

JUST ENERGY PAPERS

Seven Key Considerations for an Equitable Transition to Clean Energy

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The urgency of the climate crisis—intertwined with persistent racial injustice and public health and economic crises and disparities—

necessitates strong, consistent, and urgent action to meet community needs, accelerate the transition off fossil fuels, and build the foundation for a just and regenerative energy system.

A critical component of this transformation is moving away from electricity generated by polluting and fossil-fuel resources to clean, renewable energy sources. To achieve economic and environmental justice in the energy transition, equity must be integrated into all aspects of the design, implementation, and evaluation.

Black, Indigenous, People of Color (BIPOC) communities and families with lower incomes have been and remain disproportionately on the frontlines of climate change, environmental degradation, adverse public health impacts, and economic crisis.

The importance of the electricity sector goes far beyond the main areas of present-day electricity use. Specifically, the principal means of drastically reducing emissions in the transportation sector is to electrify as much of it as possible while making the sources of that electricity clean and renewable. Similarly, industrial uses of fossil fuels—such as for producing industrial high-temperature steam, for manufacturing fertilizers, pesticides and other chemicals, and for making building materials, notably cement and steel—also need to be addressed in getting to a decarbonized energy system compatible with addressing the climate crisis. The energy transition will also need manufacturing of the components that go into renewable energy and storage devices, production of the raw materials to manufacture them, and recycling facilities for their recovery and reuse.

Each of these sectors represents significant equity, economic, and technical issues that go well beyond electrification aspects alone, such as transportation cost burdens, the scale of public transportation investments, the types and quantities of materials used in the construction and agricultural sectors. The siting of manufacturing and recycling facilities and the environmental and worker protection standards to which they will be built also raise critical environmental

and economic justice issues. We expect to cover these issues in future papers. This paper is more narrowly focused on the electricity transition, and in this context, we adopt the common practice of using the terms “clean energy” and “clean electricity” interchangeably.

This paper describes critical considerations for achieving an equitable transition in the electricity sector that will rise to the climate challenge and the imperatives of economic and environmental justice. A fundamental starting point is to acknowledge that BIPOC communities and families with lower incomes have been and remain disproportionately on the frontlines of climate change, environmental degradation, adverse public health impacts, and economic crisis. Thus, all electricity sector transition policies and practices must achieve equitable reductions of these burdens in environmental justice communities,¹ redressing past harms and ensuring that these communities benefit equitably from the transition to clean, renewable energy.

Targeted policies are needed at both the state and federal levels. Without specific considerations, environmental justice communities, which have long borne the brunt of the country’s fossil fuel infrastructure, could face additional environmental, health, and economic burdens and not benefit economically from the transition to clean energy. The following key components should be included within state and federal renewable and clean energy policies:

1. Environmental justice communities must be identified and prioritized;
2. Environmental burdens must decrease in environmental justice communities;
3. Energy burdens of families with lower incomes should be reduced;
4. There must be opportunities for environmental justice communities and households to own renewable energy;
5. Clean energy jobs must be prioritized for environmental justice communities and communities transitioning away from fossil fuels;
6. Resilience measures for environmental justice communities should be prioritized; and
7. There must be a safe and affordable transition away from fossil fuels.

These policies and programs are necessary to ensure a more equitable energy transition. This is a framework paper rather than an exhaustive overview or list of

the environmental and climate justice issues. As such, this paper does not include all social and racial justice issues and fundamental elements of the transition to a renewable and clean energy system. Rather, this paper presents a broad summary of some of the major integral considerations.

For the purposes of this paper, we define renewable and clean electricity as follows:

Renewable energy is any form of energy from solar, geophysical, or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use in one year or less. Clean electricity generation must be renewable AND have zero criteria air pollutant emissions in the electricity generation process.

Electricity sources used for the transition should be renewable and clean. To arrive at this definition, we started with the 2014 definition of renewable energy provided by the Fifth Assessment of the Intergovernmental Panel on Climate Change: "Renewable energy is any form of energy from solar, geophysical, or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use."² However, this definition has an important gap, it does not specify the period of replenishment. In the definition used here, a renewable energy source must be fully replenished by natural processes over a period of one year or less.

Following this definition would avoid practices such as burning old-growth trees and claiming carbon neutrality by planting saplings, a practice that has high net carbon emissions for many years or even decades. Replenishment in the case of biomass should include consideration of soil carbon losses; the net combined impact of drawing atmospheric CO₂ into biomass (via photosynthesis), soil carbon increases and losses, and releasing CO₂ upon burning biomass should be zero. Nuclear energy, burning municipal waste, and fossil fuels are not renewable under this definition of renewable energy. A "clean" electricity source should not emit criteria air pollutants in the course of electricity production. While biomass burning could in theory and with great difficulty be considered "renewable," biomass-generated electricity is not clean because it emits criteria air pollutants

in the course of electricity production. In this paper, we use the term “clean energy” as shorthand for “renewable and clean electricity.”

1. Identify and prioritize environmental justice communities

Programs or policies should define environmental justice communities and households and prioritize them with targeted policies and programs. If the program or policy does not clearly and transparently define who should benefit or where problems should be addressed, it will not be able to equitably distribute benefits nor address disproportionate impacts. In particular, policies and programs should include both meaningful prioritization of vulnerable communities and targeted actions that maximize benefits to impacted communities most in need. The prioritization must balance inclusivity with an understanding that an overly broad threshold weakens the intended impact of the program. Different policies will necessarily require distinct definitions, depending on the purpose of the program. For example, programs designed to reduce energy burdens should prioritize low-income households with the highest energy burdens, while programs designed to address existing environmental burdens should prioritize communities with the highest pollution burdens. There is considerable overlap between the two groups referenced in these examples, but they are not identical.

Programs and policies should clearly define environmental justice communities and households, prioritize them, and clearly benefit them equitably.

In order to effectively target policy solutions, policymakers need a rigorous and clear way to identify areas most in need.³ While there are various methodologies that can be used to do so, the following criteria should be included and assessed in the energy context:

- **Fossil fuel extraction and production impacted areas** - Geographies and constituencies where fossil fuel extraction and production are occurring will directly need economic development, diversification, and revenue replacement to ensure a just

transition. Policies or programs targeting jobs and a just transition should include specific consideration of these areas and communities so that potential negative impacts are prevented *before they occur*.

- **Adverse climate change impacts and vulnerable communities** - Geographies and constituencies that will be particularly impacted by climate change—such as places susceptible to flooding, erosion, and wildfires, as well as agricultural areas—need urgent adaptation and mitigation support.⁴ Policies and programs addressing resiliency for environmental justice communities should identify and prioritize the communities most vulnerable to extreme climate events.
- **Cumulative burdens** - A “cumulative impact” assessment examines the full range of existing pollution burdens as well as socioeconomic and health vulnerabilities in a community to assess the overall burden. Examples include California’s [CalEnviroScreen](#) tool and the State of Washington’s [environmental health disparities](#) map. This type of mapping can be used to identify communities that should be prioritized for pollution reduction, remediation of existing pollution burdens such as coal ash ponds, and institutional support for the transition to clean energy.
- **Areas with low employment and income** - Low-income households face high energy burdens and a number of barriers to transition to clean energy. Programs designed to reduce energy burden and increase access to clean and renewable energy should be targeted to low-income households. Persistent and historically impoverished communities should also be prioritized for resources and support.
- **Native American and Alaska Native households and communities** - Native American and Alaska Native households and communities suffer disproportionately high energy cost burdens, face disparate environmental burdens, and often lack access to the resources needed to transition to clean and renewable energy. Many households and communities do not even have access to the electricity grid and resort to gasoline generators, which are polluting and expensive to operate. Native American and Alaska Native households and communities should be prioritized for all programs aimed at ensuring an equitable transition to clean, reliable, and affordable energy.

Once environmental justice communities have been identified, three basic requirements should be met to ensure that the prioritization produces positive results:

- 1. Be consistent with community priorities** - Policies should include provisions to ensure that projects are consistent with community priorities, as reflected in meaningful outreach and a public process before receiving the proposed prioritization. For example, information and meetings should be accessible to all, financial and other resources should be provided to ensure that environmental justice communities can meaningfully participate, and the process should require regulatory decisionmakers to respond to feedback.⁵
- 2. Do not cause further harm** - Projects that increase pollution within a community (such as biomass-fueled power plants) should not be included.
- 3. Show real benefits to the community** - Projects designed for environmental justice communities should ensure that meaningful benefits accrue to those communities, in addition to having verifiable emission reductions and reductions in pollutant concentrations. These benefits can be reflected in provisions for local hire, training of workers, training and hiring of returning citizens, provisions for community ownership, and other provisions that ensure that the benefits of such projects accrue to the intended community. Program administrators should provide data and reporting demonstrating that these benefits are accruing in the intended communities, and federal and state agencies should provide oversight to ensure accountability. At a minimum, federal and state accountability mechanism for tracking community benefits should: 1) define the relevant benefit metrics; 2) set specific time-based targets; and 3) build in reoccurring program evaluations with public input.⁶

In sum, programs should prioritize environmental justice communities, provide higher incentives for clean energy projects, and designate resources to redress current disproportionate harms and economic disadvantages.

2. Decrease environmental burdens in environmental justice communities

The transition to clean and renewable energy must take affirmative steps to decrease and eliminate environmental and public health burdens in environmental justice communities. These communities have long borne the brunt of fossil fuel infrastructure and the health impacts associated with that infrastructure. The transition to clean and renewable energy must decrease and eliminate historical impacts by improving air, soil, and water quality related to the impacts of the energy system and legacy environmental hazards.

The energy transition must eliminate environmental and public health burdens in environmental justice communities that have long borne disproportionate burdens.

In addition to eliminating historical impacts, policies must be designed to eliminate potential future impacts. Air pollution remains a serious issue in the United States. Numerous studies have established that communities with lower income and BIPOC communities are disproportionately burdened by air contaminants, and they face a host of negative health impacts as a result, including shorter life spans.

As the energy system transitions to clean and renewable energy, if affirmative steps are not taken to limit pollution, air pollution burdens in certain communities could increase because fossil fuel facilities can emit more pollution per hour when they backup variable renewable electricity sources. Furthermore, some energy sources that are often classified as “renewable,” such as biomass, create significant local air pollution. Given the disproportionate siting of polluting power generation sources in environmental justice communities,⁷ it is imperative that any new clean and renewable energy not lead to increased air pollution.

Water pollution as a result of fossil fuel production, transport, and use is widespread, severe, and often leads to the contamination of soil and land. Fracking results in vast quantities of wastewater and other fluids contaminated with toxic materials and radioactivity. Oil and gas production results in more than 18 billion barrels (almost one trillion gallons) of contaminated waste fluids every year.⁸

Coal ash ponds also contain toxic heavy metals and radioactivity, and the vast majority of these ponds are unlined. They are present at hundreds of operating and closed coal-fired power plants. Since water pollution reporting began to be required in 2018, the data show that “[a]lmost all [coal ash ponds] are contaminating groundwater with toxins above levels that the U.S. Environmental Protection Agency deems safe for drinking water.”⁹ Ninety-two percent of these ponds are leaking toxic materials into groundwater.¹⁰ Given that coal-fired power plants are disproportionately located in disadvantaged communities, the environmental injustice implications are clear, as is the need for stricter standards and remediation.

While nuclear power is considered a low-carbon energy source, it is critical to note that hundreds of millions of tons of radioactive uranium mining and milling wastes dot the U.S. landscape, with higher concentrations in Colorado, Utah, Arizona, and New Mexico, including Tribal Nations lands, especially those of the Navajo Nation. According to the U.S. EPA’s account of Navajo Nation uranium contamination, there are “over 500 abandoned uranium mines (AUMs), as well as homes and water sources with elevated levels of radiation. Potential health effects include lung cancer from inhalation of radioactive particles, as well as bone cancer and impaired kidney function from exposure to radionuclides in drinking water.”¹¹

At a minimum, policies should include the following to decrease environmental burdens and prevent increased pollution:

- **Improve water quality in environmental justice communities** - Coal, uranium, fossil gas, and petroleum (in the form of diesel and heavier fuels) are all used in electricity generation, and all of them are sources of water pollution across the United States, including in disadvantaged and environmental justice communities as well as Tribal Nations. Remediating past sources of water pollution to strict standards should be a high and urgent priority of the energy transition, especially for sites located in environmental justice communities and Tribal Nations.
- **Eliminate historic land-based environmental hazards** - The transition away from fossil fuel infrastructure should eliminate the environmental impacts from the long-term use of toxic and hazardous materials in environmental justice communities. This effort should include cleaning up and providing ongoing monitoring for legacy infrastructure, as well as preventing new, harmful fossil fuel infrastructure (such as pipelines) from being sited within communities.
- **Plan power system dispatch of resources** - As variable renewable resources are increased, dispatchable resources—including existing fossil fuel power plants, new storage systems, and expanded demand response programs—will be used differently. Power system planning and investment (including size, type, and location of new resources) should ensure that the reliance on polluting resources in already-burdened communities is steadily reduced and eliminated with priority as part of the transition to a clean energy system. In other words, environmental justice needs to be built into power system planning and investments, as well as how resources are used on a day-to-day and hour-to-hour basis.
- **Require transparent reporting, monitoring, and verification** - There should be requirements for frequent, publicly available reporting and verification of air pollution from all combustion sources, fossil fuel production, processing, and transmission infrastructure, as well as all programs required to reduce and eliminate the legacy of pollution. Monitoring of stack emissions from power plants and of ambient air should

be part of these programs. Without reporting and transparency, it will not be possible to know where pollution is increasing and whether programs are achieving the desired reductions in pollution burdens.

- **Update and strengthen rules and requirements** - Existing regulations should be updated to ensure that resources install the best available pollution controls to limit pollution. Policymakers should require utilities to reduce air pollution overall and at each facility, especially in environmental justice communities, near vulnerable receptors such as hospitals and schools, and all places where people live, work, and play. Strengthening of rules is also required in other areas. For example, as yet there is no federal regulation for radioactive wastes associated with fossil fuel production. So far, the matter has been left up to the states; some have regulations while others are considering them.¹² Strengthening regulations and strictly enforcing existing regulations for coal ash pond cleanup is a critical need. For clean closure, complete removal of all coal ash should be required for leaking ash ponds. Clean closure involves remediation by removal of all coal ash from leaking ponds.
- **Increase enforcement** - Policymakers should also emphasize increased enforcement of current and updated requirements, with a priority for environmental justice communities.

3. Reduce energy burdens of families with lower incomes

Energy burden refers to the fraction of a household's income that goes to pay residential energy costs. High energy cost burdens have a significant impact on families with lower incomes that are often forced to make impossible choices between heating and cooling their homes and other necessities, such as paying rent or buying food or medicine. The energy burdens of the most-disadvantaged households are likely to rise during a transition to a cleaner energy system, even if average costs decline. More extreme weather heat waves, flooding, and wildfires and the increasing frequency of such events will tend to raise bills for everyone, but without specific policies and investments, low-income households will have fewer tools to manage them.

More extreme heat waves, floods, and wildfires will increase energy burdens among low-income households, especially renters, who will also be less able to adjust by improving efficiency and acquiring rooftop solar.

For example, most low- and moderate-income households are renters who do not control whether efficiency improvements are made and are also less likely to be able to participate in rooftop solar and demand response markets.

An essential safeguard against increasing energy burdens that are already too high would be a Percentage of Income Payment Program. Several states like Colorado and New Jersey have such programs, which limit residential energy burdens to a maximum percentage of household income, usually six percent.¹³ This safeguard for low-income households will enable the energy transition across the whole sector to proceed more efficiently, since the risk that more people will become ill or homeless or have their utilities cut as a result of the increased energy costs in light of extreme weather and other climate impacts will be greatly mitigated, presuming full implementation. Ensuring people are not poorer as a result of a clean energy transition and limiting energy burdens to an affordable amount is fundamental.

The following are necessary and complementary approaches to systematically reducing energy burdens:

- **Increase energy efficiency and distributed energy resources** - Targeted programs that increase access to and resources for energy efficiency and distributed energy resources can also reduce energy burdens and provide bill consistency. Up-front financing can help expand access to these resources and to well-structured community solar contracts that guarantee lower rates than standard-offer rates of electricity supplied by utilities.
- **Create incentives for landlords** - Most families with low incomes rent their homes. Landlords who do not pay utility bills have little incentive to invest in efficiency or

rooftop solar. Incentives for landlords of affordable housing for improving building insulation and performance and investing in efficient appliances and building electrification would address this important disjunction between the parties that benefit from efficiency and those who pay for improving them.

- **Convert fossil fuel heating systems to efficient electric systems** - The conversion of fossil fuel heating to highly efficient electric systems, combined with building envelope improvements, has the potential to effectively and systemically reduce household energy bills while improving indoor air quality. Such conversions should have efficiency-oriented building standards to guide them. Low-interest loans, up-front grants, and higher rebates are all possible approaches to making the transition to a decarbonized energy system more equitable.
- **Improve indoor air quality with electrification of affordable housing** - Recent research has shown that indoor air quality often exceeds outdoor pollution limits when fossil gas is used for cooking. These problems are more acute for unvented stoves. Pollutants include carbon monoxide and nitrogen dioxide.¹⁴ Other indoor pollution sources include portable fossil fuel heaters and the use of gas stoves and ovens for space heating, as well as improperly functioning gas space and water heating systems. The significant health benefits of efficient electrification and investments in building envelope improvements that result from eliminating an important source of indoor air pollution should be taken into account in accelerating investments and incentives for the conversion of housing from fossil fuels to efficient electric systems. While the problem is general for indoor fossil gas use, available data indicate that low-income households are likely to be at greater risk of indoor air pollution.¹⁵ Programs for efficient electrification and should prioritize renters, especially in disadvantaged communities. At the same time, there are no federal standards for indoor air quality. This situation needs to be remedied, especially as most people generally spend more time indoors than outdoors.

4. Provide homeowners and renters in environmental justice communities with opportunities to own clean energy

The transition to renewable energy must be accessible to low-income and BIPOC communities and Tribal Nations. These communities would benefit from favorable financing of renewable energy installations and suitable mandates for the siting of renewable energy projects. As noted above, programs that assist with the deployment and ownership of solar and storage can also reduce energy bills. Without clear guidelines, incentives, and policies, environmental justice communities and households will be left out of the growing renewable energy transition.¹⁶ Even worse, these communities and households may pay for part of the transition with little or no reward; for example, through electricity bills, they may shoulder some of the costs of solar renewable energy credits acquired by utilities, while getting few or none of the benefits, which is often the case today.

Community solar programs, incentives for landlords, and financing support are all essential for equitable access to solar energy and efficiency, especially for renters.

Examples of policies and programs that increase development of renewable energy in environmental justice communities include:

- **Programs to fund renewable energy installations on multifamily, affordable housing** - Apartment buildings have significant solar energy potential, which has yet to be fully realized. The Solar on Multifamily Affordable Housing Program in California, which allocates \$1 billion to finance renewable energy installations directly on multifamily affordable homes, with energy utility savings going directly to tenants,¹⁷ is a good model to replicate across the United States. The inclusion of additional distributed resources, such as energy storage, can provide additional bill management

and resilience benefits.

- **Policies and incentives to enable full and inclusive participation in community solar** - Community solar programs that are designed correctly can provide an excellent way for renters, low-income homeowners, and homeowners with roofs unsuitable for solar to participate in the benefits of lower-cost renewable energy. Higher rebates for developers of community solar installations with 50 percent or greater participation of families with low- or moderate-incomes can provide a powerful incentive for enrollment. A federal insurance program to backstop against default on community solar contracts would also enable easier and smoother enrollment by a larger number of families by helping overcome credit and other barriers to participation.¹⁸
- **Opportunities for participation in the economic benefits of a smart-grid** - The electric grid of the future is likely to have time-of-use rates or even real-time rates. In such an economic environment, smart appliances, broadband, and the information to participate in demand response programs will be essential to deriving economic benefits like rate discounts. Incentives for landlords to install smart appliances, added discounts for such infrastructure for low-income homeowners, and universal broadband access will be important to lowering energy burdens and providing equitable access to the benefits of a renewable energy system.
- **Expansion of financing and resources for development and ownership of renewable resources in environmental justice communities** - Households in environmental justice communities face a number of barriers for developing clean energy, including financial barriers related to access to capital and banking services. Low or no credit scores often impact their ability to purchase or contract for renewable resources. Several different types of models can be considered to provide additional resources, including green banks that prioritize environmental justice communities, prioritization for grants, increased tax credits, and encashable tax credits.
- **Inclusion of anti-displacement measures** - Studies have shown that green investments can result in gentrification and displacement of existing residents.¹⁹ At state and local levels, provisions for funding should include anti-displacement requirements,²⁰ and at the federal level, grants can be provided to local governments

to combat displacement, gentrification, and neighborhood destabilization by protecting housing affordability.²¹

5. Prioritize clean energy jobs for environmental justice communities and communities transitioning away from fossil fuels

Jobs that provide family-supporting wages, financial security, and upward mobility are an important non-energy benefit that ensures economic security and community improvement. “[D]eveloping local workforce participation in clean energy programs is integral to enabling the full range of benefits for low-income customers.”²² A strong local-hire preference, investments in workforce development programs for un- and under-employed people, worker support—including child care, health care, and an evaluation of economic development and worker outcomes—should be key components of any program. In addition to providing labor requirements for jobs related to renewable energy development, workers in the fossil fuel industry also need support as the fossil fuel industry declines. These policies need to include reporting and oversight by the relevant federal or state bodies to ensure that they are effectively implemented to reduce barriers and provide opportunities.

Local hiring of BIPOC workers, training that leads to good jobs, and the creation of new well-paying employment before jobs are lost in fossil-fuel-dependent communities are all critical for a just energy transition.

Specific types of policies that should be considered include:

- **Prioritization of BIPOC-owned business enterprises** - Policies should be developed that ensure prioritization of BIPOC-owned businesses related to all aspects

of transition, including manufacturing and installing clean energy systems.

- **Investments in workforce development programs for un- and under-employed workers** - The clean energy transition provides employment opportunity for low-wage workers and those without jobs. Programs should be in place to provide targeted training in addition to vital resources for employment such as child care, health care, funds for tools, and transportation assistance.
- **A Displaced Energy Workers Bill of Rights** - Workers in the fossil fuel industry need to know that they will not be left without any support or income as the fossil fuel industry declines. A Displaced Energy Workers Bill of Rights would help impacted workers achieve financial security by shoring up retirement benefits, guaranteeing access to health care for any workers losing health benefits, and providing re-employment training and opportunities in coordination with local unions.²³
- **Comprehensive labor standards for all federal and state investments** - Any investments to fight climate change must ensure livable wages for all workers, including meeting prevailing wage law, utilizing Community Benefit and Project Labor Agreements, and other strong worker protections.
- **Incentives for training and hiring BIPOC workers and returning citizens** - Returning citizens face high barriers to employment including getting apprenticeships and training. BIPOC workers are not equally represented in high-quality clean energy jobs. Removing employment barriers and providing financial incentives for training followed by permanent employment are critical measures to improving the equity of the energy transition.
- **Anticipatory creation of jobs in fossil-fuel-dependent communities** - The transition should ensure that well-paid jobs are created before fossil fuel activities are phased out in communities with heavy economic dependence on fossil-fuel-related jobs. The transition should also ensure the fiscal health of communities to secure the continuity of essential services like schools and libraries.²⁴

6. Prioritize resilience measures for environmental justice communities

Climate change is already occurring and with it has come an increase in the frequency and severity of disasters, such as more-frequent wildfires, severe heat, and unprecedented flooding. Environmental justice communities are often hit first and worst by the devastating impacts of the changing climate. The following are direct investments to strengthen resilience in ways that are compatible with an equitable energy transition:

- **Increase resiliency for the most-vulnerable households** - An important way to adapt to the changing climate is to improve resiliency of households by ensuring that energy bills remain affordable and homes are safe and healthy, even though there are more frequent and more extreme weather events. Installation of solar and storage on homes and increasing the efficiency of energy use can combine to increase a household's resilience.
- **Increase resiliency of communities, especially vulnerable environmental justice communities** - Increasing grid resilience is one way to ensure vulnerable environmental justice communities adapt to climate change. This effort includes investments to: 1) reduce the frequency and geographic extent of outages; 2) rapidly restore service after outages occur; and 3) create a more-robust electricity system to withstand increasingly severe weather events.²⁵ Installation of distributed solar and storage microgrids with internal demand response capabilities in communities can support ongoing operation of cell phone towers, streetlights, water pumping stations, supermarkets, and other essential infrastructure. Community resiliency hubs can provide a safe place for community members to go during a disaster or outage. These hubs can use clean, renewable microgrids with sufficient electrical and thermal storage to enable air filtration, heating, and cooling for people who may need shelter (for instance, those under evacuation orders) during extreme climate events. Communities with climate-vulnerable populations—including households relying on electricity for medical purposes, linguistically isolated populations, senior citizens, and others—may particularly benefit from targeted deployment of such hubs. To improve resilience as well as transportation access, special attention needs to be paid to rural communities

and Tribal Nations, where increasing resilience and adaptation can be more complex and difficult due to more-dispersed settlement patterns.

In order to ensure resources are being deployed in environmental justice communities, reporting and oversight are needed.

7. Create a safe and affordable transition away from fossil fuels

Resources must also be provided to ensure a safe and affordable transition away from our reliance on fossil fuels. While some of the existing fossil fuel infrastructure may be utilized in a clean energy system—such as transmission lines from fossil fuel power stations that are fully converted to solar and storage—most fossil fuel infrastructure, like pipelines, will need to be decommissioned.

Fossil fuel companies should be required to bear decommissioning and cleanup costs and not pass them on to ratepayers.

Some specific policies and programs include:

- **Requiring fossil fuel companies to pay for complete cleanup and remediation of operations and ensure financial compliance of all companies** - As fossil fuel use declines, there will be an increase in companies going out of business, attempting to declare bankruptcy and abandoning extraction sites and facilities. These facilities will need to be cleaned up and their pollution impacts remediated and, ideally, reclaimed and transformed into a beneficial use. At a minimum, fossil fuel companies must be required to clean up operation sites and safely decommission facilities. In addition, regulators must ensure that companies do not have outstanding financial obligations, in particular unpaid employee wages or pensions or owed back taxes, so that these debts do not get offloaded to new owners or the public.²⁶

- Limit costs that can be passed to ratepayers with lower incomes during disaster response and/or decommissioning** - There are a range of ways that ratepayers can be forced to foot the bill for harm caused by utilities. For instance, in the case of wildfires caused by utility negligence, utilities have attempted to raise rates in response to increased expenses (i.e., tree trimming) and have also successfully lobbied for public funding to cover costs and for new laws that limit their liability.²⁷ Similarly, in instances where gas and coal power plants are being shut down, utility customers have sometimes paid the cost of decommissioning these facilities. Adaptation of the electric grid to climate extremes will require considerable investment. Some of these investments, such as strengthening the distribution system, will normally belong in the rate base. However, other costs—such as those arising from utilities’ failure to take prudent actions to replace aging, depreciated transmission towers—should not be allowed into the rate base. New, clear regulations are needed to limit what new investments related to climate change risks can be allowed in the rate base.
- Smaller utilities, including rural co-ops, must not be left behind** - Rural electric cooperatives serve 42 million people and power 56 percent of the country’s area, including many BIPOC communities and communities with lower income.²⁸ These cooperatives face significant debt related to coal and will need targeted programs to ensure that they can transition to renewable energy and reduce energy burden.

8. Conclusion

The urgency of the climate crisis—intertwined with persistent racial injustice and public health and economic crises and disparities—necessitates strong, consistent, and urgent action to meet community needs, accelerate the transition off fossil fuels, and build the foundation for a just and regenerative energy system. A critical component of this transformation is moving away from electricity generated by polluting and fossil fuel resources to clean, renewable energy sources. The following key components should be included within state and federal renewable and clean energy policies:

1. Environmental justice communities must be identified and prioritized;

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To achieve economic and environmental justice in the energy transition, equity must be integrated into all aspects of the design, implementation, and evaluation. These policies and programs are necessary to ensure a more equitable energy transition.

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Endnotes

- 1 This paper generally refers to environmental justice communities, which are often defined as Black, Indigenous, People of Color (BIPOC) communities and communities with lower income that are highly impacted by pollution. There is a variety of ways to define environmental justice communities using criteria that estimate cumulative impacts by evaluating socioeconomic and pollution burden factors. For example, California has developed CalEnviroScreen, which defines environmental justice communities through a variety of socioeconomic and pollution criteria. OEHHA 2021.
- 2 IPCC 2014, p. 1261.
- 3 The federal government has recently taken steps to better define environmental justice communities. On July 20, 2021, the Executive Office of the President provided interim guidance to governmental agencies and cabinet departments on defining the term “disadvantaged communities.” Criteria include levels of income and employment, racial or ethnic segregation, linguistic isolation, housing costs, and health status, among others. EOP 2021.
- 4 Examples of the type of data that should be examined, along with an analysis of the quality of that data are in APEN 2019.
- 5 For a more complete discussion of this issue, see Bolon et al. 2021, pp. 18-22.
- 6 For a more complete discussion of this issue, see Bolon et. al. 2021.
- 7 PSE 2017 and Earthjustice 2011.
- 8 EPA 2021a.
- 9 Earthjustice 2021a.
- 10 Earthjustice 2021b.
- 11 EPA 2021b. According to this same EPA webpage, the EPA has entered into agreements “valued at over \$1.7 billion to reduce the highest risks of radiation exposure to the Navajo people.” However, the government’s efforts are far from demonstrating any urgency. The EPA states that as a result of these agreements, “funds are available *to begin* the assessment and cleanup process at 230 of the 523 abandoned uranium mines” (emphasis added). ****add italics for emphasis please**** That leaves 293 sites completely unaddressed with the rest only at the start of the process for an environmental justice problem that has been festering for decades.
- 12 EPA 2021a. There are “model” regulations for states. Texas has adopted regulations “similar” to the model, and Louisiana has more limited regulations. Other states “are currently creating their own NORM regulations.”

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- 13 The Department of Housing and Urban Development defines an affordable housing burden, including utility costs, at 30 percent of income. HUD 2017, p. 5. 20 percent of the affordable housing burden is defined as an affordable burden for energy. ACEEE 2020, p. 51. See also Colton 2021, pp. 97-99 and p. 97, footnote 182. A forthcoming paper addresses the energy burden question and the additional funds needed to reduce energy burdens to affordable levels. Makhijani 2021 (forthcoming).
- 14 RMI 2020 and Zhu et al. 2020. There are no indoor air quality standards, hence the comparison to outdoor standards.
- 15 For instance, a detailed study, based on actual measurements, of indoor nitrogen dioxide (NO₂) pollution due to use of fossil gas cooking appliances (stoves and ovens) in 30 households on public health insurance indicated frequent problems of high NO₂ closely associated with amount of cooking time. At least eight of the households had NO₂ concentrations in excess of the EPA limit for outdoor air of 100 parts per billion; 25 of the 30 households were renters. Paulin et al. 2017, Figures 1 and 2. For the EPA NO₂ standard, see EPA 2018.
- 16 See, for example, Lukanov and Krieger 2019.
- 17 SOMAH Handbook 2021.
- 18 The critical importance of community solar programs is increasingly recognized; see, for example, Kienbaum and Farrell 2021, which discusses both community and rooftop solar.
- 19 Maantay and Maroko 2018.
- 20 Standards for receiving incentives or the benefits of particular programs should include appropriate protections against rent increases that would diminish net financial benefits.
- 21 See, for example, Omar 2019.
- 22 CEC 2016, p. 1.
- 23 Ricketts, Hendricks, and Thomas, n.d., p. 46.
- 24 IEER and LNS 2016.
- 25 "Grid resilience is increasingly important as climate change increases the frequency and intensity of severe weather." EOP 2013, p. 3.
- 26 Just Transition Fund 2020.
- 27 Penn and Eavis 2020.
- 28 <https://www.ruralpower.us/>