



**Testimony of Alexandra M. Wyatt
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**Before the Energy Subcommittee of the
U.S. House of Representatives Committee on Energy and Commerce
Hearing on “Generating Equity: Improving Clean Energy Access and Affordability”**

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Chairman Rush, Ranking Member Upton, Chairman Pallone, and distinguished members of the Subcommittee: Thank you for the opportunity to provide testimony to the Energy Subcommittee on improving equitable access to clean energy and increasing affordability. My name is Alexandra Wyatt, and I am a Policy and Regulatory Manager at GRID Alternatives (“GRID”). GRID is a national 501(c)(3) nonprofit organization whose mission is to make renewable energy and job training accessible to underserved communities. GRID is the nation’s largest nonprofit solar installer and a leader in helping low-income communities, communities of color, and Tribal communities nationwide get clean, affordable solar power and solar jobs. GRID implements residential, multi-family, and community solar projects that exclusively benefit low-income households and tenants of affordable housing. Since 2004, we have installed nearly 14,000 systems. We have also launched electric vehicle and solar-plus-storage initiatives that maximize the economic and environmental benefits of solar and increase resilience against climate change impacts. GRID administers a number of low-income solar, clean mobility and workforce training programs on behalf of state agency, utility commission and utility partners. GRID is also a leading advocate for equitable solar, clean energy, clean mobility, and climate policies, and maintains the Low-income Solar Policy Guide as an online resource in partnership with Vote Solar.

Improving clean energy access and affordability are urgent needs, and tremendous opportunities. Through the growth of renewable energy, the United States can address some of the greatest challenges facing lower-income and disadvantaged communities: the high costs of housing and energy, unemployment and underemployment, pollution and health disparities, climate impacts, and racial injustice. Expanding access to distributed renewable energy sources like solar can provide significant and long-term financial relief to families struggling with high and unpredictable energy costs, particularly now in light of the economic turmoil and increased home energy needs resulting from the pandemic. At the same time, equitably expanding access to clean energy can provide living-wage career paths in fast-growing clean energy industries that now employ millions of people, outpacing fossil fuel sectors several times over. Along with these and other significant economic benefits, renewables can be sources of clean, healthy, zero-carbon, resilient local energy, sited in and benefiting communities that have been disproportionately impacted by traditional energy generation. GRID’s experience shows that it is crucial for policymakers to recognize and value all of these diverse benefits together, and to deliberately make equity a driving principle throughout policy design and implementation by letting communities lead. Our specific policy recommendations also arise from our on-the-ground experience.

I. Why the Transition to Clean Energy Must Be Equitable

A. Overall Benefits of the Transition to Clean, Renewable Energy

There are few more worthwhile and urgently necessary investments than mitigating climate change through reducing greenhouse gas emissions and preventing needless death by reducing toxic air pollution emissions,¹ even before accounting for the fact that low-income communities and communities of color disproportionately bear the brunt of both of these crises. The benefits are easily in the trillions of dollars.² When acknowledging the environmental justice component of these issues and the high costs that already overburdened communities face for their energy, it becomes even more apparent that we must transition away from the polluting ways that we have produced and consumed power for our homes, buildings, industries, transportation, and more, and that we must do so as rapidly as possible. An energy transition is, indeed, already underway. Yet the transition itself can either replicate or remedy existing economic and racial injustices, depending on policy choices. Congress can seize the opportunity of the current moment to leverage clean energy as a force to promote equity and racial justice along with economic development, solving multiple problems at the same time. My testimony addresses why and how.

B. Energy Burdens

The traditional, fossil fuel-based system has provided great benefit to some, but it has imposed severe and disproportionate costs on others. Those costs have too often either gone unrecognized or been dismissed as economic “externalities.”³ Some of these costs are very direct, in that energy simply costs more for lower income families. Low-income households spend three or more times as much of their income on energy costs compared to non-low-income households, even though low-income households consume less energy per capita than other households. Households of color also spend substantially higher percentages of their incomes on energy than white households. High energy burdens (the percentage of gross household income spent on heating, cooling, and other home energy services) can lead to energy insecurity and force families to choose between paying for essential utilities and investing in their own futures. Some Americans, particularly residents of Tribal areas, also face costs resulting from energy poverty—that is, not having modern energy sufficient to meet their needs.⁴ At GRID, our clients have told us that the savings they’ve gotten from solar have given them peace of mind and let them maintain safe and healthy home conditions, support their families, handle unexpected expenses, and simply make ends meet.

C. Environmental Injustice

The traditional energy system has also imposed severe environmental and health costs. It has done so in a very unjust and racially inequitable way that has distorted our entire economy and contributed to our overall current state of societal inequality. For generations, fossil fuels have disproportionately impacted the health and well-being of low-income communities, particularly communities of color and indigenous communities. Communities outside the fence lines of power plants and energy infrastructure are subjected to toxic pollutants that contribute to high rates of asthma, cancer, heart disease, and birth defects,⁵ and now, COVID-19 mortality as well,⁶ along with cycles of poverty and

public disinvestment in neighborhoods that can least afford it.⁷ In addition to causing many serious health and quality of life impacts, these same energy sources are a major contributor to climate change. Structural vulnerabilities mean that low-income families are at the front lines of the climate crisis. They are impacted first and worst by climate change-related extreme weather, disasters, and health impacts, despite having contributed less to our greenhouse gas emissions.

D. Impact of Policy on Equity

Our energy system is now changing. Policy choices will, in part, determine whether the uptake of clean energy technologies will be rapid enough to align with climate science, as well as whether it will be equitable enough to benefit all Americans without imposing new harms or perpetuating inequality. Getting away from the old, polluting, and racially unjust fossil fuel-based system is good and necessary, but it isn't enough. Beyond getting pollution sources out of fenceline and frontline communities, we need to get solutions into them too, while protecting communities that have traditionally depended on fossil fuels for their livelihoods. Equitable access to clean, renewable energy can directly remedy the problems and burdens caused by the traditional energy system. There are myriad reasons for policy-makers to leverage the energy transition as a tool to promote equity and help constituents.

E. Results of Equitable Energy Policy

Equity and racial justice are, of course, sufficient goals in their own right. People disadvantaged by existing systems are in crisis and need solutions now. Additionally, as a matter of fairness, low-income taxpayers and utility ratepayers have helped pay for clean energy research and incentives, and they should benefit from them too. Yet equitable access to affordable clean energy, especially distributed energy resources, benefits everyone. It addresses so many problems at once.

GRID Alternatives has seen firsthand: when the energy bill savings provided by solar reach those who need them most, it contributes to social stability, economic development, and community health, and helps families avoid displacement and provide for better futures. When the most vulnerable communities have access to energy storage and resilience, the devastation from disasters is reduced and economic recovery improves. When an economically and racially more diverse range of communities see various clean energy technologies as viable solutions, local markets can move beyond the "early adopter" phase and scale more rapidly.⁸ When there are accessible and inclusive on-ramps to well-paying jobs in clean energy industries, the industries get the skilled and diverse workforce that they need, and more Americans can provide for their families while building meaningful careers that contribute to their communities. When communities have control and ownership over their energy, their energy systems better meet their needs and their energy dollars stay local.

With the energy transition unquestionably underway, we simply can't afford not to include everyone. According to a 2018 report by the Department of Energy (DOE) National Renewable Energy Laboratory (NREL), 43% of the U.S. population is at or below 80 percent of their area median income (the Department of Housing and Urban Development (HUD) definition of low-income), representing 49.8 million low-income households.⁹ An estimated half of these households are in buildings suitable for solar,¹⁰ or even better, solar plus energy storage and other technologies, while most of the remaining

households could benefit greatly from community solar and other clean energy sources. Moreover, Tribal areas constitute 2% of the country's land base but 5% of its renewable energy potential.¹¹ Federal policies targeting equity could open up access for these communities on a large scale.

II. Barriers to Clean Energy Access and Affordability

Despite the cost savings and many other benefits of clean energy, low income households and communities have faced barriers to access—even though they could benefit the most. People of color are also less likely to be getting the direct benefits of renewable energy, even controlling for income.¹²

A. Financial Barriers

First and foremost, any upfront investment required to go solar remains a significant threshold barrier for the families who most need relief from energy bills. An average four kilowatt (kW) solar electric system on a home will cost more than \$15,000. This is no small chunk of change, particularly when we consider that the national median household income is \$65,712 for all Americans in 2019, but even lower for Hispanic/Latino (\$55,658) and Black (\$43,862) Americans.¹³ Popular existing clean energy financing mechanisms, such as leasing or power purchase agreement (PPA) relationships, do enable homeowners to install solar with little or no upfront costs; however, participation in these models generally requires a credit score or debt-to-income ratio minimum that can be a barrier to low-income consumers and people of color who, on average, are more likely to have lower credit scores.¹⁴ Furthermore, solar leases and PPAs are currently unavailable to customers in some markets. Consumer loan customers with lower credit scores also either fail to qualify or are charged higher interest payments that reduce the benefits of solar ownership.¹⁵ There is often anxiety related to taking out new loans or entering new financial arrangements that can be prohibitive on its own to the process of going solar, and maintenance costs may also be a concern.

Low-income families may be unable to take advantage of the largest public incentive to making solar affordable, the federal solar Investment Tax Credit (ITC), or any additional state and local tax credit incentives. People with lower incomes are often not in a qualifying tax bracket or otherwise do not have the tax burden needed to make the nonrefundable federal ITC valuable. Likewise, Tribal entities and nonprofits cannot directly access the ITC without a direct payment option.

B. Locational Barriers

Homeownership status, physical factors, and housing conditions also present barriers. Many homes cannot host solar due to tree shading, orientation, or other factors.¹⁶ Moreover, 32 percent of residents nationwide live in multi-unit buildings or homes with shared roofs. Renters have difficulty participating in rooftop solar even if their home is suitable; there is a fundamental disconnect between the entity that would benefit most from the utility bill savings of solar (the tenant) and the entity who would need to make or approve the solar investment (the property owner). These issues are particularly pronounced for low-income households, who are more likely to live in multifamily housing or rent their homes. Those that do own their homes¹⁷ are disproportionately likely to have unsuitable roofs. The history of suburbanization, redlining, and discriminatory housing policies means that people

of color and families with low incomes are more likely to live in older homes that need repairs and upgrades, including expensive roof repairs. In more rural communities, over one third of homes are manufactured housing, which also presents challenges to clean energy access. As discussed below, community solar can be a solution for these households, but it is not available everywhere, and programs are not always well designed to serve low-income customers.

C. Client Acquisition Barriers

A number of outreach and educational barriers contribute to the challenges involved in extending the benefits of solar to vulnerable communities. Often the targets of scams, customers in low-income communities may be distrustful of claims relating to energy bill savings and may have concerns about their privacy. Traditional sales teams may not be prepared to discuss solar energy with multilingual and multicultural households. Low-income families may be less familiar with solar or may regard it as a luxury for the wealthy, and so may not believe that they can participate in solar energy at all.

D. Market Barriers

All these barriers together contribute to another large one: market disinterest. With so many issues to address, successfully serving solar markets in low-income and disadvantaged communities requires that a company's marketing, sales and account management activities be focused to that end. The additional effort and investment needed to serve this market has limited the number of companies that are recruiting customers from these communities. Without supportive policies at federal, state, and local levels, together with targeted, intentional incentives for investments, the low-income solar market will not develop or scale as with the general market.

III. Federal Policy Recommendations to Expand Access to Clean Energy Benefits and Savings

A. Ensure Inclusive and Equitable Processes

1. Legislative Branch

Policies must ensure that underserved communities are empowered to design their own energy futures. Communities most impacted by the problem are closest to the solution. Community-driven solutions thus capture essential expertise and are more comprehensive, robust, and durable. Policy design without vulnerable communities at the table results in outcomes that are not only inequitable, but unworkable and incomplete. As this Subcommittee has recognized through its convening of a number of equity-focused hearings, legislation must be developed through equitable processes which center environmental justice and the perspectives of frontline communities.¹⁸ Congress could further expand its own institutional capacity by creating a Climate and Environmental Equity Office.

2. Executive Branch

Equitable processes are also needed at the agency level. Many federal agencies and commissions have relevance to expanding clean energy access and affordability, including not only the Department of

Energy but also the Departments of Housing and Urban Development, Transportation, Labor, Education, Interior, and Justice; the Federal Emergency Management Agency; the Environmental Protection Agency; the Federal Energy Regulatory Commission; and others. Inter-agency coordination on environmental justice and clean energy access, with oversight body(ies) or advisory council(s) with direct representation from Tribes, low-income, underserved and frontline communities, would greatly benefit the efficacy and equity of regulations and policy implementation. Communities should be empowered not just to advise, but also to hold decision-makers accountable for meeting the goals shaped by their input. During program implementation, meaningful education and outreach in partnership with trusted community organizations is invaluable.

3. Achieving Inclusive Participation

At all levels, policy design and implementation processes must recognize and address participation barriers that low income and underserved communities face, such as full-time jobs, unpredictable schedules, childcare needs, and other burdens and constraints. Policymakers should recognize the value of community-based contributors' time through intervenor compensation or other means where appropriate,¹⁹ and provide capacity building and technical assistance resources to community-based and grassroots organizations so they can participate meaningfully in stakeholder processes. It's not enough to open the door to participation; decision-makers must actively solicit these perspectives to get the whole picture and craft realistic and robust policy. For equity to be a driving principle throughout policy design and implementation, not an afterthought, frontline communities must lead.

B. Address Financial Barriers and Incentive Structures

Financial barriers are a threshold issue that must be addressed for low-income access to clean energy. Policies and programs should aim to enable low-income households and underserved communities to benefit financially from clean energy without either upfront costs, or a risk of variable costs over time.

1. Near-Term Stimulus

Families and businesses are suffering. Investing now in affordable, reliable and renewable energy, energy storage, and clean mobility will help families weather financial hardship related to the ongoing pandemic, help strengthen community resilience to economic and other shocks, and spur much-needed economic recovery and opportunity across the country. A focus on equity will enhance the effectiveness of clean energy as an economic driver. The federal government should coordinate with states and Tribal Nations to identify shovel ready projects for green stimulus, in direct consultation with frontline communities to prioritize equity and access.

The Solar Investment Tax Credit has been an effective financial incentive for the growth of solar, but is currently scheduled to decline starting in 2021. The timing of this step-down is an unnecessary burden on clean energy. The ITC should be extended (and expanded to include energy storage). There should be a direct pay option or other cash payment such as that offered previously through the 1603 Program,²⁰ to ensure that low-income customers and other entities without tax appetites, including Tribes, may equitably access the benefits of the ITC without incurring additional transaction costs.

2. Longer-Term Incentives and Investment

a. Investments to Overcome Financial Barriers to Clean Energy Access in Low-Income and Underserved Communities

One exemplary policy pioneered by communities in New York requires directing 40% of all governmental investments in clean energy toward disadvantaged communities, utilizing data obtained through equity impact mapping.²¹ This or similar benchmarks should be scaled up to the federal level to ensure proportionate and effective distribution of funds, while encouraging long-term market development.

There have been a variety of legislative proposals in recent years to provide federal funding to bridge gaps and promote low-income residential, multifamily, and community solar and energy storage through grants, loans, or other incentives. Properly designed and deployed, such investments would be highly effective and result in very high returns in terms of financial security, health, economic development, workforce development, resilience, and climate benefits. Funds could be distributed through a variety of means including newly designed programs, Green Bank-style financial institutions,²² revival of DOE's Energy Efficiency and Conservation Block Grant program, and expansion of existing programs such as DOE's State Energy Program and the Office of Indian Energy. Existing legislative authorities can be updated to explicitly allow solar, energy storage, community solar, grid modernization, low-income energy burden reduction programs, demand reduction, non-wires alternatives, electrification, and energy resilience projects such as microgrids.²³

HUD should commit to deploy solar for all federally-assisted affordable housing properties. Such deployment should encourage integration of storage and other distributed energy resources to the extent practicable, aimed at increasing resiliency.

Tribal Nations should have access to administer all grants, incentives and funding directly, and would also benefit from technical assistance and greater flexibility with respect to cost match requirements.

b. Harmonization with and Expansion of Energy Assistance Programs

Solar and clean energy assistance programs should be funded separately from or incrementally to the existing Low-Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP). These programs should, themselves, be fully funded to be able to serve all eligible households nationally. Clean energy access should not be set up to appear to compete for funds with energy assistance and weatherization, which are vitally and increasingly important.

These general energy assistance programs nevertheless should be well integrated with federal and state clean energy efforts. Solar can offer a longer-term and more cost-efficient solution than simply paying utility bills, especially in combination with efficiency and weatherization.

For the LIHEAP program, the WAP spending allowance should be expanded, and states should be allowed to use up to 100% of the funds on energy efficiency, smart thermostats, solar, energy storage, home electrification, and community solar projects that serve eligible households.

Funding to meet needs that can be prerequisites to going solar, like roof repairs or electrical upgrades, can also help more rapidly deploy clean energy where it can have the most impact.

Under WAP, a number of unnecessary and outdated restrictions that hamstring state administrators can be loosened to improve the program,²⁴ and nonprofits and other entities with experience in solar and clean energy access should be allowed to administer funds, in addition to community action agencies.

Raising income eligibility thresholds for programs to 80% of Area Median Income, with commensurate funding, would also enhance clean energy access and affordability.

3. Other Supportive Policies

a. Federal Policy to Support Funding and Financing from Non-Federal Sources

A federal Renewable Electricity Standard, building on successful state programs,²⁵ would promote equitable access to clean energy with strong carve outs for distributed energy resources benefiting low-income and underserved communities and owned and/or controlled by those communities.

Federal policies should also encourage state regulators and utilities to fully value and compensate for the benefits of renewable energy generation, especially for low income customers. Compensation for solar generation via net metering, a billing mechanism that credits solar energy system owners for the electricity they add to the grid, has proven to be a straightforward, effective, and overall equitable way to incentivize the installation of distributed energy systems around the country.²⁶

To ensure that residents of subsidized housing can access savings from net metering or other compensation mechanisms, HUD should be directed to issue a national exemption of solar bill credits when calculating utility allowances, similar to the memorandum issued by HUD concerning virtual net metering credits in California.²⁷

The Public Utility Regulatory Policies Act of 1978²⁸ could also be amended to require each utility, to the extent practicable, to make investments in programs aimed at expanding access to clean energy technologies benefitting low-income households and underserved communities.

b. Community Solar

Community solar programs, sometimes known as “shared solar” or “solar gardens,” are not currently authorized in every state, but they can help address both the physical and financial barriers that low income households face to directly benefiting from solar. Community solar allows individual subscribers to directly benefit from a solar installation sited elsewhere in the community, eliminating the need for roof space. Subscribers receive a credit on their utility bill for the clean energy produced by the system using the Virtual Net Energy Metering mechanism, saving money each month.

The federal government should institute or encourage equitable community solar policies that are flexible enough to allow for a variety of ownership and contract models to meet different consumers’ preferences and financial standing; don’t undermine other existing renewable energy programs;

contain strong consumer protections; and include a targeted focus on serving low-income consumers, such as through a carveout or incentive adder.²⁹

c. Reducing “Soft Costs” and Other Barriers

Other ways to further reduce the costs of solar and extend it to more communities include soft cost³⁰ reduction, such as the SolarAPP+ (Solar Automated Permit Processing) initiative supported by DOE’s NREL³¹ to make the process of going solar easier and cheaper for customers, and allow local governments to quickly and safely approve applications.

Strong, uniform federal consumer protection standards can also provide necessary reassurance for low-income households and reduce customer acquisition costs. Clean energy benefits businesses as well as consumers, but successful clean energy policies should not create incentives for predatory lending or exploitation of communities for financial gain. Rather, they should seek to maximize benefits, most importantly bill savings, for participating households. Community input can shape robust consumer protection measures, disclosures, and accountability measures that protect both vulnerable customers and small businesses.

C. Maximize and Capture the Many Benefits of the Clean Energy Transition

1. Integrate Programs and Address the Energy Transition Comprehensively

It is important for policymakers to recognize, measure, and capture the many benefits of clean, renewable energy, including equity. Failing to do so artificially tilts the market toward dirtier, environmentally unjust fossil fuels, and interferes with the deep decarbonization that is needed. Aligned solutions or co-benefits should be addressed together whenever possible, via prior planning.

At the levels of policy and program design and general implementation, integration and harmonization across programs, agencies, and sectors can result in greatly increased efficacy per federal dollar.

At the point of delivery of these solutions to Americans, there may be limited outreach opportunities to have the attention of a household, affordable housing provider, or community leader about their energy, especially in low-income communities. Each “touch” should therefore be put to maximum advantage both for their benefit and for the benefit of a faster, better energy transition.

Opportunities to change electricity sources from fossil fuels to renewables should be integrated with complementary opportunities to obtain weatherization, healthy home, and energy efficiency products and services; to gain resilience with energy storage; to engage in beneficial electrification of heating and cooling systems and appliances that run on gas; and to electrify transportation and mobility, with equitable access to electric vehicles and vehicle charging infrastructure.³²

2. Target Policies to Maximize Inclusive Clean Energy Workforce Development

Finally, addressing climate change demands a rapid transition to a renewable energy-based economy

nationally, which in turn requires building up a large-scale workforce with the capacity to execute this transition. Federal policy should expressly aim to expand this clean energy workforce and to ensure that clean energy jobs remain increasingly good jobs. Particularly as the country struggles to recover from the economic impacts of the pandemic, Congress can start by expanding existing federal job training programs, like the HUD Jobs Plus Program, and adding emphasis on clean energy jobs.

Congress can also expand existing grants that provide solar and renewable energy training, especially focused on low-income and underserved communities, and workers who are displaced from fossil fuel industries or otherwise impacted by the energy transition. GRID particularly supports funding for the SolarCorp Program supported through the AmeriCorps VISTA grant.

Because career choices are shaped by experiences and education prior to entry into the workforce, Congress should provide and incentivize resources for colleges and universities including HBCUs, Tribal colleges, and minority serving institutions, as well as high schools and technical schools to support solar and renewable energy training and placement programs.

There is also ample opportunity to create new renewable energy, storage and electric vehicle infrastructure-focused training programs that provide living wages and health benefits during training, along with holistic wrap-around support services to reduce employment barriers.³³ Wages and benefits during training are crucial to building a more inclusive workforce, as individuals from disadvantaged communities are less likely to be able to take unpaid time to engage in training and professional development. The Solar Works DC program in the District of Columbia, a program of the District's Department of Energy and Environment and the Department of Employment Services that is implemented by GRID Alternatives Mid-Atlantic, provides one scalable model for delivering paid clean energy training that reduces barriers to full-time employment with real-world experience, while at the same time helping the community benefit through low-income solar.³⁴

D. Promote Energy Democracy and Community-Owned, Community-Benefitting Energy

It is not just electric power that people need, but also political power, power within their communities, and power over their own futures. To strengthen local community-level ownership and control over energy systems, technical assistance can specifically aim to build capacity for democratized, community-owned, community benefiting energy. Driven by communities themselves, incentives can be structured to encourage ownership and access for Tribes, low-income communities and communities of color, and to maximize benefits such as local job creation and economic opportunity for minority and disadvantaged business enterprises. Policies can promote opportunities for communities, including Tribal Nations, to opt into ownership or increased agency over their electricity generation, such as community or Tribal choice aggregation³⁵ or legislation to support Tribal energy sovereignty.

Entrepreneurship programs and assistance aimed at fostering solar and clean energy businesses, especially focused on Tribes and minority and disadvantaged business enterprises, can also help address market barriers while keeping the financial and economic benefits of clean energy where they're most needed.

Endnotes and References

¹ See generally House Committee on Oversight and Reform, “The Devastating Health Impacts of Climate Change,” Hearing (Aug. 5, 2020) and Linked Testimony, <https://oversight.house.gov/legislation/hearings/the-devastating-health-impacts-of-climate-change/>.

² *Id.*; Stephen Mufson, *Moody’s Analytics says climate change could cost \$69 trillion by 2100*, WASHINGTON POST (Jul. 8, 2019), https://www.washingtonpost.com/climate-environment/moodys-analytics-says-climate-change-could-cost-69-trillion-by-2100/2019/07/02/f9fb94ac-99cb-11e9-916d-9c61607d8190_story.html.

³ See, e.g., Machol, B. & Rizk, S., *Economic value of U.S. fossil fuel electricity health impacts*, ENVIRON. INT’L. 52:75-80 (Feb. 2013), <https://www.sciencedirect.com/science/article/pii/S0160412012000542?via%3Dihub> (“Fossil fuel energy has several externalities not accounted for in the retail price, including associated adverse human health impacts, future costs from climate change, and other environmental damages.”).

⁴ See generally, e.g., Brown et al., *Low-Income Energy Affordability: Conclusions from a Literature Review*, OAK RIDGE NATIONAL LABORATORY ORNL/TM-2019/1150, available at <https://info.ornl.gov/sites/publications/Files/Pub124723.pdf>.

⁵ See Machol, *supra* note 3; NAACP and Clean Air Task Force, *Fumes Across the Fence-Line: The Health Impacts of Air Pollution from Oil and Gas Facilities on African American Communities* (Nov. 2017), https://www.naacp.org/wp-content/uploads/2017/11/Fumes-Across-the-Fence-Line_NAACP-and-CATF-Study.pdf; McKenzie et al., *Congenital heart defects and intensity of oil and gas well site activities in early pregnancy*, ENVIRON. INT’L. 132:104949 (Nov. 2019), <https://pubmed.ncbi.nlm.nih.gov/31327466/>.

⁶ Wu, X. et al., *Air pollution and COVID-19 mortality in the United States: strengths and limitations of an ecological regression analysis*, Science Advances (in press, 2020), <https://projects.iq.harvard.edu/covid-pm>.

⁷ See EPA, *Smart Growth and Equitable Development*, <https://www.epa.gov/smartgrowth/smart-growth-and-equitable-development>.

⁸ Solar is contagious. See Graziano, M. & Gillingham, K., *Spatial patterns of solar photovoltaic system adoption: the influence of neighbors and the built environment*, J. Econ. Geogr. 15, 815–839 (2015) (noting spatial neighbor effects conveyed through social interaction and visibility).

⁹ Sigrin, B., and Mooney, M., *Rooftop Solar Technical Potential for Low-to-Moderate Income Households in the United States*, NATIONAL RENEWABLE ENERGY LABORATORY NREL/TP-6A20-70901 (2018), <https://www.nrel.gov/docs/fy18osti/70901.pdf>.

¹⁰ *Id.*

¹¹ Doris et al., *Geospatial Analysis of Renewable Energy Technical Potential on Tribal Lands*, DOE Office of Indian Energy Policy and Programs (2013), <https://www.nrel.gov/docs/fy13osti/56641.pdf>.

¹² See Sunter et al., *Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity*, NATURE SUSTAINABILITY Vol. 2, 71-67 (Jan. 2019).

¹³ U.S. Census Bureau American Community Survey Briefs, Household Income: 2019 (ACSB/20-03, issued 2020), <https://www.census.gov/content/dam/Census/library/publications/2020/acs/acsbr20-03.pdf>.

¹⁴ See Choi et al., *Explaining the Black-White Homeownership Gap” A Closer Look at Disparities across Local Markets*, URBAN INSTITUTE HOUSING FINANCE POLICY CENTER (Oct. 2019), https://www.urban.org/sites/default/files/publication/101160/explaining_the_black-white_homeownership_gap_a_closer_look_at_disparities_across_local_markets_0.pdf.

¹⁵ Groups like Solstice are trying to change the historical reliance on credit scores with their EnergyScore tool. Solstice, *EnergyScore: An Alternative to FICO Credit Requirements for Low-to-Moderate Income Community Solar* (2018), <https://solstice.us/wp-content/uploads/2018/08/2018-08-09-EnergyScore.pdf>.

¹⁶ Sigrin et al., *supra* note 9.

¹⁷ Approximately half of households with less than the national median family income own their homes, as compared to 78% of households with incomes greater than or equal to the median income, according to 2017 U.S. Census data.

¹⁸ See also, e.g., 100% Network, *Comprehensive Building Blocks for a Regenerative and Just 100% Policy* (2020), https://www.100percentnetwork.org/uploads/cms/documents/100-network_comprehensive-building-blocks-for-a-just-regenerative-100-policy-2020.pdf.

¹⁹ For example, the California Public Utilities Commission’s Intervenor Compensation Program allows qualified parties in proceedings before the Commission to request compensation for their participation (allowable fees and costs) to ensure that

individuals and groups have the financial resources to bring their concerns and interests to the Commission during formal proceedings. See <https://www.cpuc.ca.gov/icomp/>.

²⁰ For more information see Solar Energy Industries Association (SEIA), *Tax Basis for the ITC and 1603 Applications* (2012), <https://www.seia.org/research-resources/tax-basis-itc-and-1603-applications>.

²¹ Climate Leadership and Community Protection Act (CLCPA), S. 6599/A. 8429 (2019), <https://legislation.nysenate.gov/pdf/bills/2019/S6599>; see also NRDC, *Unpacking New York's Big New Climate Bill: A Primer* (June 2019), <https://www.nrdc.org/experts/miles-farmer/unpacking-new-yorks-big-new-climate-bill-primer-0>.

²² Coalition for Green Capital, <https://greenbankus.com/>.

²³ Opportunity Zones, created to promote economic development in low-income communities by allowing companies to defer capital gains taxes, have been promoted and used in some instances as means of bringing renewable energy to those communities. However, this program is highly limited in its ability to advance residential clean energy, timelines and rules may further limit energy applications, and the place-based tax incentive doesn't equate to benefits for communities. Relatively little Opportunity Zone investment has gone toward renewable energy, especially renewable energy directly financially benefiting the communities where it is sited.

²⁴ 42 U.S.C. § 6864. (1) Shift from metrics of reducing energy usage to outcome-oriented measures such as reducing energy burden; improving residents' health and safety; and increasing energy resilience and renewable energy access. (2) Eliminate the following: household spending cap, one-time only rule, efficiency-first mandate, cost effectiveness mandate/ savings-to-investment ratio, and the outdated Appendix A list of technologies. (3) Spur innovation by allowing the private sector to compete to implement projects. (4) Widen eligibility to 250% Federal Poverty Level or 80% Area Median Income and loosen household income verification requirements. (5) Explicitly allow green roofs; cool roofs; roof repair and replacement; and electrical system upgrades, as well as workforce training programs.

²⁵ For more information on state renewable portfolio standards, see NREL, State, Local, and Tribal Governments: Renewable Portfolio Standards, <https://www.nrel.gov/state-local-tribal/basics-portfolio-standards.html>.

²⁶ Even payment for solar power at utility retail rates (net metering) is unlikely to fully capture the benefits and lower cost of service for residential utility customers with solar photovoltaic systems; see, e.g., William Driscoll, *SEIA finds rooftop solar is worth 24¢/kWh in Michigan*, PV MAGAZINE (June 29, 2020), <https://pv-magazine-usa.com/2020/06/29/seia-finds-rooftop-solar-is-worth-24%C2%A2-kwh-in-michigan/>. However, net metering is simple and relatively intuitive for customers and has a demonstrated history of success.

²⁷ HUD Memorandum re: Treatment of Solar Virtual Net Energy Metering Credits on Tenant Utility Bills (July 8, 2019), https://calsomah.org/sites/default/files/docs/SOMAH_HUD_Solar_VNEM_Credits_memo_2019-07-08.pdf.

²⁸ 16 U.S.C. § 2621(d).

²⁹ For more information on community solar program design options, see *Low Income Solar Policy Guide*, <https://www.lowincomesolar.org/best-practices/community-solar/>, and resources linked therein.

³⁰ DOE Solar Energy Technologies Office, *Soft Costs*, <https://www.energy.gov/eere/solar/soft-costs>.

³¹ See NREL SolarApp website, <https://solarapp.nrel.gov/>.

³² GRID Alternatives is helping pioneer clean mobility programs in alignment with its solar and other programs in California and elsewhere, including partnering with the California Air Resources Board to administer its One-Stop-Shop pilot, a statewide project to create easy and comprehensive access to California's clean transportation-related programs for residents and communities that have historically faced the most harm from environmental injustice. For more information, see <https://gridalternatives.org/what-we-do/access-electric-vehicles> and links therein.

³³ The Solar Foundation and Solar Training Network, *Strategies for Solar Workforce Development: A Toolkit for the Solar Industry* (2018), available at <https://www.americansolarworkforce.org/>.

³⁴ For further discussion of the Solar Works DC program, see Cortlynn Stark, *As demand for solar energy grows, D.C. job training offers both employment and community results*, Washington Post (Aug. 30, 2019), https://www.washingtonpost.com/local/dc-politics/as-demand-for-solar-energy-grows-dc-job-training-offers-both-employment-and-community-results/2019/08/30/744fd1dc-bf65-11e9-a5c6-1e74f7ec4a93_story.html.

³⁵ EPA Green Power Partnership, *Community Choice Aggregation*, <https://www.epa.gov/greenpower/community-choice-aggregation>.