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EMPOWERED NEIGHBORHOODS: SUPPORTING COMMUNITY MICROGRIDS

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Abstract

In an era of climate change and increasing power outages, microgrids have the potential to significantly improve grid resilience and reliability. Because they can operate separately from larger electric grids, microgrids can often continue providing electricity service during broader grid outages caused by severe weather events. To the extent that solar- or wind-powered microgrids displace fossil fuel electricity generation, they also help to decarbonize energy systems. Unfortunately, electric utilities often view privately-owned community microgrids as competitive threats and have reasons to obstruct them within their exclusive service areas. Utility opposition and other factors have heretofore hindered community microgrid development in much of the country. This Article highlights the scope of community microgrids' many benefits and advocates for statutory and regulatory changes capable of accelerating the deployment of community microgrid technologies across the United States.

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INTRODUCTION

Fearing the growing frequency of powerful Atlantic coast storms, Eric and Camela Moulder recently purchased a home in Heron's Nest—a residential community in North Carolina that uses an onsite microgrid system to provide extra resilience against electricity outages.[1] The Moulders were attracted to Heron's Nest not only because of its unique protection against storms but because its low and stable electricity bills fit their fixed income.[2] They are among a growing number of Americans seeking greater resilience against power outages and more predictably-priced electricity service in the emerging

[1] *See* Kaya Laterman, *What if Your Town Doubled as a Private Power Grid?*, N.Y. TIMES (Aug. 7, 2023), https://www.nytimes.com/2023/08/07/realestate/microgrid-solar-power-energy.html.
[2] *See id.*

climate change era.[3] Community microgrids like those at Heron's Nest are a potentially valuable means of meeting that growing demand—especially in rapidly developing suburban residential communities across America's sunbelt region.[4]

Community microgrids interconnect electricity users and distributed energy resources within localized areas in ways that can have tremendous value as the country shifts toward a more sustainable energy system.[5] Microgrids can operate autonomously or in conjunction with a utility-scale power grid.[6] By enabling communities to temporarily disconnect and operate separately from utility grids, they increasingly offer greater energy efficiency, sustainability, and resilience—particularly during power outages or emergencies.[7]

Unfortunately, state-chartered electric utilities often serve as gatekeepers to microgrid development and have few reasons to promote it within their exclusive service areas.[8] Homes and businesses that meet much of their electricity demand through community-level microgrids purchase less grid-supplied power from utilities and, thus, threaten utilities' revenues and market position.[9] Confronting this utility opposition and other market and regulatory obstacles will be crucial to accelerating microgrid development in the United States in the coming years.

This Article underscores the numerous potential advantages of community microgrids and outlines specific legal and policy changes capable of accelerating the deployment of these technologies. Part I of this Article describes the distinctive features of microgrids and how they could benefit the U.S. electricity system and highlights existing legal and political obstacles to their more widespread adoption. Part II analyzes the challenges facing the microgrid industry in the United States and identifies means of overcoming them so that microgrids can play a more significant role in promoting cleaner and more resilient energy systems across the country. Among other things, Congress could enact legislation deterring state regulators and utilities from erecting obstacles to microgrid development and introducing additional tax incentives to help drive private investment in

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[3] *See id.*

[4] *See* Joseph W. Kane et al., *Pandemic-fueled suburban growth doesn't mean we should abandon climate resiliency*, BROOKINGS (Apr. 12, 2022), https://www.brookings.edu/articles/pandemic-fueled-suburban-growth-doesnt-mean-we-should-abandon-climate-resiliency/ [https://perma.cc/89FM-CW87].

[5] *See* Kevin B. Jones et al., *The Urban Microgrid: Smart Legal and Regulatory Policies to Support Electric Grid Resiliency and Climate Mitigation*, 41 FORDHAM URB. L.J. 1695, 1699 (2014).

[6] Kyle Manahan, *The advantages of microgrids*, EDISON ENERGY (Dec. 12, 2023), https://www.edisonenergy.com/blog/the-advantages-of-microgrids/ [https://perma.cc/JDT4-3DUK].

[7] *See* Jones*, supra* note 5, at 1699–1702.

[8] *See generally* Press Release, Mark Rodeffer, Press Secretary, Utility Scorecard: Energy Efficiency Efforts Stagnating Amid Climate Crisis, Am. Council for an Energy-Efficient Econ. (ACEEE) (Aug. 24, 2023), https://www.aceee.org/press-release/2023/08/utility-scorecard-energy-efficiency-efforts-stagnating-amid-climate-crisis [https://perma.cc/WDH7-NS9V].

[9] *See* Brad Plumer, *Rooftop solar is growing so fast that electric utilities are now trying to slow it down*, VOX (Sept. 29, 2014), https://www.vox.com/2014/9/29/6849723/solar-power-net-metering-utilities-fight-states [https://perma.cc/ZBK7-JU4V].

microgrid systems. State legislatures could further promote community microgrid development by clarifying regulatory and ownership questions that create legal uncertainty around microgrid projects. Collectively, such reforms could finally unleash microgrid technologies and their numerous benefits in communities across the country.

I. BACKGROUND

Recent advancements in microgrid technologies have introduced a new and innovative means of supplying electricity service to communities. For more than a century, electric utilities have relied on centralized power plants to generate the vast majority of the electricity consumed in the United States and have delivered that power across transmission and distribution grids to retail customers.[10] Leveraging economies of scale, these large, centralized utilities have long been the country's most cost-efficient means of providing widespread electricity service.[11]

The high upfront costs of building electricity distribution infrastructure across vast geographic areas have historically made electricity distribution markets prone to natural monopoly problems and heavy regulation.[12] State governments determined long ago that heavy regulation was needed to prevent electric utilities from exploiting their market positions to charge excessively high retail rates and earn excessive profits at the expense of customers.[13] For about a century, regulators in most states have managed these challenges by heavily regulating utilities' retail electricity pricing and requiring utilities to provide electricity service to all paying customers within their exclusive service areas.[14] In return, regulators have generally shielded electric utilities from competition within their service areas and ensured that utilities earned reasonable returns on their infrastructure investments.[15]

The centralized utility model has served the nation well for many decades and will undoubtedly continue to have a major role within the U.S. energy sector for decades to come. However, technological and other changes are placing unprecedented pressure on it

[10] Energy Info. Admin., *Electricity Explained* (Apr. 16, 2024), https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php [https://perma.cc/2WBV-M2FH].
[11] *See* Troy A. Rule, *Unnatural Monopolies: Why Utilities Don't Belong in Rooftop Solar Markets*, 52 IDAHO L. REV. 401, 404 (2016) (describing the history of electric utilities in the United States, their susceptibility to natural monopoly problems, and how cost-based utility rate regulation seeks to address those problems).
[12] *See id.*
[13] *See* Tyson Slocum, *The Failure of Electricity Deregulation: History, Status and Needed Reforms*, PUB. CITIZEN 2–3 (2007).
[14] *See id.*
[15] *See* Rule, *supra* note 11, at 402–03.

today.[16] Although the three main interconnections[17] that comprise the United States transmission grid are crucial elements of the nation's broader electricity system, they have some weaknesses that are growing more significant as climate change worsens and the country transitions to lower-carbon renewable energy sources.[18] Much of the nation's grid infrastructure is aging and was designed to suit an electricity system dependent on large, centralized power plants.[19] Transmission grids have always shed load as high-voltage electric current travels long distances.[20] The massive scale of large grid systems and their interconnection across wide distances also make them relatively vulnerable to power outages.[21] Disruptions, even hundreds of miles away, can impact an entire region's grid operations.[22]

The country's existing transmission grid interconnections were not designed to support heavy reliance on intermittent energy sources such as wind and solar energy. Thus, the interconnections struggle to preserve service reliability as more of those energy sources come online.[23] Incumbent utilities, unfortunately, have little incentive to support the interconnection of third-party-owned microgrids within their service areas because such facilities often reduce retail demand for grid-supplied power.[24] In short, the existing electric grid infrastructure in the United States cannot fully support the energy transition.

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[16] David Roberts, *What's threatening utilities: Innovation at the edge of the grid (with dik-diks!),* GRIST (May 29, 2013), https://grist.org/technology/whats-threatening-utilities-innovation-at-the-edge-of-the-grid/ [https://perma.cc/LB4G-UAYE].

[17] The Western Interconnection, the Eastern Interconnection, and the Texas Interconnected system. *See* U.S. Env't Prot. Agency, *U.S. Grid Regions*, https://www.epa.gov/green-power-markets/us-grid-regions [https://perma.cc/Y76T-H4FN] (last visited Aug. 22, 2024).

[18] *See Lack of ambition and attention risks making electricity grids the weak link in clean energy transitions*, INT'L ENERGY AGENCY (Oct. 17, 2023), https://www.iea.org/news/lack-of-ambition-and-attention-risks-making-electricity-grids-the-weak-link-in-clean-energy-transitions [https://perma.cc/B7CT-FCKX].

[19] *See* GLEN ANDERSEN ET AL., NAT'L CONF. OF ST. LEGIS., MODERNIZING THE ELECTRIC GRID: STATE ROLE AND POLICY OPTIONS (2021), https://www.ncsl.org/energy/modernizing-the-electric-grid [https://perma.cc/H8HJ-N2WT].

[20] *See Electricity Transmission Systems*, WORLD NUCLEAR ASS'N (Aug. 20, 2020), https://world-nuclear.org/information-library/current-and-future-generation/electricity-transmission-grids.aspx [https://perma.cc/WZ36-B8XB].

[21] *See* Banghua Xie et al., *The Vulnerability of the Power Grid Structure: A System Analysis Based on Complex Network Theory*, 21 SENSORS 7907, *25 (2021).

[22] *See id.*

[23] Milton Ezrati, *America's Electric Grid Is Weakening*, FORBES (Mar. 24, 2023), https://www.forbes.com/sites/miltonezrati/2023/03/24/americas-electric-grid-is-weakening/?sh=4e1f48cf7e9e [https://perma.cc/U9LY-SMF3].

[24] *See* ACEEE*, Utility Business Models*, https://www.aceee.org/topic/utility-business-models [https://perma.cc/UA7X-Q4CK] (last visited Aug. 22, 2024).

A. An Increasingly Vulnerable Electric Grid

Over the past couple of decades, a shifting energy mix and the effects of climate change have begun straining electricity transmission infrastructure in the United States like never before.[25] The origins of electricity transmission in the United States trace back nearly 150 years.[26] Thomas Edison's first grid system, which serviced fewer than sixty customers, laid the earliest groundwork for a buildout of an expansive web of infrastructure that continues to transport electric power throughout the country today.[27] Edison and his partners formed Commonwealth Edison and used holding companies to scale and centralize large power plants, sparking a trend of consolidating private companies within the electricity sector that continued through the early 1900s.[28] Although the U.S. transmission grid has evolved in various ways over the past century, its primary focus on transmitting electricity from centralized power plants across high-voltage lines to load centers has largely remained the same.[29] Unfortunately, this century-old approach is increasingly ill-suited to the needs of a modern energy system whose energy sources are increasingly decentralized and intermittent.

The United States faces significant hurdles in expanding its transmission infrastructure. Legal structures governing grid expansion activities complicate the planning process and make it relatively easy for objectors to impede development.[30] As wind and solar energy projects supply more of the country's power, the need for more long-distance transmission lines capable of transporting renewable energy from remote, resource-rich areas has steadily grown.[31] While utilities and grid operators collectively invest billions annually in transmission infrastructure, most of these expenditures are directed towards local upgrades rather than developing long-distance high-voltage lines for transporting renewable power.[32] As the energy transition progresses, the constraints associated with the country's outmoded transmission system are increasing congestion, inefficiencies, and costs and slowing the pace of renewable energy growth.[33]

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[25] U.S. Env't Prot. Agency, *Climate Change Impacts on Energy*, https://www.epa.gov/climateimpacts/climate-change-impacts-energy [https://perma.cc/ASW4-34FQ] (last visited Aug. 22, 2024).

[26] *See* James McBride & Anshu Siripurapu, *How Does the U.S. Power Grid Work?,* COUNCIL ON FOREIGN RELS. (July 5, 2022), https://www.cfr.org/backgrounder/how-does-us-power-grid-work [https://perma.cc/TZ6J-GMZE].

[27] *See id.*

[28] *See* DAVID P. TUTTLE ET AL., UNIV. OF TEX. AT AUSTIN ENERGY INST., THE HISTORY AND EVOLUTION OF THE U.S. ELECTRICITY INDUSTRY 5 (2016).

[29] McBride & Siripurapu, *supra* note 26.

[30] MIT ENERGY INITIATIVE, MANAGING LARGE-SCALE PENETRATION OF INTERMITTENT RENEWABLES 13–14 (2011).

[31] TUTTLE ET AL., *supra* note 28, at 17.

[32] *See id.* at 16.

[33] *See id.* at 15–16.

The aging U.S. transmission grid is also increasingly vulnerable to cyberattacks and physical attacks on substations or other critical transmission infrastructure.[34] Recently, there has been a notable increase in incidents of vandalism against transmission facilities.[35] Various extremist groups likewise increasingly view transmission infrastructure as a potential target.[36]

In recent years, the United States has witnessed a staggering increase in the severity and frequency of extreme weather events that are placing further pressure on the nation's power grid.[37] From widespread blackouts prompted by harsh weather in the Mid-Atlantic and South to the catastrophic failure of the Texas power grid during Winter Storm Uri, weather-related incidents are drawing increased attention to the need for grid resilience and modernization.[38] Such storms increasingly expose the grid's vulnerabilities by leaving millions without power for extended periods.[39]

As the climate continues to warm, conditions conducive to severe weather events are projected to increase, making grid vulnerability even more of a problem.[40] According to one study, the warming climate could lead to a "6.6% increase in supercell frequency nationwide by the end of the century," with particularly notable increases in the eastern United States.[41] As the threat of severe weather continues to escalate, urgent action is needed to fortify the nation's infrastructure and enhance resilience in vulnerable communities.

B. What Are Microgrids?

Microgrid technologies are a promising tool for helping to confront the strain that climate change and the energy transition are placing on traditional grid systems. Microgrids have the potential to offer an array of grid-related benefits, including reduced peak demand, reduced carbon emissions, and more seamless sharing of electricity among neighbors.[42] Microgrids are smaller-scale electric grid systems that use physically proximate distributed

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[34] *See* NAT'L RSCH. COUNCIL, TERRORISM AND THE ELECTRIC POWER DELIVERY SYSTEM 2 (2012).
[35] *See* Nicole Sganga, *Physical attacks on power grid rose by 71% last year, compared to 2021,* CBS NEWS (Feb. 22, 2023), https://www.cbsnews.com/news/physical-attacks-on-power-grid-rose-by-71-last-year-compared-to-2021/ [https://perma.cc/Q55T-W58E].
[36] *See id.*
[37] Barbara Tyran, *Extreme weather events are expanding – the US power grid is not*, UTILITYDIVE (Mar. 16, 2023), https://www.utilitydive.com/news/extreme-weather-events-are-expanding-the-us-power-grid-is-not/645184/ [https://perma.cc/TNM2-4Y5C].
[38] *Id.*
[39] *Id.*
[40] *See Severe Storm, Supercell, and Tornado Trends*, CLIMATE CENTRAL (Apr. 11, 2023), https://www.climatecentral.org/climate-matters/severe-storm-supercell-and-tornado-trends-2023 [https://perma.cc/CRD3-6KEN].
[41] *Id.*
[42] *See* Adam Hirsch, et al., *Microgrids: A review of technologies, key drivers, and outstanding issues,* 90 RENEWABLE & SUSTAINABLE ENERGY REVS. 402, 404, 408–09 (2018).

energy resources (DERs) such as rooftop solar arrays to provide electricity service to multiple end-use customers—usually in relatively small geographic areas.[43] "Island" microgrids are completely isolated from any larger grid, while "connected" microgrids are interconnected with the broader grid but can disconnect from it and operate independently when necessary.[44] Various types of microgrids exist, including those designed to suit college campuses, remote military facilities, or even suburban residential communities.[45]

Institutional and campus microgrids typically power a small collection of buildings on a campus or institution and are owned by a single entity.[46] Because certain institutions, such as research centers, may require higher electricity loads, microgrids are a good fit for tailoring electricity load to meet these specific requirements.[47] Commercial and industrial microgrids typically have a single owner.[48]

Community microgrids provide electricity service to discrete neighborhoods or communities.[49] Like all microgrids, community microgrids can help to reduce peak load demand and decarbonize electricity generation in areas where they are situated.[50] Some community microgrids employ blockchain or other digital ledger technologies to help make their operations more transparent, secure, and efficient.[51] Customers with rooftop solar arrays connected to community microgrids can often transact directly with each other to purchase and sell excess generated energy.[52] Integrating blockchain technologies into such microgrids may additionally aid verification of renewable energy certificates and otherwise benefit connected parties.[53]

A promising example of a successful community microgrid comes from Brooklyn, New York. Built by Siemens and start-up LO3 Energy, this microgrid in Brooklyn's Park Slope neighborhood allows tenants of neighboring apartment buildings equipped with solar

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[43] *See* ADAM BERRY ET AL., *What Role for Microgrids?, in* SMART GRID: INTEGRATING RENEWABLE, DISTRIBUTED & EFFICIENT ENERGY 185, 188 (2012).
[44] *See id.* at 189.
[45] *See* Patrick L. Morand, *The Evolving Role of Microgrids*, 32 NAT. RES. & ENV'T 27, 27–30 (2018) (describing various types of microgrids (including campus, remote, and community microgrids), some benefits of microgrids, and the legal and regulatory hurdles facing microgrid development).
[46] Centrica, *Benefits of on-campus microgrids*, https://www.centricabusinesssolutions.com/us/knowledge-center/blogs/benefits-campus-microgrids [https://perma.cc/2HMK-KF49] (last visited Aug. 22, 2024).
[47] Morand*, supra* note 45, at 28.
[48] *See* Moslem Uddin, et al., *Microgrids: A review, outstanding issues, and future trends*, 49 ENERGY STRATEGY REVS. 1, 3 (2023).
[49] Morand*, supra* note 45, at 28–29.
[50] *See id.*
[51] *See* Sulman Shahzad et al., *Possibilities, Challenges, and Future Opportunities of Microgrids: A Review*, 15 SUSTAINABILITY 6366, *4–5 (2023).
[52] *See id*.
[53] *See* Scott J. Shackelford & Michael Mattioli, *Powerhouses: A Comparative Analysis of Blockchain-Enabled Smart Microgrids*, 46 J. CORP. L. 1003, 1013 (2021).

panels to sell energy to each other using blockchain.[54] On-site energy production and low transaction costs due to blockchain allow participants to enjoy lower energy prices.[55] The ability to sell excess energy from solar panels further offsets energy costs.[56]

Another example of a successful residential community microgrid is North Carolina's Heron's Nest neighborhood, which was spotlighted above.[57] Unlike Brooklyn's microgrid, the microgrid at Heron's Nest was included in the neighborhood's original design.[58] Local electric cooperatives and developers collaborated to develop the neighborhood as an "environmental village," fitting each of the homes with solar panels, smart water heaters that can interact with the grid, smart thermostats, electric vehicle chargers, and a "solar garden" that uses battery storage.[59]

Heron's Nest provides a glimpse into the possibilities for microgrids and other sustainability-oriented features in future residential communities. The neighborhood's driveways are built with permeable materials, and its homes are built with more sustainable materials.[60] Heron's Nest's solar garden—a larger solar array sited within the community that is attached to battery storage[61]—provides a constant visual reminder of the centrality of sustainability values in the community. Microgrid communities like Heron's Nest are valuable pioneers in the transition toward more sustainable and climate-resilient residential living.

C. Microgrids as a Means of Increasing Grid Reliability and Resilience

Some of the most appealing potential benefits of microgrids relate to their capacity to enhance grid reliability and resilience. Microgrids can allow for more flexible grid responses to load demand, extend electricity service to remote areas with lower total infrastructure costs, and make service across portions of a grid system less vulnerable to extreme weather or other potential disruptions.[62]

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[54] *See* Diane Cardwell, *Solar Experiment Lets Neighbors Trade Energy Among Themselves*, N.Y. TIMES (Mar. 13, 2017), https://www.nytimes.com/2017/03/13/business/energy-environment/brooklyn-solar-grid-energy-trading.html.
[55] *See id*.
[56] *See id*.
[57] *See* Scott Gates, *Co-op Tech: Life on a Microgrid*, CAROLINA COUNTRY (Mar. 2019), https://www.carolinacountry.com/your-energy/between-the-lines/co-op-tech-life-on-a-microgrid [https://perma.cc/F3YE-BVSD] (describing the Heron's Nest microgrid).
[58] *See id*.
[59] *See* Kristi Brodd, *Heron's Nest Community Features North Carolina's First Residential Microgrid*, ADVANCED ENERGY (Sept. 26, 2019), https://www.advancedenergy.org/news/herons-nest-community-features-north-carolinas-first-residential-microgrid [https://perma.cc/K4U4-JSR3].
[60] *See* Cardwell, *supra* note 54.
[61] *See* Gates, *supra* note 57.
[62] Lisa Cohn, *Is Load Flexibility the New Demand Response*, MICROGRID KNOWLEDGE (July 12, 2019), https://www.microgridknowledge.com/distributed-energy/article/11429571/is-load-flexibility-the-new-demand-response [https://perma.cc/4YWP-9DCW].

1. Extending Electricity Service into Remote Rural Areas

Microgrid technologies can benefit the country's evolving electricity sector by making it possible to more affordably extend electricity service into geographically remote areas. Supplying affordable and reliable electricity service to such areas has historically been challenging due to their relatively low household incomes and elevated infrastructure costs.[63] Microgrids powered with locally-generated renewable power can help mitigate these challenges by relocating electricity generation closer to end users.[64] Microgrids in remote areas spare utility companies from building lengthy transmission lines, reduce energy sprawl, and help to slow climate change.[65]

Microgrids are a potentially transformative technology for remote rural areas because they can supply reliable electricity service to entire communities without any connection to a larger grid system.[66] For example, the remote mountain community of Hot Springs, North Carolina, built a microgrid in lieu of extending a pipeline through the mountains to reach the town.[67] The community's microgrid is powered solely by solar panels and batteries and has advanced inverter equipment that allows it to "black start" after an outage without the assistance of fossil fuel generation.[68] Such advancements create opportunities for the electricity systems in some remote communities to potentially become fully self-sustaining with the use of batteries and locally-sourced renewables.

2. Facilitating Demand Flexibility and Response

Microgrids can also enhance the resilience of the broader electric grid by increasing the flexibility of load demand in the utility service areas where they reside. Because many microgrid systems have significant energy storage capacity, they can often supply electricity to connected customers during periods of peak load demand at costs and rates that are lower than those paid to conventional utilities.[69] This feature not only saves microgrid-connected customers money but can also shave load peaks across the broader grid within their region.[70] A microgrid installed at the University of California-San Diego

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[63] Julie C. Michalski, *Microgrids for Micro-Communities: Reducing the Energy Burden in Rural Areas*, 26 MICH. TECH. L. REV. 145, 153–55 (2019) (noting that many rural communities face higher energy burdens due to higher transmission costs, reduced energy reliability and lower household incomes).
[64] *Id.* at 158.
[65] *Id.*
[66] *See* K.K. DuVivier, *Mobilizing Microgrids for Energy Justice*, 26 STAN. TECH. L. REV. 250, 261–62 (2023) (highlighting how microgrid technologies can advance energy justice principles through on-site electricity generation and storage in disadvantaged communities).
[67] *Id.* at 263.
[68] *Id.*
[69] Masud Rana, et al., *A Review on Peak Load Shaving in Microgrid—Potential Benefits, Challenges, and Future Trend*, 15 ENERGIES 2278, *9–10 (2022).
[70] *Id*.

campus illustrates this benefit.[71] When the university's microgrid started providing electricity to the campus, the local utility improved the reliability of its electricity service to off-campus customers.[72]

Many microgrids can further enhance load demand flexibility through integrated demand response systems that send real-time signals to customers to influence their energy use.[73] During high load demand within a region, demand response technologies can motivate microgrid operators to use locally stored power or feed power onto the broader grid to help shave load peaks.[74] By improving real-time communication between microgrids and larger grid operators, such microgrid-integrated demand response strategies can significantly improve reliability on the broader grid.

3. Increasing the Resilience of the Electricity System

Community microgrids can also increase energy resiliency by generating and distributing localized power.[75] For example, the Marine Corps has strategically begun building microgrid systems on military bases nationwide to better equip them to maintain electricity-dependent services during grid outages.[76] One such microgrid in San Diego can operate independently for up to 21 days and thus supports critical and valuable national security functions.[77] This innovative microgrid incorporates renewable energy sources, including solar, exemplifying the military's commitment to carbon neutrality by 2050.[78]

The military's growing use of microgrids not only enhances bases' ability to maintain critical defense operations during power grid failures or extreme weather events but also promotes the resilience of the surrounding power grid.[79] The San Diego microgrid

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[71] *See* Laura Margoni, *Environmentally-Friendly Battery Energy Storage System to Be Installed at UC San Diego*, UC SAN DIEGO TODAY (Sept. 29, 2014), https://today.ucsd.edu/story/environmentally_friendly_battery_energy_storage_system_to_be_installed_at_u [https://perma.cc/9387-L5MW].
[72] *See* Raquel Parks, *Microgrids: Legal and Regulatory Hurdles for a More Resilient Energy Infrastructure*, 36 PACE ENV'T L. REV. 173, 179–80 (2018) (describing various microgrid laws and regulations across the United States).
[73] DuVivier, *supra* note 66, at 263.
[74] Morand, *supra* note 45, at 27.
[75] *See id.* at 30.
[76] *Microgrid at Marine Corps Air Station Miramar*, U.S. MARINE CORPS (June 30, 2021), https://www.marines.mil/News/News-Display/Article/2677033/microgrid-at-marine-corps-air-station-miramar/ [https://perma.cc/4FLE-UR6G].
[77] *See* Quil Lawrence, *The military is turning to microgrids to fight global threats—and global warming*, NPR (Oct. 2, 2023), https://www.npr.org/2023/10/02/1201838599/military-microgrids-climate-change [https://perma.cc/K6SP-FP3T] (describing the United States military's use of microgrids to make military bases more energy resilient and highlighting how a microgrid at the Miramar Marine Air Corps Station has helped that site maintain operations amid electricity service disruptions during severe heat waves).
[78] *See id*.
[79] *See id*.

mentioned above proved instrumental during a recent heatwave, preventing potential blackouts and showcasing the military's role in addressing climate change challenges.[80]

Several state initiatives implementing microgrids have similarly showcased the resiliency potential of microgrids during natural disasters. For example, New York University (NYU) utilizes a microgrid to provide heating, air conditioning, and temperature-controlled water to as many as 40 campus buildings.[81] During Hurricane Sandy, the microgrid disconnected from the broader grid, and many buildings across the university were thereby able to avoid widespread blackouts.[82] Buildings connected to the microgrid maintained heat and electricity throughout the storm.[83] One vulnerability of the NYU microgrid is that it uses natural gas as its main source.[84] Integrating more DERs and battery storage into NYU's microgrid system could enable it to be more climate-friendly and even more resilient.

The resiliency benefits of microgrids can be particularly valuable for the elderly and other uniquely vulnerable citizens during times of distress. In February of 2021, Winter Storm Uri had disastrous effects on the Texas power grid.[85] Freezing temperatures caused a large proportion of the state's electricity customers to lose power.[86] The cold shut down natural gas wells, pipelines, and electricity generators.[87] An estimated 4.5 million Texans were left without power for up to seven days, causing more than 100 deaths due mostly to hypothermia.[88] If microgrids had dotted Texas during and after the storm, many more Texans could have received essential services such as heating and use of electricity-dependent home medical equipment. By decentralizing energy generation and distribution, microgrids mitigate the health and safety risks associated with widespread blackouts by helping electricity service to continue even during grid disruptions.[89]

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[80] *Microgrid at Marine Corps Air Station Miramar*, *supra* note 76.
[81] Jones, *supra* note 5, at 1722.
[82] *Id.* at 1721.
[83] *See id.*
[84] *Id.* at 1723.
[85] Jessica Bridger, *The Texas coldwave disaster – How cascading risks took out an entire power grid*, U.N. OFF. FOR DISASTER RISK REDUCTION (June 28, 2022), http://www.undrr.org/quick/72547 [https://perma.cc/47PL-DVLH].
[86] Neelam Bohra, *Almost 70% of ERCOT customers lost power during winter storm, study finds*, TEX. TRIBUNE (Mar. 29, 2021), https://www.texastribune.org/2021/03/29/texas-power-outage-ERCOT/ [https://perma.cc/CM5Q-VMBV].
[87] Bridger, *supra* note 85.
[88] *See* Joshua W. Busby et. al., *Cascading risks: Understanding the 2021 winter blackout in Texas*, 77 ENERGY RSCH. & SOC. SCI. 102106, *1 (2021).
[89] Lisa Cohn, *Microgrids Can Protect Public Health. So Why Aren't We Using More That Way?*, MICROGRID KNOWLEDGE (Feb. 1, 2019), https://www.microgridknowledge.com/editors-choice/article/11429943/microgrids-can-protect-public-health-so-why-aren8217t-we-using-more-that-way [https://perma.cc/ZV8A-MRXE].

4. Supporting the Renewable Energy Transition

Microgrid technologies can further support the energy transition by providing an additional means of integrating small distributed renewable energy systems such as rooftop solar arrays into the grid. Through the use of digital ledgers such as blockchain, microgrid systems can easily manage the sharing of rooftop solar-generated power among neighbors within a community and can even help to verify renewable energy certificates.[90] Such localized electricity sharing can potentially promote more rooftop solar development—especially within the service areas of utilities that do not provide full solar net metering.[91]

D. Microgrids as Tools for Promoting Energy Justice

Community microgrid development could even help to make the U.S. electricity sector more just and democratically governed. By decentralizing much of the decision-making surrounding electricity service and facilitating greater community involvement, microgrids can strengthen the voices of marginalized communities and promote more equitable access to clean and reliable energy sources. To the extent they improve grid reliability, community-owned microgrid systems can likewise help provide more dependable access to essential services during crises and thereby better protect vulnerable communities and low-income households during extreme weather events.

Community microgrids promote energy democracy principles like localism and participatory governance by empowering communities to have greater ownership and control over their electricity service.[92] Decentralizing decision-making over electricity generation and distribution can increase citizen engagement and responsiveness to community needs.[93] Community-owned microgrids embody localism and access to process within the energy sector.[94] By empowering communities to own and operate their own small-scale energy systems, microgrids can enable local residents to have greater involvement in electricity service-related decisions.

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[90] Shackelford & Mattioli, *supra* note 53, at 1012.
[91] *See* Kathryn Krawczyk, *Net-metering rollbacks threaten solar progress*, ENERGY NEWS NETWORK (Oct. 24, 2023) (discussing localized electricity sharing can potentially promote more rooftop solar development—especially within the service areas of utilities that do not provide full solar net metering)., https://energynews.us/newsletter/net-metering-rollbacks-threaten-solar-progress/ [https://perma.cc/KFX5-SYHP].
[92] *See* Shelley Welton, *Grasping for Energy Democracy*, MICH. L. REV. 581, 604 (2018).
[93] *See* Abraham Rugo Muriu, Decentralization, citizen participation and local public service delivery: A study on the nature and influence of citizen participation on decentralized service delivery in Kenya *31 (2013) (Master thesis, University of Potsdam) (available at http://hdl.handle.net/10419/104749 [https://perma.cc/L6C9-BLK6]).
[94] *See* Vida Rozite et al., *Empowering people – the role of local energy communities in clean energy transitions*, INT'L ENERGY AGENCY (Aug. 9, 2023), https://www.iea.org/commentaries/empowering-people-the-role-of-local-energy-communities-in-clean-energy-transitions [https://perma.cc/46XN-9Y53].

It is conceivable that a proliferation of community microgrids could ultimately threaten energy justice in some way. In particular, if cost barriers cause community microgrids to serve primarily higher-income citizens in newer neighborhoods, less wealthy citizens who continue relying solely on their regulated utility for electricity service could potentially suffer electricity rate increases or other adverse impacts.[95] Historically marginalized communities of all income levels may similarly lack the resources or political capital to harness community microgrid technologies as easily and thus miss out on their benefits.[96] Also, while local autonomy is often celebrated as a hallmark of democratic governance, more localized-decision-making can also sometimes exacerbate inequalities—particularly in communities with a history of exclusionary practices.[97] Concerns about energy cliques and exclusionary policies underscore the importance of ensuring that community-centered energy reform is guided by principles of equity and inclusion.[98] Giving careful attention to such principles can help those designing community microgrid policies to better ensure that citizens of all income levels and circumstances benefit from them.

E. Utility Opposition to Microgrids

Despite the many potential public policy benefits of community microgrids, their pace of their deployment across the country will be hindered without the support of existing electric utilities. Many electric utilities view microgrids as a threat to their existing business model because of microgrids' potential to erode market demand for utility-provided electricity.[99] Accordingly, some utilities have openly campaigned against microgrids in recent years.[100] At the state government level, legislation and policy play a crucial role in shaping the landscape for microgrid development. States have the authority to enact regulations, provide incentives, and establish frameworks that either facilitate or hinder the deployment of microgrid technologies within their jurisdictions.

Among other things, some utilities have argued that community-based microgrids should be treated as state-regulated utilities themselves.[101] Many states broadly define utilities as encompassing nearly any entity with interconnected electrical infrastructure

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[95] *See* Mary Hardin, *Clean energy revolution may leave disadvantaged communities behind*, UCLA NEWSROOM (July 1, 2020), https://newsroom.ucla.edu/releases/clean-energy-revolution-and-disadvantaged-communities [https://perma.cc/W5MJ-BMKM].
[96] *See* Sharon Jacobs & Dave Owen, *Community Energy Exit*, DUKE L.J. 251, 305 (2023).
[97] *See id.* at 288–89.
[98] *See id.* at 257.
[99] *See* Chris Nelder, *Microgrids: A Utility's Best Friend or Worst Enemy?*, GREENTECH MEDIA (May 23, 2013), https://www.greentechmedia.com/articles/read/microgrids-a-utilitys-best-friend-or-worst-enemy [https://perma.cc/N9FH-9TDW].
[100] *Volts: Utilities are lobbying against the public interest. Here's how to stop it.,* VOLTS (Feb. 10, 2023), https://www.volts.wtf/p/utilities-are-lobbying-against-the [https://perma.cc/YY9Y-7MFA].
[101] *See* DuVivier, *supra* note 66, at 252–53.

serving multiple distinct parties.[102] Such classifications can subject multi-user microgrid operators to the same onerous regulatory framework as utilities, which can severely limit their appeal.[103] Although some states such as Maine have passed legislation that has clarified that microgrid operators are not classified as public utilities,[104] this issue continues to significantly deter community microgrid development in many states.[105]

A handful of states and the territory of Puerto Rico have incorporated microgrid definitions into statutes as part of broader initiatives aimed at promoting microgrid development.[106] Formally defining microgrids in a statute can help state governments more easily specify which types of systems are eligible for various state programs. The U.S. Department of Energy provides a foundational definition of a microgrid as "a group of interconnected loads and distributed energy resources [DERs] within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid," which can operate both connected to and disconnected from the main grid.[107] While many states adhere closely to the DOE's definition, others such as California have expanded it to encompass additional components such as energy storage, demand response tools, and analytical resources.[108] Puerto Rico's definition of microgrids emphasizes the creation of interconnected loads and distributed energy resources within clearly defined electrical boundaries, aiming to act as a single controllable entity, thereby reducing reliance on fossil fuels and supporting a transition to local renewable energy generation.[109] Certain state PUCs have also developed more detailed classifications for microgrids, such as New Jersey's tiered classification system based on size and structure that enables regulators to tailor regulations to better fit various scales of microgrid projects.[110]

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[102] Brittany Blair & Paul De Martini, *Community Microgrid Ownership Models*, PAC. ENERGY INST. *5 (Dec. 2020), https://pacificenergyinstitute.org/wp-content/uploads/2020/12/Community-Microgrid-Ownership-Models-Paper-final.pdf [https://perma.cc/UWP8-LH2U].
[103] *See id.* at 5.
[104] This legislation allows the Maine Public Utilities Commission to greenlight microgrid proposals up to 25 MW if they align with the public interest. The legislation clarifies that microgrid operators cannot be classified as a public utility under Maine law. *See* ME. REV. STAT. ANN. tit. 35-A, § 3351 (2023).
[105] National Association of Regulatory Utility Commissioners, *State Microgrid Policy, Programmatic, and Regulatory Framework* (2022).
[106] Daniel Shea, *Microgrids: State Policies To Bolster Energy Resilience*, NAT'L CONF. STATE LEGS. (June 10, 2022), https://www.ncsl.org/energy/microgrids-state-policies-to-bolster-energy-resilience [https://perma.cc/6F7J-2CH9].
[107] Dan T. Ton & Merrill A. Smith, *The U.S. Department of Energy's Microgrid Initiative,* 25 ELEC. J. 84, 84 (2012).
[108] CAL. PUB. UTIL. CODE § 8370(d) (2024).
[109] *Public Policy on Energy Diversification by Means of Sustainable and Alternative Renewable Energy in Puerto Rico Act*, Act No. 82-2010, § 1.4, July 19, 2010. *See also Puerto Rico Energy Public Policy Act*, Act No. 17-2019, § 1.2(n), April 11, 2019.
[110] N.J. Bd. Pub. Utils., *Microgrid*, https://www.nj.gov/bpu/about/divisions/opp/microgrid.html [https://perma.cc/D9LU-BJ8R] (last visited Aug. 22, 2024).

F. Cost- and Risk-Related Obstacles to Community Microgrids

In addition to the regulatory hurdles affecting community microgrids, uncertainty about profitability can further deter the development of these innovative projects.[111] Because community microgrids are a relatively new type of development, many potential investors and lenders understandably view them as relatively risky ventures.[112] Perceived risks associated with these projects include uncertainties about the reliability of the technologies themselves, the potential financial burdens of ongoing operations and maintenance, and the potential for utilities to take future actions that could reduce microgrids' economic viability.[113] Enhancing the financial viability of community microgrid models and better insulating microgrid operators against utility opposition is an essential means of supporting their development.

II. ANALYSIS

Crafting legal and policy reforms to address the regulatory and economic obstacles to community microgrid development requires a clear understanding of the externality problems affecting these projects and of electric utilities' incentives to oppose them. Public choice theory, which frames stakeholders operating in political systems as actors in an economic market, provides one useful perspective for viewing electric utilities and their actions in the context of microgrid-related policy.[114] Within that framework, public utilities' political activities and interactions with regulators seek foremost to serve their own interests.[115]

Rent-seeking theory highlights how private actors sometimes use political systems for their own economic gain, even when such actions are harmful to the broader public.[116] Political rent-seekers attempt to maximize their own profit even when doing so reduces the

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[111] *See generally* Financial Times, *How regulatory uncertainty could endanger the energy transition*, https://edp.ft.com/article/regulatory-uncertainty-could-endanger-energy-transition [https://perma.cc/J3V8-KY93] (last visited Aug. 22, 2024).

[112] Nat'l Renewable Energy Lab'y, *Financing Microgrids that Can Have a Mega-Impact*, https://www.nrel.gov/state-local-tribal/blog/posts/financing-microgrids-that-can-have-a-mega-impact.html [https://perma.cc/G36C-GA73] (last visited Aug. 22, 2024).

[113] Sulman Shahzad et al., *Possibilities, Challenges, and Future Opportunities of Microgrids: A Review*, 15 SUSTAINABILITY 6366, *11–13, *22–24, *28 (2023) https://doi.org/10.3390/su15086366.

[114] Robert Longley, *Public Choice Theory: Definition and Principles*, ThoughtCo, https://www.thoughtco.com/public-choice-theory-6744655 [https://perma.cc/AR7V-UMFL] (last visited Aug. 22, 2024).

[115] *See* Jim Rossi, *Public Choice Theory and the Fragmented Web of the Contemporary Administrative State*, 96 MICH. L. REV. 1746, 1752 (1998) (book review) (addressing pessimism regarding the administrative state that arose alongside public choice theory).

[116] Jason Brennan, *The Right to Good Faith: How Crony Capitalism Delegitimizes the Administrative State*, 11 GEO. J.L. & PUB. POL'Y 317, 328 (2013) (arguing that various types of "crony capitalism," including bailouts and rent-seeking behavior, can undermine the legitimacy of governmental institutions and particularly the administrative state).

net social welfare.[117] By definition, rent-seeking behavior differs from ordinary lobbying in that rent-seeking creates negative social impacts.[118]

Some utilities may have incentives to lobby against policies that would support private microgrid development because these projects can erode utilities' revenues, and most of their benefits flow to others. Positive externality problems arise when some of the benefits of an action accrue to parties other than the actor.[119] Community microgrids can improve the reliability and resiliency of electricity service, but many of these advantages flow only to customers who are connected to the microgrid itself.[120] For example, utilities may not gain much from the continuation of electricity service within microgrid-connected communities during broader grid-wide blackouts or brownouts. This self-sufficiency reduces the need for utility intervention and diminishes economic incentives for utilities to prioritize these areas during outages.[121] Because these and other benefits do not accrue to utilities, utilities are likely to exhibit sub-optimally low support for microgrid development.

The public choice theory concept of "regulatory capture" offers further insights into utilities' actions in microgrid-related policymaking. Regulatory capture occurs when a government entity becomes controlled or excessively influenced by private actors it seeks to regulate.[122] Regulatory capture theory characterizes influenced regulators as motivated by personal interests such as reelection, political power, future employment prospects, or potential wealth accumulation after government service.[123] In the context of electricity regulation, regulatory capture is "the process through which regulated monopolies end up manipulating the state agencies that [we]re [designed] to control them."[124] Utilities invest substantial capital into electricity infrastructure within their service areas and thus may seek to unduly influence policymakers on microgrid-related laws to safeguard the value of

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[117] *See* Anne O. Krueger, *The Political Economy of the Rent-Seeking Society*, 64 AM. ECON. REV. 291, 291–92 (1974) (discussing the competitive nature of rent-seeking and its impact on social welfare).
[118] *See* GORDON TULLOCK, THE ECONOMICS OF SPECIAL PRIVILEGE AND RENT SEEKING 55 (1989).
[119] For an explanation of positive and negative externalities and their application to property law, see, e.g., Gideon Parchomovsky & Peter Siegelman, *Cities, Property, and Positive Externalities*, 54 WM. & MARY L. REV. 211, 220 (2012) (discussing how positive externalities arise when the benefits of an action accrue to parties other than the actor, exemplified by the enjoyment third parties receive from a well-maintained garden, and highlighting the asymmetry in attention given to positive versus negative externalities in legal scholarship).
[120] Justin Gundlach, *Microgrids and Resilience to Climate-Driven Impacts on Public Health*, 18 HOUS. J. HEALTH L. & POL'Y 77, 108 n.121 (2018).
[121] James Kirtley, et al., *Financing Microgrids for Resilient, Sustainable Communities*, MIT ENERGY INITIATIVE, https://climate.mit.edu/explainers/microgrids [https://perma.cc/Y82C-PRUN] (last visited Aug. 22, 2024).
[122] *See* David Thaw, *Enlightened Regulatory Capture*, 89 WASH. L. REV. 329, 333–35 (2014) (describing classic views of regulatory capture and its negative impacts).
[123] Heather Payne, *Game Over: Regulatory Capture, Negotiation, and Utility Rate Cases in an Age of Disruption*, 52 U.S.F.L. REV. 75, 79–80. For a discussion of possible utility regulatory reforms aimed at reducing regulatory capture involving utilities and public utility commissions, see *id.* at 110–12.
[124] Ernesto Dal Bó, *Regulatory Capture: A Review*, 22 OXFORD REV. ECON. POL'Y 203, 203 (2006).

those investments.[125] Policy strategies aimed at promoting community microgrid development are more likely to be effective if they account for this utility opposition.

A. Policy Recommendations for Facilitating Microgrid Development

Well-crafted and impactful policy reforms will be needed to effectively overcome today's many legal and political obstacles to community microgrid development. Among other things, such policies might include performance-based utility incentives, a federal requirement that utilities swiftly interconnect qualifying community microgrids, a federal microgrid tax credit program, and state laws declaring that community microgrids are not "utilities" subject to conventional cost-based regulation.

1. Performance-Based Utility Incentives

Performance-based utility regulations are one potential means of reducing utilities' opposition to community microgrid development. Conventional cost-based rate regulation often incentivizes utilities to maintain or grow demand for grid-supplied electricity within their service territories.[126] In some contexts, this interest in preserving grid-supplied electricity demand can motivate utilities to oppose innovations that threaten that demand. Because community microgrids erode grid-supplied electricity demand, they can fall victim to this type of opposition. Performance-based regulations (PBR) would indirectly enable microgrid development by setting an overall requirement for "utilities to provide an affordable, reliable and clean power system" and then regulating utilities based on that standard regardless of the means used to achieve it.[127] This removes any inherent reason for utilities to oppose microgrids. Though PBR models have not yet become commonplace, some jurisdictions are beginning to embrace them.[128]

One specific way to reduce utilities' opposition to private community microgrid development is through "decoupling" or other targeted adjustments to their cost-based rate regulatory structures. For instance, some decoupling policies compensate utilities for

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[125] *See* Institute for Local Self-Reliance, How Investor-Owned Utilities Turn Your Money into Political Power, ILSR (May 11, 2023), https://ilsr.org/articles/how-investor-owned-utilities-turn-your-money-into-political-power/ [https://perma.cc/DBN6-G4TY]. For a discussion of the high upfront costs of building out electrical infrastructure and associated natural monopoly problems for utilities, see generally Rule, *supra* note 11.

[126] *See* Rule, *supra* note 11, at 387 (explaining how community solar users decrease utility revenue because customers with solar panels buy far less electricity from utility companies, which incentivizes utilities to maintain or expand demand for grid-supplied electricity).

[127] *See* Martin Warneryd et al., *Unpacking the complexity of community microgrids: A review of institutions' roles for development of microgrids*, 121 RENEWABLE & SUSTAINABLE ENERGY REVS. 109690, *6 (2020).

[128] In 2018, Hawaii became the first state to adopt a PBR law. *Id.*

For an example of a utility informally changing its own business model, see generally Xionan Lu, et. al., *Bronzeville Community Microgrids: A Reliable, Resilient and Sustainable Solution for Integrated Energy Management with Distribution Systems*, 28 ELEC. J. 29 (2015).

revenue losses they incur due to energy conservation or energy efficiency programs.[129] Tailored decoupling policies, which seek to separate a rate-regulated utility's total electricity sales from its profitability, could potentially adjust the incentive structures of utilities such that they are more welcoming toward community microgrids.[130] More specifically, such policies could compensate utilities for any losses incurred from the integration of microgrid-connected communities that would otherwise be solely dependent on utility-supplied electricity service.[131]

2. Federally Mandating Community Microgrid Interconnections

A more direct and powerful means of addressing utility opposition to community microgrids would be federal legislation expressly mandating that utilities integrate qualifying third-party-owned microgrids within their service areas. The Public Utility Regulatory Policy Act of 1978 (PURPA) provides a potential template for such an approach. PURPA encourages independent power production and greater competition in electricity generation by requiring utilities to purchase electricity from qualifying facilities at reasonable "avoided cost" rates.[132] Courts have repeatedly upheld challenges to PURPA, enabling it to be a useful tool in helping to drive utility-scale renewable energy development across the country.[133]

New federal legislation modeled after PURPA that required utilities to interconnect qualifying community microgrids could significantly accelerate the deployment of these technologies in the United States. Legislation could prescribe specific criteria for qualifying microgrids, incorporating elements such as capacity limits, reliance on renewable energy, and demand response capabilities. Such requirements, like PURPA's

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[129] Inara Scott, *Incentive Regulation, New Business Models, and the Transformation of the Electric Power Industry*, 5 MICH. J. ENV'T. & ADMIN. L. 319, 353 (2016).
[130] *See* Warneryd et al., *supra* note 127, at *6.
[131] *See* American Council for an Energy-Efficient Economy, *Utility Rate Decoupling*, ALLIANCE TO SAVE ENERGY (2014), https://www.ase.org/resources/utility-rate-decoupling-0 [https://perma.cc/5Y7W-YD9R]. As of 2018, more than half of states have adopted decoupling policies for utilities. Dylan Sullivan & Donna De Costanzo, *Gas and Electric Decoupling*, NAT. RES. DEF. COUNCIL (Aug. 24, 2018), https://www.nrdc.org/resources/gas-and-electric-decoupling [https://perma.cc/GT9H-PAFZ]. For more on decoupling, see *id.*
[132] *See* Kari Twaite, *Monopoly Money: Reaping the Economic and Environmental Benefits of Microgrids in Exclusive Utility Service Territories*, 34 VT. L. REV. 975, 983 (2010)*; see* Solar Energy Industries Association, *PURPA 101 Fact Sheet*, SEIA (Sept. 2018), https://www.seia.org/sites/default/files/2018-09/SEIA-PURPA-101-Factsheet-2018-Sept.pdf [https://perma.cc/3356-HSXZ].
[133] *See, e.g.*, Phx. Power Partners, L.P. v. Colo. Pub. Utils. Comm'n, 952 P.2d 359, 367 (Colo. 1998) (en banc) (affirming a state public service commission decision requiring a new power purchase agreement with a renewable energy facility to comply with PURPA's provisions); Vote Solar v. Mont. Dep't of Pub. Serv. Regul., 473 P.3d 963, 980 (Mont. 2020) (holding that a state public service commission violated PURPA by improperly calculating avoided cost rates and contract terms in a discriminatory way against renewable qualifying facilities); Brazos Elec. Power Coop. Inc. v. Fed. Energy Regul. Comm'n, 205 F.3d 235, 248 (5th Cir. 2000) (denying a utility's petition to revoke a cogeneration facility's qualifying status under PURPA).

classification system for qualifying small power production facilities, could help ensure that microgrid projects adhered to defined performance standards that strengthened overall grid reliability and resilience.

Because it would preempt many state-level restrictions on community microgrids, a new PURPA-like federal law promoting community microgrids would also help to address utility regulatory capture and political rent-seeking obstacles at the state level. Utilities would be less able to wield influence with state legislators and regulators in ways that further impede community microgrid development. For these reasons, Congress should take the opportunity to support such direct and impactful legislation.

3. Federal Microgrid Investment Tax Credits

Federal tax credits are another type of policy strategy that could help to accelerate community microgrid development across the United States. Building on existing models like the Residential Clean Energy Tax Credit,[134] a Microgrid Investment Tax Credit (MITC) could provide a percentage-based tax credit for taxpayers' private investments in qualifying community microgrid development projects.

An appropriately structured MITC program could motivate residential developers to include a community microgrid as an amenity within their new projects. By offsetting the costs of installing microgrid infrastructure during the construction of new residential neighborhoods, these tax credits could enable developers to better meet the country's growing demand for more electricity service that is resilient during major storms or other weather events. The neighborhood's homeowners' association or a separate formed entity could then contract with a third party to maintain and operate the microgrid throughout its useful life.

The MITC incentivizes private investment in qualifying microgrid projects and fosters a sustainable energy system by offsetting installation costs and meeting demand for resilient electricity services. Congress must embrace policies like the MITC in order to spur microgrid development at the federal level.

4. State Level Legislation

The success of legislation in California in driving the adoption of microgrid technology demonstrates the potential impact of state tax incentive programs. California's SB 1339, which was enacted in 2018, directed the California Public Utilities Commission (CPUC) to collaborate with other state energy entities in formulating policies concerning microgrids.[135] One key provision of SB 1339 mandated that the CPUC develop criteria and

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[134] Internal Revenue Serv., *Residential Clean Energy Credit*, https://www.irs.gov/credits-deductions/residential-clean-energy-credit [https://perma.cc/R3SX-5ZNH] (last visited Aug. 22, 2024).
[135] Cal. Pub. Utils. Comm'n, *Resiliency and Microgrids*, https://www.cpuc.ca.gov/resiliencyandmicrogrids [https://perma.cc/C7EZ-MHYS] (last visited Aug. 22, 2024).

to support the implementation of microgrids.[136] The bill outlines several focal points for the CPUC to address, including microgrids' potential to enhance the grid operations, their alignment with state policy objectives, their role in integrating distributed energy resources, their compatibility with existing state regulatory frameworks, and the technical obstacles associated with microgrid implementation.[137] Multiple state programs further incentivize utility customers and communities to invest in microgrid infrastructure.[138]

Beyond California, a handful of other states have adopted microgrid-related programs and regulatory initiatives. For instance, Oregon's Community Renewable Energy Grant Program supports resilient clean energy projects, including microgrids, with an allocated $50 million in funding.[139] Under this legislation, electric companies must develop plans for meeting clean energy targets.[140] These plans must also examine resiliency opportunities, including considerations specific to microgrid deployment.[141] More recent legislation enacted in the state requires the Oregon Department of Energy, in collaboration with the state's Public Utilities Commission, to study microgrid development and adoption for enhancing energy resilience.[142] North Carolina's legislation also recently approved funding for that state's Energy Office to provide technical assistance on prospective clean energy projects.[143] Although states such as California are beginning to provide policy support for microgrids, a similar policy focus could do much to help accelerate community microgrid development in other states.

5. Renewable Portfolio Standard Carveouts and Multipliers

Adding carveout or multiplier provisions to state renewable portfolio standards (RPSs) is one other potentially valuable strategy for accelerating community microgrid development. Most state RPSs mandate that regulated utilities within the state procure some minimum prescribed percentage of their electricity from renewable sources like wind and solar.[144] Carve-out provisions within RPSs single out a particular type of energy

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[136] LPDD, *California's SB 1339*, https://lpdd.org/resources/californias-sb-1339/ [https://perma.cc/DN44-B3F3] (last visited Aug. 22, 2024).
[137] *Id.*
[138] Kelsey Jones et. al., *State Microgrid Policy, Programmatic, and Regulatory Framework*, NAT'L ASS'N REGUL. UTIL. COMM'RS & NAT'L ASS'N STATE ENERGY OFFS. 6–11 (Aug. 2023), https://pubs.naruc.org/pub/2649E6EB-D7CE-77DC-2BE3-89D48A713213 [https://perma.cc/UV6B-63WX].
[139] Oregon.gov, *Community Renewable Energy Grant Program*, https://www.oregon.gov/energy/Incentives/Pages/CREP.aspx [https://perma.cc/TUQ4-CC9Z] (last visited Aug. 22, 2024).
[140] *See* OR. REV. STAT. § 469A.410 (2021) (setting clean energy targets for electric companies); OR. REV. STAT. § 469A.415 (2021) (requiring electric companies to develop plans for meeting clean energy targets).
[141] *See* OR. REV. STAT. § 469A.410 (2021)
[142] *See* OR. REV. STAT. § 469A.415 (2021).
[143] *See* S.B. 209, 133rd Gen. Assemb., Reg. Sess. (N.C. 2021).
[144] Solar Energy Indus. Ass'n, *Renewable Energy Standards*, https://www.seia.org/initiatives/renewable-energy-standards [https://perma.cc/6PDB-SR7Q] (last visited Aug. 22, 2024).

strategy and require utilities to use that strategy to satisfy a specified portion of their RPS requirement.[145] A microgrid carveout provision would require that utilities use microgrid-connected renewable energy to meet some minimum percentage—such as five or ten percent—of their RPS requirement. Although Vermont's Renewable Energy Standard mandates that 75% of the state's electricity supply come from renewable DERs by 2032,[146] no states presently have an RPS carveout provision focused solely on microgrid-connected power.[147]

RPS multipliers are another potential means of singling out and tying elevated incentives to a specific type of energy strategy.[148] To promote community microgrid development, such a multiplier would effectively amplify the credit awarded for microgrid-connected renewable power.[149] Applying multipliers in this way would better reward the unique benefits of microgrids, such as enhanced energy resilience, helping to address the positive externality problems associated with these projects.

6. Clarifying that Microgrid Communities Are Not Public Utilities

In addition to strengthening incentives for microgrid development, state governments could promote more microgrid-related investment within their jurisdictions. Doing so may clarify that community microgrids and their operators are not public utilities subject to cost-based rate regulation. Reducing uncertainty about whether community microgrid owners and operators might be classifiable utilities can do much to reduce regulatory risks associated with microgrid development. Although utility companies possess expertise and regulatory experience that could help them efficiently develop and manage community microgrids,[150] their profit-seeking objectives often may not align with

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[145] *Policy Explainer: Creating Renewable Energy Markets Through Solar Carve-Outs*, CLIMATE XCHANGE (July 21, 2022), https://climate-xchange.org/2022/07/21/policy-explainer-creating-renewable-energy-markets-through-solar-carve-outs/ [https://perma.cc/P65M-GHBX].
[146] *Id*.
[147] VT. DEP'T PUB. SERV., 2022 VERMONT COMPREHENSIVE ENERGY PLAN 11 (2022), https://publicservice.vermont.gov/sites/dps/files/documents/2022VermontComprehensiveEnergyPlan_0.pdf [https://perma.cc/XV5Q-TQKF].
[148] *See* Brian Lips, *Credit Multipliers in Renewable Portfolio Standards*, CLEAN ENERGY STATES ALL. 4 (July 2018), https://www.cesa.org/wp-content/uploads/RPS-Multipliers.pdf [https://perma.cc/JJB2-DUMX] (finding that credit multipliers simplify the quantification of the value of specific renewable resources and applications, providing clarity for both the public and the market).
[149] *See* Nat'l Conf. of State Legs., *State Renewable Portfolio Standards and Goals*, https://www.ncsl.org/energy/state-renewable-portfolio-standards-and-goals [https://perma.cc/QAG5-XAR9] (last visited Aug. 22, 2024).
[150] U.S. DEP'T OF ENERGY, MICROGRID AND INTEGRATED SYS. PROGRAM 8 (Jan. 2022), https://www.energy.gov/oe/articles/microgrid-and-integrated-microgrid-systems-program-report-download [https://perma.cc/V3GC-F4RB] (affirming that utilities lack proper incentive to improve resilience for military installations).

the long-term interests of residents.[151] So long as adequate safeguards are in place, homeowners' associations (HOAs) or contracted private entities that specialize in microgrid management could potentially serve as valuable owners and operators of community microgrid systems.

Because they are community-based, HOAs tend to be relatively familiar with local needs and preferences in ways that could help them ensure that a community microgrid effectively and affordably serves its residents. HOAs tend to be directly accountable to their members, which may foster transparency and more democratic decision-making in microgrid management.[152] HOAs also have a vested interest in promoting energy resilience and affordability within their communities, aligning their objectives with those of residents.

Unfortunately, utility companies, intent on safeguarding their own monopoly status, often have reasons to resist community ownership of microgrids. One line of attack against community microgrid development is the argument that community microgrid owners are electric utilities subject to state-level cost-based utility rate regulation. Persuading state regulators to classify microgrid owners as utilities essentially prohibits privately-owned microgrid development within an incumbent utility's exclusive service area. Entities classified as public utilities often fall under the purview of state public utility commissions (PUCs). These entities are subjected to costly, burdensome regulatory processes that would be difficult and prohibitively expensive for most small community microgrid owners to manage.[153]

A few recent court cases have highlighted the challenges of defining and regulating public utilities—particularly in the context of emerging sustainable energy technologies. In one case, the non-profit North Carolina Waste Awareness and Reduction Network (NCWARN) sold solar-generated electricity to a church through a PPA, compelling the court to decide whether that sale would qualify as a "public utility."[154] The court ultimately did deem NCWARN to be a public utility, subjecting the entity to many of the same regulatory burdens as those that investor-owned utilities bear.[155]

A state statutory law expressly declaring that community microgrid owners and operators are not utilities would prevent incumbent electric utilities from trying to use this line of argument to impede microgrid development. Such legislation could include the formation of an alternative regulatory framework tailored to microgrids that reflects the unique features of these distributed energy systems. For instance, legislation enacted in

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[151] *See generally How the top microgrid developers do business*, WOOD MACKENZIE (Jan. 9, 2020), https://www.woodmac.com/news/opinion/top-microgrid-developers-2019/ [https://perma.cc/X5CX-KAKC].
[152] *See generally* Michael C. Pollack, *Judicial Deference and Institutional Character: Homeowners Associations and the Puzzle of Private Governance*, 81 U. CIN. L. REV. 839, 866–87 (2013).
[153] *See* DuVivier, *supra* note 66, at 291.
[154] *See* State ex rel. Utils. Comm'n v. N.C. Waste Awareness & Reduction Network, 805 S.E.2d 712 (N.C. Ct. App. 2017); *Id.* at 302–03.
[155] DuVivier, *supra* note 66, at 303.

Maine empowers that state's Public Utilities Commission to approve microgrid proposals of up to 25 MW if they serve the public interest.[156] The legislation expressly declares that microgrid operators are not public utilities, enabling the state to apply a different regulatory structure to these innovative entities.[157] Among other things, such specific state requirements could mandate that a certain percentage of ownership be locally held so that community microgrids are more likely to prioritize the interests and needs of local citizens.

III. CONCLUSION

Microgrid technologies have the potential to decentralize much more of the country's electricity generation and distribution in ways that could promote greater resilience, environmental sustainability, and community empowerment throughout the United States. Unlike conventional transmission grids, microgrids are designed to facilitate highly localized electricity generation, sharing, and consumption. These features can enable community microgrids to reduce the need for fossil fuel-dependent infrastructure and enhance energy security and resilience. Using renewable energy sources and battery storage, microgrids can provide reliable electricity even to remote underserved areas, helping to fill gaps in energy access and promoting energy justice.

Community microgrids can also help to democratize the energy sector and empower individual citizens to have greater input in local energy policymaking. Unlike traditional utility ownership models, which tend to concentrate regulatory authority and decision-making in the hands of a few, microgrid-integrated models can empower local communities and their residents to have stronger voices. Community-owned microgrids can not only foster local economic development and job creation; they can also promote more participatory decision-making and more collective ownership of renewable energy resources. This inclusive approach ensures that more of the energy transition's benefits are shared equitably among community members—regardless of their socioeconomic or land ownership status.

With well-tailored legal and policy support, microgrid technologies can help the United States realize a more affordable, reliable, customized energy future. Effective microgrid policies address the regulatory barriers and market distortions that hinder the widespread adoption of microgrids, including outdated utility regulatory regimes and utility rent-seeking behavior. Microgrid technologies have the potential to help usher in an era in which local communities are better protected against disruptions in electricity service and are more empowered to navigate their own energy future. By facilitating the more widespread development of microgrid systems, governments can help accelerate progress toward an electricity system that better supports energy justice, community empowerment, and environmental stewardship. By localizing electricity generation and enabling more

[156] ME. REV. STAT. tit. 35-A, § 3401 (2024).
[157] *See id.* at § 3351(3).

efficient electricity sharing among neighbors, microgrid technologies and policies can illuminate neighborhoods and brighten the country's energy outlook for generations to come.