftop solar development, supported by batteries, could actually lead to utility savings if the utility uses the development to avoid drawing from the regional power grid during peak times.[92] Although the utility does not discuss in detail the economic or ownership model of the low-income development, a customer in the new housing development notes that when the power goes out, she "does not have to worry about food spoiling in the refrigerator," a key equity benefit fostered by the utility's willingness to innovate beyond the standard utility business model.[93]

Community solar programs reflect the broader changes in the nature of the relationship between utility and ratepayer. The programs emerged in the wake of successful NEM programs as a way to allow those who cannot participate in rooftop solar energy production to participate in the clean energy transition.[94] Currently, 16 states have some form of community solar legislation, and in some jurisdictions, utilities have designed programs that allow for community energy generation.[95] From 2015 to 2016 alone, the amount of community solar capacity in the United States grew from 125 megawatts (MW) of electricity to 331 MW, and there is increased demand for such programs.[96] The Clean Energy States Alliance defines community solar as "a purchasing arrangement in which multiple customers share the electricity or the economic benefits from a single solar array,"[97] and notes that this broad definition may give rise to "very different" meanings "in different states, and sometimes even within the same state."[98] This breadth provides the opportunity to implement community energy programs in ways that support the utility business model transition away from electricity generation, distribution, and sales toward the energy service provider business model, but it

91. *Id.*
92. *Id.*
93. *Id.*
94. *See* Baker, *supra* note 16, at 215.
95. Diana Chace & Nate Hausman, Clean Energy States All., Consumer Protection for Community Solar 8 (2017), *available at* www.cesa.org/assets/2017-Files/Consumer-Protection-for-Community-Solar.pdf.
96. *Id.* at 7 (noting that Massachusetts, Minnesota, and New York "have community solar interconnection queues that dwarf currently installed community solar capacity").
97. *Id.* at 5.
98. *Id.* at 6.

also brings potential consumer protection risks.[99] In designing community energy frameworks, regulators must also be mindful of particular risks to low-income customers, such as long-term contracts that increase risks to customers and unclear definitions concerning the relationship between the customer and service provider.[100]

Approaches to community solar programs vary. The most common approach to community solar allows an electricity customer to purchase a participation interest in a solar project located away from the customer and receive a credit on her electricity bill for the solar energy produced by the solar panels.[101] In some cases, community solar customers pay extra for solar energy, and in others, programs are modeled after NEM, where customers receive utility credit for solar power at the retail rate.[102] Programs may also peg community solar compensation rates to the "value of solar," calculated to include all of the benefits of costs of solar power, or the wholesale rate for electricity.[103] In many community solar programs, customers are introduced to long-term contracts for service, whereas in others, customers are given the option to opt in on a month-to-month basis.[104]

Ownership approaches to community solar programs also run the gamut. Solar arrays may be utility-owned, investor-owned, community-owned, or offer the opportunity for community ownership at some point after the project is developed.[105] As should be evident, community solar programs are not created equal; some programs mitigate the equity issues concerning the rise of distributed energy generation, while others exacerbate equity concerns.[106]

In ideal circumstances, community solar programs would create the same incentives for participation embedded within early NEM policy frameworks. The programs would offer a retail rate of electricity in exchange for the power generated. Customers would also have the opportunity to export clean power into the electricity grid and receive credit for this exported power, much like early NEM programs. Finally, customers would also have some flexibility and control over the siting, size, and ownership of the panels, just as with NEM.[107]

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99. Reforming the Energy Vision, *supra* note 83.
100. Chace & Hausman, *supra* note 95, at 6.
101. *Id.*
102. *Id.* at 10.
103. *Id.* at 12.
104. *Id.* at 10.
105. *Id.* at 11.
106. *See* Baker, *supra* note 16, at 216.
107. Nearly one-half of American households who pay no federal income tax would not benefit from the solar tax credit still available for solar installation, *see* Chace & Hausman, *supra* note 95, at 15. On balance, the robust design of a community solar policy can still offer economic benefits for the

Unfortunately, not all community energy programs incorporate these features, and in an attempt to balance the concerns arising from NEM programs, some state utilities commissions, such as the Public Utility Commission (PUC) of Hawaii, the first state to end its NEM program,[108] have proposed designs to community energy programs that will effectively decrease incentives to participation. In Hawaii, the PUC staff proposed community-based renewable energy programs require an up-front investment by ratepayers to participate in the program; the program does not allow for retail rate exchange for energy produced; and it does not incentivize community-based development or ownership.[109] The proposal attempts to remedy many of the issues identified by the state's investor-owned utility concerning the state's highly successful NEM program, and in the process creates a complex framework for community energy that may be unattractive to those the program was intended to serve—those without rooftops to affix panels and those without the financial resources to participate in rooftop solar programs.[110]

Vermont community solar development addresses many of these concerns. As outlined by Kevin B. Jones and Mark James in *Distributed Renewables in the New Economy: Lessons From Community Solar Development in Vermont*, the design of the Boardman Hill Solar Farm closely mirrors the approach to early NEM programs.[111] The project is a community-owned project developed in partnership with the owners of the Boardman Hill Farm; members of the Mount Holly, Vermont, community; and a local solar developer.[112] The developer built the project and then sold the project to a community-owned business entity.[113] Individuals in the Mount Holly community also received federal tax credits as owners of individual solar panels within the

consumer by allowing consumers to receive credit at the retail rate for electricity generated. Moreover, third parties may share tax benefits by offering attractive financing packages to customers seeking to develop community solar projects.

108. Order No. 3325, *In re Pub. Utils. Comm'n Instituting a Proceeding to Investigate Distributed Energy Resource Policy*, Docket No. 2014-0192 (Haw. Pub. Utils. Comm'n., Oct. 12, 2015), *available at* http://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A15J13B15422F90464.

109. *See* Order No. 34388, Addressing Pending Matter and Issuing the Attached Proposed Community-Based Renewable Energy Program Framework and Model Tariff Language for Review and Comment, *In re Haw. Elec. Co.*, Docket No. 2015-0389 (Haw. Pub. Utils. Comm'n., Feb. 10, 2017), *available at* http://dms.puc.hawaii.gov/dms/OpenDocServlet?RT=&document_id=91+3+ICM4+LSDB15+PC_DocketReport59+26+A1001001A17B13B02451H1486718+A17B13B34151G856641+14+1960.

110. *See generally* S.B. 1050 SD2 HD3 CD1 (Haw. 2015), *available at* www.capitol.hawaii.gov/session2015/bills/SB1050_CD1_.pdf.

111. Kevin B. Jones & Mark James, *Distributed Renewables in the New Economy: Lessons From Community Solar Development in Vermont*, *in* Law and Policy for a New Economy: Sustainable, Just, and Democratic, *supra* note 16, at 189-210.

112. *Id.* at 204-09.

113. *Id.*

project.[114] Unlike the Hawaii-proposed approach, which relies on third parties to deliver energy, in the Vermont example, community members formed a business entity that generated its own electricity, which allowed for community control over the siting and scale of energy projects.[115] These legal entities, comprised of community members, become owners of the electricity generated and were able to sell the electricity generated back to the utility at the retail rate plus a "solar adder" that added around 4.5 cents per kilowatt hour.[116] Although, like early NEM programs, the entities must secure financing to cover the cost of developing the project, over time, this ownership interest allows for greater economic benefits spread over the participants in the project, eventually leading to outright ownership and control of the electricity infrastructure and electricity.

Community solar is a natural successor to NEM, but policy frameworks must be designed to provide a pathway for low- to moderate-income communities to participate in the energy transition. Such frameworks must also take into account the reality of the current energy system: Certain features of the traditional utility model must yield to the innovations spurred by the decreased cost of solar panels. When policymakers fail to recognize the broader context within which NEM is unfolding, they run the risk of creating solutions to NEM that exacerbate inequities within the existing energy system as well as shutting vulnerable communities out of the renewable energy transition.

Policymakers should move beyond the zero-sum framing to design policies that allow low- to moderate-income payers to benefit economically from the wealth created when customers generate their own electricity. As discussed earlier, when properly designed, community solar programs provide one such pathway; however, within an energy services provider framework, where the utility provides a range of services to electricity customers, other innovations may emerge.

B. Masking Energy Inequities

As noted, NEM detractors have deftly used equity as a sword to combat the increased penetration of rooftop solar in jurisdictions such as Hawaii and

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114. *Id.*

115. *Id.* at 204 (noting that the "key features of the [community-owned solar project] are appropriate land use and siting, community ownership of solar array and solar energy, affordable cost with growing member equity in the project, and a member-managed organizational structure").

116. *Id.* at 204.

Nevada.[117] Equity has also been used to shield some jurisdictions from the development of the distributed solar energy market. This section outlines the ways in which NEM detractors have focused narrowly on certain equity issues while avoiding other, more significant, equity concerns embedded within the energy system. An illustration of the full panorama of equity concerns reveals that, rather than harm low-income ratepayers, NEM provides regulators and policymakers with the opportunity to identify and correct the inequities inherent in the existing energy system. These equity concerns should be explicitly evaluated when considering the overall value of solar. Against this more complex equity backdrop, policymakers may also create successor NEM policies that ensure that inequity is not replicated in the energy system of the future.

NEM policies created a market for renewable energy by incentivizing homeowners and business owners to invest in solar panels, eventually lowering electricity costs for these early adopters. These attractive policies helped to spur development and innovation within the solar industry, driving down the cost of solar energy and making it more affordable to those initially unable to invest in rooftop solar panels. Creative financial instruments also emerged to broaden access to solar energy.[118] Noting the disruptive potential of solar, and understanding that increasing access to renewable energy meant lower electricity sales, utilities began to argue that solar energy harms low-income ratepayers because such ratepayers are left to bear the costs of maintaining the electric grid. The deep irony of this equity argument is that, just as solar is becoming accessible to a broader segment of the population, including low- to moderate-income ratepayers through a variety of policy and financial innovations including community solar, utilities are using poor people to limit programs from which they could economically benefit.[119]

Focusing on the value of solar to the grid today also ignores the long-term positive impact that a successful rooftop solar market may have on low-income communities, among them decreased fossil fuel-burning in low

117. Krysti Shallenberger, *Hawaii PUC Ends Net Metering Program*, UtilityDive, Oct. 14, 2015, www.utilitydive.com/news/hawaii-puc-ends-net-metering-program/407328/; Julia Pyper, *Does Nevada's Controversial Net Metering Decision Set a Precedent for the Nation?*, Green Tech Media (GTM), Feb. 4, 2016, www.greentechmedia.com/articles/read/nevada-net-metering-decision. *But see Nevada Reinstates Key Solar Energy Policy*, Reuters, June 15, 2017, www.reuters.com/article/us-usa-solar-nevada/nevada-reinstates-key-solar-energy-policy-idUSKBN1962IZ (discussing the reversal of the initial decision to end net metering in Nevada).

118. Deborah N. Behles, *From Dirty to Green: Increasing Energy Efficiency and Renewable Energy in Environmental Justice Communities*, 58 Vill. L. Rev. 25, 47-50 (2013) (discussing financial innovation to spur clean energy development in low-income communities and communities of color).

119. Baker, *supra* note 16, at 211.

and moderate-income communities[120] and increased participation in ownership of energy production. Low- to moderate-income communities and communities of color have long absorbed the negative externalities of the fossil fuel-based energy system.[121] Distributed energy generation lessens the burden on these communities by reducing the amount of fossil fuels burned at power plants sited in poor and low-income communities, as well as reducing the number of new energy projects required to meet energy needs. Any analysis concerning the value of solar must acknowledge the inequities in the current energy system with respect to fossil fuel generation, and adjust the value of solar upward to reflect the social good generated by rooftop solar policy incentives. Successor NEM policies should also be designed to mitigate the harms experienced in historically burdened communities, but this policy outcome can only be reached once policymakers recognize the system's underlying inequities.

Although early solar adopters tended to be those ratepayers with the means to invest in solar panels, as the market expands, so do opportunities for greater participation and control over energy resources by low- to moderate-income ratepayers, advancing the goals of energy democracy.[122] Recent innovations in community energy policy and access to financing support these opportunities. Low- to moderate-income ratepayer control over household-level energy resources could also help to mitigate energy poverty in ways not available under existing low-income assistance programs that sometimes fail to reach ratepayers in need.[123] Regulators should take into consideration these long-term benefits when evaluating the costs and benefits of solar, recognizing that increased participation by economically vulnerable ratepayers in the generation and ownership of electricity ultimately provides a net economic benefit to these ratepayers, who pay greater proportions of income

120. *See* Jeanne Marie Zokovitch Paben, *Green Power and Environmental Justice—Does Green Discriminate?*, 46 Tex. Tech. L. Rev. 1067, 1084-88 (2014) (noting historical impacts of fossil-fuel development on communities of color); *see also* Richard J. Lazarus, *Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection*, 87 Nw. U. L. Rev. 787, 802-06 (1993) (discussing range of environmental pollutants to which community of color are exposed).

121. *See generally* Adrian Wilson et al., Coal Blooded (Monique W. Morris ed., 2016), *available at* www.naacp.org/wp-content/uploads/2016/04/CoalBlooded.pdf (exploring the disparate impact that pollution from coal-fired power plants has on low-income communities and communities of color). *See also* Baker, *supra* note 16, at 219.

122. Matthew J. Burke & Jennie C. Stephens, *Energy Democracy: Goals and Policy Instruments for Sociotechnical Transitions*, 33 Energy Res. & Soc. Sci. 35, 38, tbl. 1, 38-43 (2017).

123. Diana Hernández & Stephen Bird, *Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy*, 2 Poverty & Pub. Pol'y 5, 9 (2010) (noting that in 2009 the low-income assistance program LIHEAP provided assistance to 6.8 million households but upwards of 10-15 million households were struggling with energy poverty); *id.* at 14-19 (analyzing potential of energy-efficiency programs to help mitigate energy poverty).

toward electricity costs and who are more likely to experience impacts when centralized power facilities lose power for extended periods of time. Distributed generation owned and operated by low- to moderate-income ratepayers could also help to stabilize and offer greater predictability of energy costs for these particularly vulnerable ratepayers.

As discussed earlier, over time, utilities will eventually be forced to reckon with the overall transformation spurred by rooftop solar. When regulators create policy that lowers incentives to participate in rooftop solar programs, rather than correct perceived market failures created by NEM, they only reify the inequalities embedded therein and limit opportunities for low- to moderate-income ratepayers to materially change their economic circumstances. This is the true flavor of equity at stake in the NEM policy debates; regulators must design successor NEM policies to address this concern, which is only fully understood over a longer time horizon.[124]

The zero-sum framing of the current NEM debate, wherein the benefits afforded to rooftop solar customers directly and proportionately harm those without solar panels, has tempted policymakers to roll back and reduce compensatory benefits for future adopters of rooftop solar, creating unforeseen equity impacts. Reducing compensatory benefits for solar energy reduces incentives for ratepayers to participate in rooftop solar programs in the future; solidifies benefits for early adopters, who are among the most affluent ratepayers; and freezes in place inequalities already embedded in the system. Retrenchment of NEM policies reinforces the gap between those with means and those without means, and misses an opportunity to lessen the economic burden of energy cost on economically distressed ratepayers.

Equity provides a thematic backdrop for the NEM debate, but the solutions that utilities and other industry players typically offer in response to fairness concerns fit within a narrow band of possibility that avoid a deeper reckoning of the aspects of the energy system that are themselves inherently unjust. By focusing on the economic value of solar within the policy debates, regulators miss an opportunity to create greater equity within the energy system. Further, they miss the opportunity to remedy past harms and create real opportunities for low- and moderate-income ratepayers to participate in the energy transition as prosumers. The following discussion outlines the range

124. *See, e.g.*, Solar Energy Industries Association & Vote Solar, Principles for the Evolution of Net Energy Metering and Rate Design 2 (2017), *available at* https://votesolar.org/files/6314/9623/9565/NEM_Future_Principles_Final_5-31-17.pdf ("The time frame for review of costs and benefits must be on par with the life of the particular type of Distributed Energy Resources (DER) assets, e.g. 20-30 years, and be forward looking, not a snapshot of one year of sunk costs as is typical in a general rate case (GRC).").

of solutions frequently offered by utilities and NEM opponents as possible pathways forward, and notes that if regulators adopt the narrow perspectives offered by such opponents, regulators will fail to utilize NEM to equitably transform the existing energy system.

C. Reifying Energy Inequities

On the extreme end of the spectrum, NEM detractors argue that regulators and legislators should altogether terminate NEM programs. From an equity standpoint, this solution is problematic, as it both reduces the amount of clean energy on the grid and increases the possibility that large, utility-scale developments will be built. If history is a guide, both of these outcomes would disproportionately impact low- and moderate-income ratepayers, since fossil fuel-burning facilities are often sited in low- to moderate-income communities and developers also site utility-scale developments, even renewable energy projects, in areas where the land is cheapest, typically rural areas or areas already burdened by industrial development.[125]

Focusing on the compensatory aspects of NEM, detractors also suggest that regulators reduce the amount offered to rooftop solar participants in exchange for the energy they produce. Although, on its face, such a solution might appear equitable, this solution could harm low- to moderate-income ratepayers by making it unattractive for them to participate in programs that could lower their electricity bills. In addition, many such ratepayers would need to rely on external financing to participate in solar energy programs, and reducing or destabilizing the rate of compensation available for investing in rooftop solar could discourage solar companies from extending financing within these communities, cementing in place economic benefits for early adopters of rooftop solar panels and leaving the most economically vulnerable ratepayers behind.

Finally, utilities have suggested that if the compensation offered under NEM programs continues undisturbed, regulators should increase fixed charges on utility bills to cover the utility cost of providing service. This approach also raises equity concerns, given that these increased fees would disproportionately harm low- to moderate-income ratepayers who often already face budgetary constraints and are sensitive to any increases in electric bills.[126] If regulators opt for a scheme that adds charges to ratepayer bills, a progressive scheme would be more equitable. Although this approach

125. *See, e.g.*, Uma Outka, *The Renewable Energy Footprint*, 30 Stan. Envtl. L.J. 241 258 (2011).
126. Erica Schroeder McConnell et al., Interstate Renewable Energy Council, Shared Renewable Energy for Low- to-Moderate-Income Consumers: Policy Guidelines and Model Provisions

would add complexity, the approach could mitigate the impact of a flat fixed charge on low- to moderate-income ratepayers.

The first generation of NEM policy created incentives that helped to spur remarkable growth in the solar industry, leading to the rapid rise in the number of individuals generating electricity on their rooftops who receive a monetary benefit for the generation of such electricity. Early adopters of rooftop solar tended to be ratepayers with the means to purchase solar panels, giving rise to questions about how the electricity grid should be paid for and raising concerns regarding equity; however, rather than deal directly with these equity concerns, utilities have urged regulators to limit their analysis to the consideration of the economic costs and benefits of distributed solar power to the electric grid.

As the foregoing discussion illustrates, when regulators take such narrow analytical approaches to NEM policy and lower the rate of compensation for solar generated, they freeze inequality in place. Under regulatory schemes that restrict solar access, low and moderate-income people will never have the opportunity to produce and own their own electricity. The following outlines ways that regulators might foreground the equity concerns that form the heart of NEM policy debates but are often left unaddressed in the solutions proffered by energy stakeholders.

IV. Toward a New Framing

As the foregoing discussion illustrates, many existing frameworks used to analyze the fairness of NEM programs and the design of successor regulatory frameworks focus narrowly on cost-benefit analysis and leave issues of equity and energy justice unexamined by either masking or reifying inequity. These issues merit thorough treatment within the NEM debates, as the decisions regulators and lawmakers make regarding the future frameworks for compensating rooftop solar will influence the design of the energy system of the future and shape the trajectory of the current energy transition. This part offers guidance to regulators seeking to foreground equity in decisionmaking concerning the future of NEM programs. This part first defines energy justice as a set of principles, then provides recommendations for how regulators may operationalize principles of energy justice to analyze existing NEM programs, and offers a suite of approaches to design successor regimes.

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13 (2016), *available at* www.irecusa.org/publications/shared-renewable-energy-for-low-to-moderate-income-consumers-policy-guidelines-and-model-provisions/.

A. Principles of Energy Justice

The transformation of the energy system provides an opportunity to identify and remedy the inequities and injustices already embedded within the energy system. Energy justice is an emerging field of scholarly inquiry that offers guideposts and principles to assist with the difficult task of understanding, and then remedying, the injustices embedded within the energy system.[127] Prof. Lakshman Guruswamy frames energy justice as a doctrine that "seeks to apply basic principles of justice and fairness to the injustice evident among people devoid of life sustainable energy. . . ."[128] Energy justice can also be thought of as a broader thematic framework that builds upon the existing fields of environmental justice, climate justice, and economic justice.[129] The field also incorporates principles of energy democracy, itself an emerging field of study that stems from grassroots efforts to "resist, restructure, and reclaim" the existing energy system.[130] This section discusses the contours of each principle identified within the field of energy justice and offers ways to view these principles within the context of the renewable energy transition underway around the United States.

Environmental justice theory explores the ways in which communities of color and low-income communities have historically suffered disproportionate impacts of development, including energy development.[131] As states turn toward renewable energy futures and transition electric grids away from fossil-fuel development, the concerns of environmental justice remain important. Scholars analyzing the impacts of renewable energy development globally and within the United States have noted that renewable energy projects can have large physical footprints that raise a host of social and environmental concerns.[132] The renewable energy transition offers an opportunity for regulators and policymakers to transform the existing energy system and shape a new energy system that does not replicate the environmental justice concerns of the old system. New renewable energy development should balance costs and benefits of development, bearing in mind historical burdens borne by vulnerable communities.

127. Baker, *supra* note 16, at 218.
128. Lakshman Guruswamy, *Energy Justice and Sustainable Development*, 21 Colo. J. Int'l Envtl. L. & Pol'y 231, 233 (2010).
129. Baker, *supra* note 16, at 218-21.
130. Burke & Stephens, *supra* note 122, at 37.
131. Baker, *supra* note 16, at 219.
132. *See generally* Shalanda H. Baker, *Unmasking Project Finance: Risk Mitigation, Risk Inducement, and an Invitation to Development Disaster?*, 6 Tex. J. Oil, Gas, & Energy L. 273 (2010-2011); Outka, *supra* note 125.

Climate justice builds upon and expands environmental justice, and offers a lens to evaluate the potential impacts of climate change.[133] The field acknowledges that low- to moderate-income communities suffer disproportionately from the impacts of climate change, as they often live in communities with degraded environments and are least prepared to bear the economic burdens of major weather events[134] or an unstable climate. Recent examples of these theoretical principles bear this out. For example, the communities who proved most vulnerable to Hurricane Katrina and Superstorm Sandy were low-income communities and communities of color.[135] In New Orleans and New York City, for historical reasons, poor residents lived in environmentally degraded areas below sea level and on the waterfront, which made them particularly vulnerable to the impacts of the storms.[136] Many of these residents also lacked sufficient economic resources to leave their homes and thus chose to ride out the storm, placing them in harm's way.[137] Similarly, Superstorm Sandy left poor residents without the power to pump water within large high rises, in some cases for weeks, posing a sanitation risk.[138] Moreover, many residents lost valuable medicines that required refrigeration. Power outages left medical equipment inoperable and placed these residents at risk.[139] Incorporating climate justice into renewable energy policy requires policymakers to consider pathways that fortify such communities and render them less vulnerable to the impacts of climate change. Examples include micro-grid development and increasing the amount of distributed (back-up) energy available in particularly vulnerable communities.[140]

Economic justice provides avenues for groups who historically have been impacted by economically harmful law and policy to find redress. As discussed earlier, the structure of the modern energy system operates to perpetuate a certain amount of economic injustice in low- to moderate-income

133. Baker, *supra* note 16, at 220.
134. *Id.*
135. Shelley Welton, *Clean Electrification*, 88 U. Colo. L. Rev. 571, 628 (2017).
136. Maya Wiley, *After Sandy: New York's "Perfect Storm" of Inequality in Wealth and Housing*, Guardian, Oct. 28, 2013, www.theguardian.com/commentisfree/2013/oct/28/sandy-new-york-storm-inequality (noting that in New York City, beginning in the 1950s, "we put our elderly and disabled, our hard-working poor and their children, in high-rise brick boxes of public housing on vacant, out-of-the-way waterfront land").
137. *Id.* (noting that many public housing residents chose not to evacuate during Superstorm Sandy due to lack of resources and fear that they would lose valuable government housing).
138. City of N.Y., *supra* note 1, at 17.
139. Michael T. Schmeltz, et al., *supra* note 18, at 804.
140. Jeff Winmill, *Electric Utilities and Distributed Energy—Opportunities and Challenges*, 6 San Diego J. Climate & Energy L. 199, 207-08 (2015) (noting that buildings with combined heating power units and those connected to microgrids maintained electricity even when surrounding areas lacked power; and "rooftop solar, while an intermittent resource, was also able to provided needed electricity in the weeks after the storm when the main transmission grid was down").

communities, because they pay a disproportionately high amount of their income for something that is arguably a public good.[141] Although electricity is essential to modern life, for many, the cost of electricity poses a burden on household budgets. This phenomenon is often referred to as energy poverty.[142] As the new energy system takes shape, policymakers should consider energy policies that redistribute energy benefits and burdens, and offer those who pay disproportionately high amounts for electricity the opportunity to generate and own their own electricity in order to reduce their energy costs. This approach to energy policymaking would begin to redress the economic injustices suffered by communities within the old energy system.

Energy democracy gives individuals and communities a voice in shaping the energy system.[143] The term encapsulates both substantive and procedural elements, as not only do ratepayers have the ability to comment on proposed developments and participate in community energy planning processes, but within a paradigm of energy democracy, ratepayers would also have a true economic stake in energy projects.[144] In many ways, rooftop solar captures aspects of energy democracy because energy customers have control over the siting and size of solar panels while reaping economic benefits. Certain forms of renewable energy lend themselves to this type of participatory approach to development, and communities in diverse jurisdictions around the world have illustrated the power of energy democracy through community energy planning and community-owned energy projects.[145]

Energy justice requires lawmakers to identify injustices embedded in the existing energy system and craft policies that remedy these injustices. A justice-based approach to designing the energy system of the future also levels the playing field for those who have been harmed by an inequitable system, in alignment with the true meaning of equity. The following section provides policymakers with practical guidance on how to foreground and operationalize equity in energy policymaking.

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141. *See* Baker, *supra* note 16, at 227-32 (arguing for conceptualizing a new energy commons in energy policymaking).

142. Michael Keenan, *Too Much of a Good Thing: How Overpopulation, Overconsumption, and Failing Distributive Justice Programs Are Imperiling Mankind*, 24 Vill. Envtl. L.J. 59, 74-75 (2013) (noting that the high cost of electricity can lead to energy poverty). *See also* Raffaella Centurelli, *Energy Poverty: Can We Make Modern Energy Access Universal? Focus on Financing Appropriate Sustainable Energy Technologies*, 22 Colo. J. Int'l L. & Pol'y 219, 221 (2011) (defining energy poverty as a question of access to electricity).

143. Baker, *supra* note 16, at 220.

144. *Id.*

145. *See, e.g.*, Lincoln L. Davies & Alexis Jones, *Fukushima's Shadow*, 48 Vand. J. Transnat'l L. 1083, 1119 (2015) (discussing energy democracy efforts in Germany); *see also* Rafael Leal-Arcas, *Sustainability, Common Concern, and Public Goods*, 49 Geo. Wash. Int'l L. Rev. 801, 868 (2017) (discussing broader European efforts toward greater citizen participation in the energy transition).

B. *Operationalizing Equity in the Cost of Solar Analysis*

As noted, much of the analysis concerning NEM to date has focused on the value of solar to the grid and then tying this monetary value to the amount of compensation that rooftop solar participants should be compensated or credited for the energy they provide to the grid. In general, the value of solar methodology examines the cost that the solar power helps the utility to avoid.[146] For example, when a ratepayer generates a certain amount of electricity, the utility avoids the need to purchase the power from a power provider. Given that utilities purchase power from the energy marketplace at a wholesale rate that is much lower than the rate that they sell to electricity customers—the retail rate—utilities argue that rooftop solar energy should be benchmarked to this wholesale power rate, rather than the retail rate.[147]

Incorporating equity and principles of energy justice into the value of solar analysis requires regulators to incorporate social impacts into the overall rubric that informs value of solar methodologies. This analysis expands the lens from the avoided power calculus to the more comprehensive "avoided social cost" perspective. Regulators should also incorporate a longer time horizon in analyses regarding the value of solar. In addition to evaluating the amount of power the utility may avoid purchasing on the energy market during a particular narrow window of time, energy justice requires regulators to consider the long-term impact of more distributed energy on the grid and compare this amount of energy to the overall expenditures the utility would be required to make in order to meet ratepayer electricity needs. This approach to valuing solar foregrounds equity because it places value on foregoing building a power plant that would have social and environmental impacts. Moreover, with distributed solar energy, the solar customers and solar companies bear the cost of investing in the solar infrastructure, rather than all ratepayers, as would be the case with a utility-scale project whose costs the utility could pass on to the entire rate base.

When using principles of energy justice to determine the value of solar and its potential benefits to ratepayers, regulators should also look to a broader range of impacts, including the positive impact of cleaner energy within the electricity grid on low- to moderate-income communities. As discussed, low- and moderate-income ratepayers often inhabit communities that have long been home to polluting industries, including power facilities. With the

146. Weissman & Fanshaw, *supra* note 56, at 1, 8.
147. Georgia and Mississippi take variations of this approach. *See* NCSL, *supra* note 26 (noting that Georgia Power, Georgia's largest utility, credits solar customers at the avoided cost, and Mississippi credits solar customers at the avoided costs plus a premium).

exception of fossil fuel-burning facilities that supply a base load of power to the grid and that must be maintained at a certain level to preserve the stability of the electric grid, increasing distributed solar power on the electric grid reduces the amount of new fossil fuel that must be burned in new energy projects or in "peaker" plants that supply energy to the grid during times of high energy load on the grid.[148] Since such polluting projects are often sited in poor and low-income communities, energy justice requires that regulators consider the health and safety benefits of rooftop solar to marginalized communities in analyzing its overall value to the electricity grid.

C. *Designing Successor NEM Regimes*

Utilizing principles of energy justice as a guide, regulators should seek to design successor NEM policies that remedy the inequities already embedded in the energy system, rather than mask or reinforce them. Community energy must be a part of any policy debates concerning the future of customer-sited renewable energy. Community energy provides the clearest pathway for low- to moderate-income electricity customers, who often are not homeowners, to generate and own their own electricity and receive economic benefits for creating such energy,[149] just as with early NEM programs. Community-based energy development provides deeper resilience to climate change. Community-scale development gives consumers greater control over the siting and scale of the energy projects that serve them. Community-based renewable energy also reduces harmful environmental impacts of fossil fuel-based energy.

Community energy regulatory regimes and statutory frameworks should be prioritized within the design of successor NEM regimes, as they can be designed to meet important energy justice objectives. Such community energy development regulatory regimes should allow for communities to participate in the design of renewable energy projects, including siting and scale of energy development; as well as allow communities to reap economic benefits from the projects. When properly designed, community energy development can allow for low- to moderate-income ratepayers to participate in renewable energy generation in ways that mirror early NEM programs. This participation resonates with the principles of equity, which allows for

148. *See* Jeremy Neubaur et al., Nat. Renewable Energy Lab., Identifying and Overcoming Critical Barriers to Widespread Second Use of PEV Batteries 59 (2015), *available at* https://permanent.access.gpo.gov/gpo59845/63332.pdf (explaining and defining role of "peaker plants").

149. Cheryl V. Jackson, *Want Solar Panels but Can't Afford Them? Cook County Working to Set Up Co-Ops*, Chi. Trib.: Blue Sky Innovation, Apr. 3, 2017, www.chicagotribune.com/bluesky/originals/ct-cook-county-solar-panel-co-ops-bsi-20170403-story.html.

previously excluded or marginalized communities to "catch up" to those who have gotten a head start in reaping the economic benefits of the energy transformation. Regulators and lawmakers should be mindful of avoiding the mistakes of early community energy programs, which lack opportunities for ownership of energy projects and do not provide adequate economic incentives for participation by developers or communities.

Community energy provides a pathway for decentralized energy production, which increases resilience to climate change by creating opportunities for low and moderate-income communities to generate electricity that can be used as back-up energy during climate change events. Community energy policies should be designed to attract low-income and moderate-income consumers and incentivize community-scale, rather than utility-scale, development within their communities. Policies that aim for these twin objectives will mitigate the impact that utility-scale developments have in low- to moderate-income communities and also provide critical economic support.

V. Conclusion

Hurricane Sandy exposed, in a stark and devastating way, the injustices already embedded in the nation's energy system. As regulators look to evaluate and redesign existing NEM policies to reflect the true value of solar, they will have an unprecedented opportunity to remedy the energy system's existing inequities. This chapter has provided a road map to undertake this important work.

Evaluative tools and methodologies must first acknowledge the broader context in which the NEM debates are unfolding. First, the utility business model is undergoing a drastic and fundamental change. Utilities face decreased electricity sales and will be forced to develop new business models, such as the energy services provider model, or face extinction. Second, the relationship between the utility and consumer has been permanently altered. Ratepayers are no longer passive recipients of electricity who pay the utility a predetermined rate; they are prosumers who generate their own electricity.

Once this broader transformative context is acknowledged, regulators can create a new energy system that foregrounds principles of energy justice, which would allow all ratepayers to benefit from the transformation of the energy system. In this new energy system, environmental justice, climate justice, economic justice, and energy democracy serve as a lens to develop energy policy that reduces impacts of energy development on low-income and moderate-income communities. Within this energy justice frame, policymakers can also create regulatory pathways to reduce the impacts of climate change on low- and moderate-income communities, provide opportunities for communities to generate and own their own power, and give communities a voice in determining the siting and scale of energy facilities.

The NEM debates provide an opportunity for energy stakeholders to evaluate, in a meaningful way, the existing inequities embedded in the energy system and work to design successor policy frameworks to remedy them. This chapter provides guideposts for this transformative work. As policymakers in New York and other jurisdictions actively experiencing the impact of climate change know, when the most vulnerable among a society thrive, the entire society thrives.[150] Energy justice provides powerful tools to transform the energy system into one in which all communities thrive.

150. City of New York, *supra* note 1, at 18 (noting that the recovery of the communities impacted by Sandy "is vital not only to the people who live and work in them, but to the city as a whole" and that Sandy helped to illuminate the vulnerabilities that "climate change likely will exacerbate in the future").