



WORLD  
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ISSUE BRIEF

# ADDRESSING ENERGY EQUITY IN THE UNITED STATES:

*Policy Considerations for Federal Investment*

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## EXECUTIVE SUMMARY

### Highlights

- There are major inequities in the distribution of costs and benefits within the U.S. energy system. Some households, particularly low-income; Black, Latino, and Indigenous; and other households of color, spend a disproportionate share of their income on home energy costs. Without thoughtful intervention, the benefits of federal clean energy investment, particularly job creation and access to clean energy, will not be spread equitably across income groups, races, ethnicities, geographies, and gender identities.
- Energy system inequities are tied to a sociopolitical context that elevates some (based on factors like income, race and ethnicity, geography, and gender) while marginalizing others. Strategic spending and policy design can contribute to a more equitable clean energy transition. However, structural and contextual changes are also necessary.
- The federal government has several methods for targeted investments that can be used to address inequities faced by individuals, households, and communities that experience disproportionate energy burdens or receive fewer benefits from the energy system.
- Policies and spending related to data quality and availability, local capacity building, community engagement and partnerships, workforce diversity and job quality, and inclusive clean energy financing can address barriers to the effectiveness of targeted federal spending by delivering benefits to intended recipients.

## Closing the Energy Equity Gap

**Low-income, Black, Latino, and Indigenous households, as well as other households of color, face higher household energy burdens than higher income, white counterparts.** Twenty-five million U.S. households reduce or forgo food or medicine to afford energy payments (EIA n.d.). Approximately 25 percent of U.S. households endure high household energy burdens, spending at least 6 percent of their household income on electric, natural gas, and other heating bills. Sixty-seven percent of low-income households face a high energy burden. Hispanic, Black, and Native American households also face disproportionately high energy burdens (Drehobl et al. 2020).

**Certain individuals and communities may not inherently benefit from clean energy deployment and, in some cases, may have to pay for it.** This stems in part from the historic lack of access to capital for low-income, Black, Latino, and Indigenous communities, and other communities of color that results from longstanding environmental and economic inequity, a major barrier to an equitable shift to a clean energy economy. For example, an estimated 42 percent of the total residential rooftop solar potential—in terms of suitable rooftop area and generation capacity potential—is found in low-to-moderate income communities (Sigrin and Mooney 2018). However, access to solar energy technology has been limited for low-income communities; Black, Latino, and Indigenous communities; and other communities of color, with higher-income households four times more likely to adopt solar technology than households with lower earnings (Sunter et al. 2019; O’Shaughnessy et al. 2021).

**Without intervention, job creation from clean energy investments may contribute to low-quality employment and a job market that already benefits certain genders, races, and ethnicities over others.** While the racial diversity of the clean energy workforce varies by sector, there are representation issues for some subsectors. The share of women in the clean energy sector is consistently lower than the national average and a gender pay gap is reported (IRENA 2019; DOE et al. 2021). Additionally, clean energy job quality can vary substantially by subsector, sometimes producing jobs that offer low pay, limited benefits, and little stability or opportunity for advancement, limiting the availability of high-quality clean energy jobs.<sup>1</sup>

**This inequitable distribution of the costs and benefits of the energy system exists against a backdrop of long-standing environmental and economic inequity in the United States, caused by compounding racial, gender, and geographic discrimination and unjust policies throughout the country’s history.** Such socioeconomic factors are key considerations when designing and implementing federal investment because programming will have to be targeted, designed, and implemented in a way that is responsive and tailored to that context to be effective in different communities (McCauley et al. 2013; Healy and Barry 2017; Malin et al. 2019; Sovacool 2009; Bouzarovski and Simcock 2017).

**Targeted federal investment—including direct payments, grants, loans, loan guarantees, and technical assistance and training—could advance equitable access to clean energy and its social, health, environmental, and financial benefits.** Federal spending, including in response to the economic impact of the COVID-19 pandemic, provides an opportunity to consider how federal recovery investments in the near term and energy transition investments in the longer term can help those most in need through thoughtful and responsible targeting of resources. This is already a stated priority of the federal government per U.S. President Joseph R. Biden, Jr.’s commitment to 40 percent of the benefits from federal climate and clean energy investments flowing to disadvantaged communities (Young et al. 2021).

**Policies and spending that create enabling conditions for successful targeted federal investments are needed for effective energy equity programming.** Prioritizing data quality and availability, local capacity building and technical assistance, community engagement and partnerships, workforce diversity and job quality, and inclusive clean energy financing can address barriers to the effectiveness of targeted federal investments in delivering benefits to intended recipients. For example, the current lack of detailed national data from utilities on disconnections of service has made it challenging to identify and address some of the clearest energy poverty issues or evaluate the effectiveness of related policies challenging them (Flaherty et al. 2020). There is a need for robust data collection, alongside programming, and data disclosure requirements in order to improve existing and future programs.

## About This Issue Brief

**This issue brief aims to contextualize current energy equity issues around the complex intersection of race, income, gender, and geographical discrimination, focusing on three dimensions of energy injustice that we use to define energy inequity: energy burden, clean energy access, and clean energy employment.** This brief considers the clean energy transition in the United States and how it impacts equity in the distribution of social, environmental, and financial benefits in the energy system. While related, this brief does not directly address critical priorities around environmental justice, changing labor markets, climate-related health issues, income poverty and the racial wealth gap, or affordable housing more broadly. Nor does it address systematic inequity in governing systems associated with these issues.

**This brief is intended to be a resource for actors in the policy space on how targeted investment and other spending and policy considerations can direct and retain benefits of clean energy for households and communities that, historically and currently, have not benefited equitably from the energy system.** This brief provides a synthesis of existing literature and serves as a resource for the ongoing discussions around what it means to prioritize “disadvantaged” communities in equitable, low-carbon, and climate-resilient recovery and infrastructure investments.

## Considerations and Recommendations for Policymakers and Implementing Authorities

Targeted federal spending can contribute to the desired outcomes for an equitable energy transition and should be paired with policies and additional spending that will increase their impact and effectiveness while supporting families and wealth building.

### We recommend policymakers and implementing authorities:

- Review existing forms of directed federal spending and programs for their suitability to address energy inequity through targeted investment, improve them, and extend resulting enhanced targeting methods to other federal investment.
- Implement effective, data-driven, and results-focused programming on energy equity issues by cultivating metrics, reporting requirements, qualitative and quantitative data sources, and analysis that is grounded in the experience and input of target households and communities.
- Address the marginalization of disadvantaged communities, which have less available resources to design, secure, and implement federally funded clean energy programming. Build the capacity of states, local governments, community groups, and other representatives of disadvantaged communities to lead on co-creating opportunities, applying for federal funds, and engaging with or implementing programming.
- Bring the interests of communities that have historically been excluded to the forefront of federal spending, while equipping and empowering these actors to lead in program design, implementation, and monitoring. Incorporate advance planning, community-led project design, and funding for robust, inclusive, respectful, culturally sensitive, and intentional community partnership.
- Ensure clean energy spending creates pathways to high-quality jobs for a diverse workforce. Require jobs created through federal spending to meet wage standards, protect the right to organize, enforce anti-harassment and antidiscrimination protections, encourage local hiring and engaging minority-owned and women-owned businesses, and train and equip currently underrepresented members of the clean energy workforce to capitalize on new opportunities in the sector.
- Support inclusive financing approaches to deploy clean energy and energy efficiency in low-income communities; Black, Latino, and Indigenous communities; as well as other communities of color.



## 1. INTRODUCTION

Both the U.S. economic recovery from the COVID-19 pandemic and its accelerating transition to a clean energy economy are proceeding against a backdrop of long-standing inequity—built on intersecting racial, ethnic, and gendered discrimination throughout the country’s history—driving a compounding inequitable distribution of the costs and benefits of developments in the energy system (Carley and Konisky 2020; McCauley et al. 2013; Healy and Barry 2017; Malin et al. 2019; Sovacool 2009; Bouzarovski and Simcock 2017).

Climate change poses the greatest risks to those who have contributed the least to it but also face compounding social and economic disadvantages (Bullard 2018). Like the disproportionate impacts from pollution and climate change, the way energy is produced and distributed can be equally unjust (Jones et al. 2015). There is an inequitable distribution of the costs and benefits in the U.S. energy system across dimensions of income, race, ethnicity, gender, and geography—even as the system transitions to cleaner forms. If the benefits created by investing in a clean energy transition accrue to those who have historically benefited in the energy sector, it will perpetuate existing inequities in the clean energy system (Carley and Konisky 2020). Advocates for energy justice seek an energy system where the burdens and benefits of energy are equitably distributed.<sup>2</sup> A just energy system also includes governance and decision-making structures that are democratic and representative, seeking to address the long-standing, continued marginalization of certain voices, which is unfortunately not often the case in U.S. structures today (Salter et al. 2018).<sup>3</sup> Realizing a just energy system requires foundationally addressing the broader inequitable ecosystem that the energy system operates within. Additionally, within current systems and structures, there must be a refocusing in policy design and implementation on how investments can be more effective in addressing energy inequity. This refocusing is the topic of this issue brief.

Future federal spending on national infrastructure, clean energy deployment, workforce development, legacy pollution cleanup, climate-resilient affordable housing, clean transportation, and other economic recovery measures prioritizing those communities that have not benefited equitably from the energy system

(disadvantaged communities) has the potential to contribute to a more just and equitable energy system. However, the exercise of identifying and targeting such disadvantaged communities—a term with varied definitions and applied in varying ways during the policy, program design, and implementation process—is not straightforward and needs to be accompanied by supportive spending and policies at all levels of government to facilitate investments reaching those with the greatest needs.

## Purpose and Methods

This issue brief aims to contribute to a clean energy transition that prioritizes those not benefiting equitably in the past, present, or future energy system by serving as a resource for those looking to influence that process at the federal level, including policymakers and grant-making agencies.

The brief defines clean energy as low- or zero-carbon energy generation and storage, clean energy end-use technologies, and energy efficiency. This includes renewable energy technologies, such as wind and solar, as well as electric appliances and vehicles, energy efficient appliances and building materials, and other advanced technologies that are and will be developed.

The brief focuses on three dimensions of energy injustice where federal policy and targeted spending is positioned to have an impact: energy burden, clean energy access, and clean energy employment. While there are many other dimensions to energy justice, these were specifically chosen because of the potential scale of their impact in closing the energy equity gap and the opportunity for federal investment to address these dimensions of energy injustice. The brief assesses the current state of inequity within the energy system, provides an overview of methods for targeting clean energy spending, and discusses challenges and recommendations around data and information, processes, and capacity building that can complement targeted spending policies. While related to equally critical priorities around environmental justice, changing labor markets, climate change vulnerability, climate-related health issues, income poverty, the racial wealth gap, and affordable housing more broadly, it does not address these topics directly. Nor does it address systematic inequity in governing systems associated with these issues or global inequities. The findings and recommendations in this issue brief are based on current literature and expert interviews.<sup>4</sup>

## 2. THE INEQUITABLE DISTRIBUTION OF COSTS AND BENEFITS IN THE ENERGY SYSTEM

### 2.1 Energy Burden and Its Impact

Energy burden is a measure of energy insecurity, the share of household income spent on energy bills; researchers often consider above 6 percent as high for a household and above 10 percent as severe.<sup>5</sup> While energy burden alone may not always be the best measure of energy access and injustice, and in particular may not fully address the behavioral drivers of energy insecurity (Cong et al. 2021), it is a widely reported as a measure of energy insecurity.

Approximately 25 percent of all U.S. households experience a high energy burden, as do 67 percent of low-income households (Table 1).<sup>6</sup> For households with lower income, a 6 percent or more expense is a substantial share of their financial resources, whereas households with a much larger monthly income may spend a smaller percentage on utility bills. Energy burden, while linked with income poverty, is a complex issue with many contributing factors that include utility rates, household income, housing type and quality, and housing energy

efficiency (Bohr and McCreery 2019). Even as low-income and non-white households may consume less energy than other households, poor housing efficiency and the age of dwellings—among other factors that require further research—contribute to high burden (Bednar et al. 2017).<sup>7</sup>

While the median energy burden for white (non-Hispanic) households is 2.9 percent, it is 3.5 percent for Hispanic households, 4.2 percent for Native American households, and 4.2 percent for Black households (Drehobl et al. 2020). Black households represent less than 14 percent of all U.S. households but account for almost 20 percent of homes experiencing a high energy burden (Drehobl et al. 2020) (Table 1). Further, rural households face an energy burden three times greater than the national average (Drehobl and Ross 2016) (Figure 1).

There is a dearth of information on the energy burden of female-headed households, while women across races and ethnicities face higher rates of poverty than their male counterparts. Furthermore, Black women, Hispanic women, and American Indian or Alaska Native women are disproportionately represented among women living in poverty (Bleiweis et al. 2020). Together this suggests gender inequities should be considered in the context of high household energy burden.



TABLE 1

**ENERGY BURDEN BY HOUSEHOLD RACE, INCOME, TENURE, AND LOCATION, 2017**

|                                 | Percentage with high energy burden | Millions of households with high energy burden | Share of total U.S. households | Share of households with high energy burden | Difference (Demonstrating the proportionality/disproportionality of energy burden) |
|---------------------------------|------------------------------------|--|--------------------------------|---|--|
| HOUSEHOLD TYPE OR LOCATION      | MAGNITUDE OF BURDEN                |  | INEQUITY OF BURDEN             |   |  |
| All households                  | 25%                                | 30.59  | —                              | —   | —  |
| HOUSEHOLD DEMOGRAPHICS          |                                    |  |                                |   |  |
| Black households                | 36%                                | 6.00   | 13.6%                          | 19.6%                                       | 6.0%   |
| American Indian households      | 36%                                | 0.54   | 1.2%                           | 1.8%  | 0.5%   |
| Hispanic households             | 28%                                | 4.57   | 13.6%                          | 14.9%                                       | 1.4%   |
| White (non-Hispanic) households | 23%                                | 18.50  | 66.3%                          | 60.5%                                       | -5.8%  |
| Renters                         | 30%                                | 13.22  | 36.2%                          | 43.5%                                       | 7.3%   |
| Owners                          | 22%                                | 17.18  | 63.8%                          | 56.5%                                       | -7.3%  |
| Low-income                      | 67%                                | 25.78  | 31.7%                          | 83.2%                                       | 51.5%  |
| Non-low-income                  | 6%                                 | 5.21   | 68.3%                          | 16.8%                                       | -51.5%   |
| REGIONS                         |                                    |  |                                |   |  |
| Central-Northeast               | 29%                                | 5.37   | 15.2%                          | 17.0%                                       | 1.8%   |
| Central-Southeast               | 38%                                | 2.82   | 6.1%                           | 8.9%  | 2.8%   |
| Central-Northwest               | 25%                                | 2.13   | 7.0%                           | 6.8%  | -0.3%  |
| Central-Southwest               | 25%                                | 2.52   | 11.6%                          | 11.1%                                       | -0.4%  |
| Middle Atlantic                 | 29%                                | 4.65   | 13.2%                          | 14.7%                                       | 1.5%   |
| Mountain                        | 21%                                | 1.87   | 7.3%                           | 5.9%  | -1.4%  |
| New England                     | 29%                                | 1.69   | 4.8%                           | 5.3%  | 0.6%   |
| Pacific                         | 18%                                | 3.30   | 15.1%                          | 10.4%                                       | -4.6%  |
| South Atlantic                  | 26%                                | 6.23   | 19.7%                          | 19.7%                                       | 0.0%   |

*Note:* The regions are Central-Northeast (WI, MI, IL, IN, and OH), Central-Southeast (KY, TN, MS, and AL), Central-Northwest (ND, SD, MN, NE, KS, IA, and MO), Central-Southwest (OK, AR, LA, and TX), Middle Atlantic (NY, PA, and NJ), Mountain (MT, ID, WY, NV, UT, CO, AZ, and NM), New England (ME, VT, NH, MA, RI, and CT), Pacific (WA, OR, CA, AK, and HI), and South Atlantic (MD, WV, VA, NC, SC, GA, and FL).

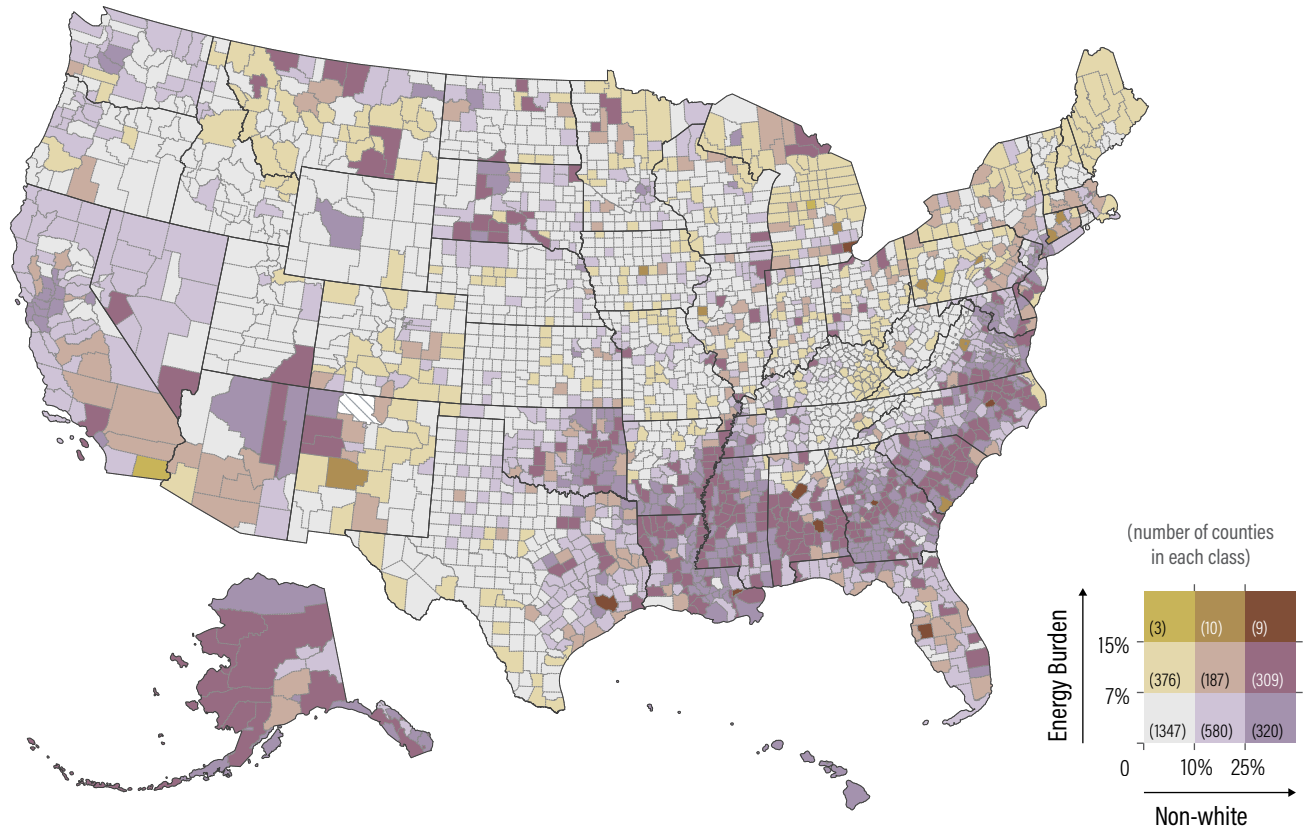
*Source:* Dreihobl et al. 2020.

*Analysis utilized data from the 2017 U.S. Census Bureau's American Housing Survey. Household count figures were rounded to significant figures for publication here and thus differ from the source.*



FIGURE 1

## COUNTY-LEVEL ENERGY BURDEN AND SHARE OF NON-WHITE RESIDENT POPULATION, 2018



Note: The county-level energy burden value is the highest value among census tracts within the county, not an average.

Source: Ma et al. 2019. See data breakdown here: <https://github.com/wri/us-covid-19-equitable-recovery-supporting-materials>.

The 2015, most recent, Residential Energy Consumption Survey (RECS) found that 25 million households reduce or forgo food or medicine to afford energy payments (EIA n.d.). Households facing high energy burdens are more likely to keep their homes at temperatures that can negatively impact health—for example, forgoing heating in the winter which can lead to extreme home temperatures associated with health issues like respiratory illness—and have to deal with stress-related mental health issues, which can be compounded by utility disconnection (Hernández and Bird 2010; Drehobl et al. 2020). Households that tend to bear a disproportionately high energy burden were also the households whose energy bills were most affected by COVID-19, one of many equity issues exacerbated by the pandemic (Drehobl 2020). In 2020, researchers at

Indiana University conducted a nationally representative survey of low-income households that suggested that between May 2020 and May 2021, an estimated 23.5 million Americans could not pay an energy bill and more than 7.5 million had their electricity disconnected. The percentage was higher for Black and Hispanic households; compared to 16.8 percent of low-income white households, 33.7 percent of Hispanic households and 36.5 percent of Black households could not pay an energy bill between May 2020 and May 2021 (Konisky and Carley 2021). Struggling households found support from direct federal relief payments, eviction moratoria at the state and federal level, and utility shutoff moratoria across many states, which were meant to prevent utilities from suspending service to customers unable to pay their bills. Yet it remains important to monitor how higher-



than-average unemployment, underemployment, and the end of most utility shutoff moratoria will impact the risk of utility disconnections for households experiencing high energy burdens.

## 2.2 Uneven Clean Energy Access

Clean energy technologies continue to be developed, improved, and deployed rapidly across the United States as technology costs decline and national and local policies encourage investment (EIA 2020; EIA 2021a; EIA 2021b). The expansion of clean energy can produce climate, public health, and environmental benefits, while creating jobs and in some cases providing cost savings over fossil fuels; however, the equitable distribution of these benefits is not guaranteed. Technology-specific trends in the clean energy sector to date—two examples of which are discussed below—suggest the importance of intentionally planning for equity in clean energy deployment.

Access to solar energy technology, for example, has been limited for low-income Black and Hispanic communities (Sunter et al. 2019). In 2018, higher income households were four times more likely to adopt solar technology than households with lower earnings (O’Shaughnessy et al. 2021). This is true even though an estimated 42 percent of the total residential rooftop solar potential—in terms of suitable rooftop area and generation capacity potential—is found in low-to-moderate-income communities (Sigrin and Mooney 2018). Some drivers for this discrepancy include that rooftop solar is still too expensive for low-income households to afford and incentives or funding mechanisms are not addressing this issue, a lack of home ownership among low-income households, and limited or no access to rooftop space (Paulos 2017). The profitability of rooftop solar may also be impacted by the size of existing energy bills since low-income households often consume less energy (Drehobl et al. 2020). Even after adjusting for disproportional low income and lack of homeownership, majority Black, Hispanic, and Asian census tracts show less solar rooftop installation than no-majority tracts. The drivers of this discrepancy require further study, but suggested causes include a lack of early adopter installations to drive community uptake and a lack of inclusion in the rooftop solar workforce (Sunter et al. 2019).

There are similar examples of differing access to clean energy benefits for energy efficiency. Research on rural residential efficiency programs in Alaska, Maine, New

Hampshire, and Vermont all found rural households face barriers, including geographic isolation, a lack of accessible financing or insufficient funds for up-front costs, limited access to expertise, a lack of awareness of efficiency programs, or an inability to capitalize on efficiency programs as renters (MacDonald et al. 2020). Further, some may have homes that require basic and substantial repairs before energy efficiency technologies can be installed (Kelly and Reta 2021). Even where efficiency improvements are cost-effective—meaning the monthly energy savings pay back the up-front costs within a reasonable period—there is a below average uptake of efficiency upgrades in rural communities (MacDonald et al. 2020).<sup>8</sup>

## 2.3 Clean Energy Employment and Diversity

Clean energy investments create jobs and are consistent with long-term economic growth, while mitigating the economic risks posed by climate change (Saha and Jaeger 2020).<sup>9</sup> At the end of 2020, the clean energy workforce consisted of about 3 million Americans nationwide (E2 2021).<sup>10</sup> Clean energy jobs generally feature some of the hallmarks of high-quality jobs: They have higher median hourly wages than the national median, higher-than-average rate of unionization, and are more likely to offer health care and retirement benefits compared to other private sector jobs (E2 et al. 2020).<sup>11, 12</sup> However, the quality of clean energy jobs can vary greatly. In California, utility-scale solar has been found to support higher-quality careers than rooftop solar, but even solar farms have been critiqued for creating short-term, middling, or poor-quality jobs (Jones and Zabin 2015; Scheiber 2021). Furthermore, while it is challenging to compare clean energy and fossil fuel jobs given their diversity and different stages of development, clean energy jobs are not inherently of a higher quality than those in the fossil fuel industry that they may displace, particularly in terms of wages, benefits, and stability (Saha and Jaeger 2020).

Racial diversity varies by clean energy sector, with some sectors (like solar and wind) having a larger share of non-white workers than the national average, though that does not address equity in leadership and ownership. Gender diversity in the workforce is low; the share of women in the clean energy sector is consistently lower than the national average and, in some cases, lower than the fossil energy sector (Figure 2 and Figure 3).

Looking at the solar industry in 2019, 26 percent of the industry’s workforce identified as women, compared to

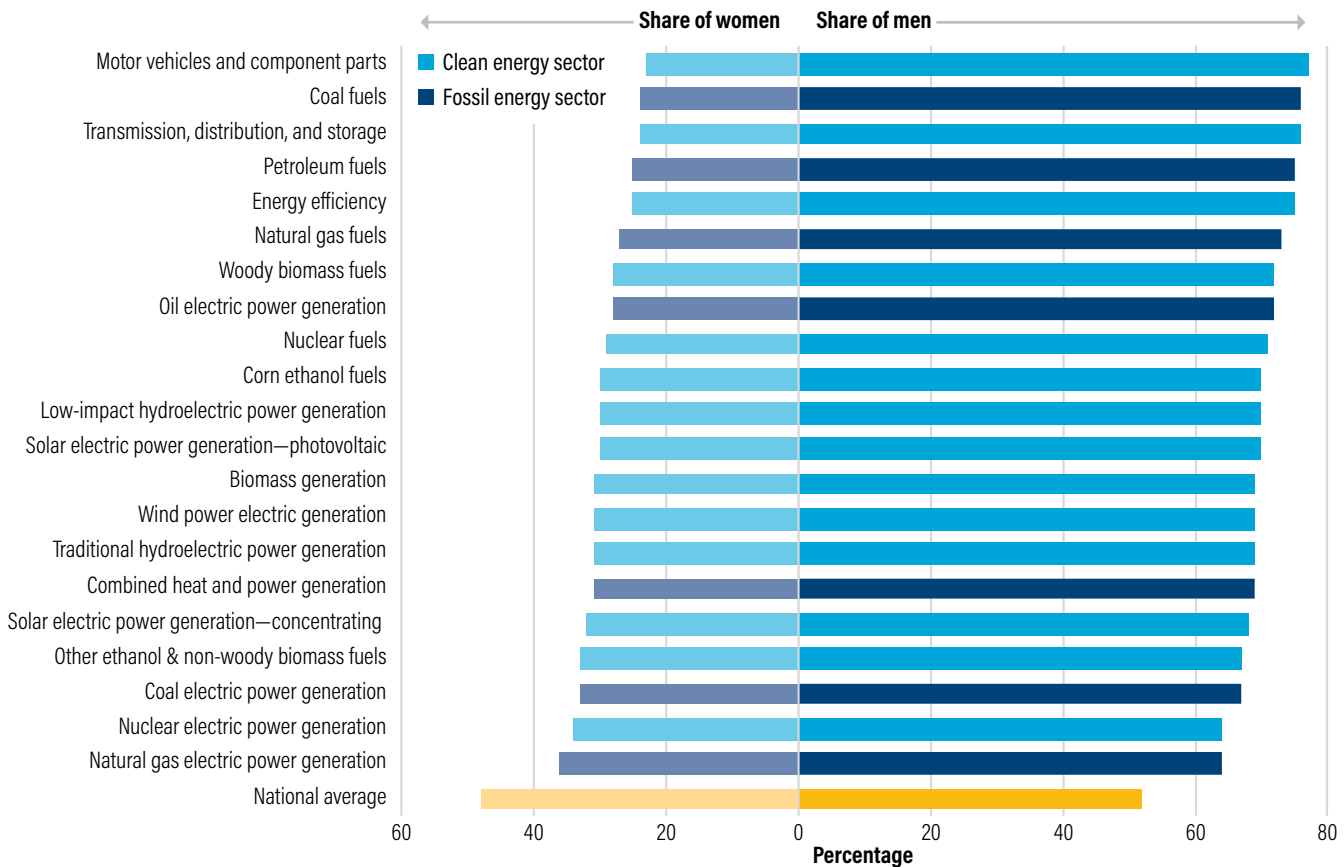
47 percent of the broader national workforce. About 17 percent of the solar workforce was Latino or Hispanic, 9 percent were Asian, and 8 percent were Black or African Americans, compared to 18, 6, and 12 percent nationally, respectively (Solar Foundation 2019, 2020; NASEO and EFI 2020). At the executive level, women and people of color are substantially underrepresented in the solar industry—20 percent and 12 percent, respectively. This is similar to reported low national numbers; only 22 percent of executive-level leaders across corporate America are women and only 13 percent are people of color (Solar Foundation 2019, 2020). While across sectors and

racess women only make about 82 cents for every dollar men make in identical positions, in the solar industry women make just 74 cents on the dollar compared to men (Bleiweis 2020; Solar Foundation 2019, 2020). The difference in reported solar wages across races or ethnicities appears to be more equitable.

Unequal access to quality employment opportunities can limit the earning potential for certain individuals and communities and further exacerbate existing disparities. A lack of diversity has also been found to undermine innovation and performance in the private sector (Lorenzo et al. 2018; Dixon-Fyle et al. 2020).

FIGURE 2

GENDER DISTRIBUTION OF THE ENERGY SECTOR WORKFORCE IN Q4 2020 COMPARED TO THE NATIONAL AVERAGE

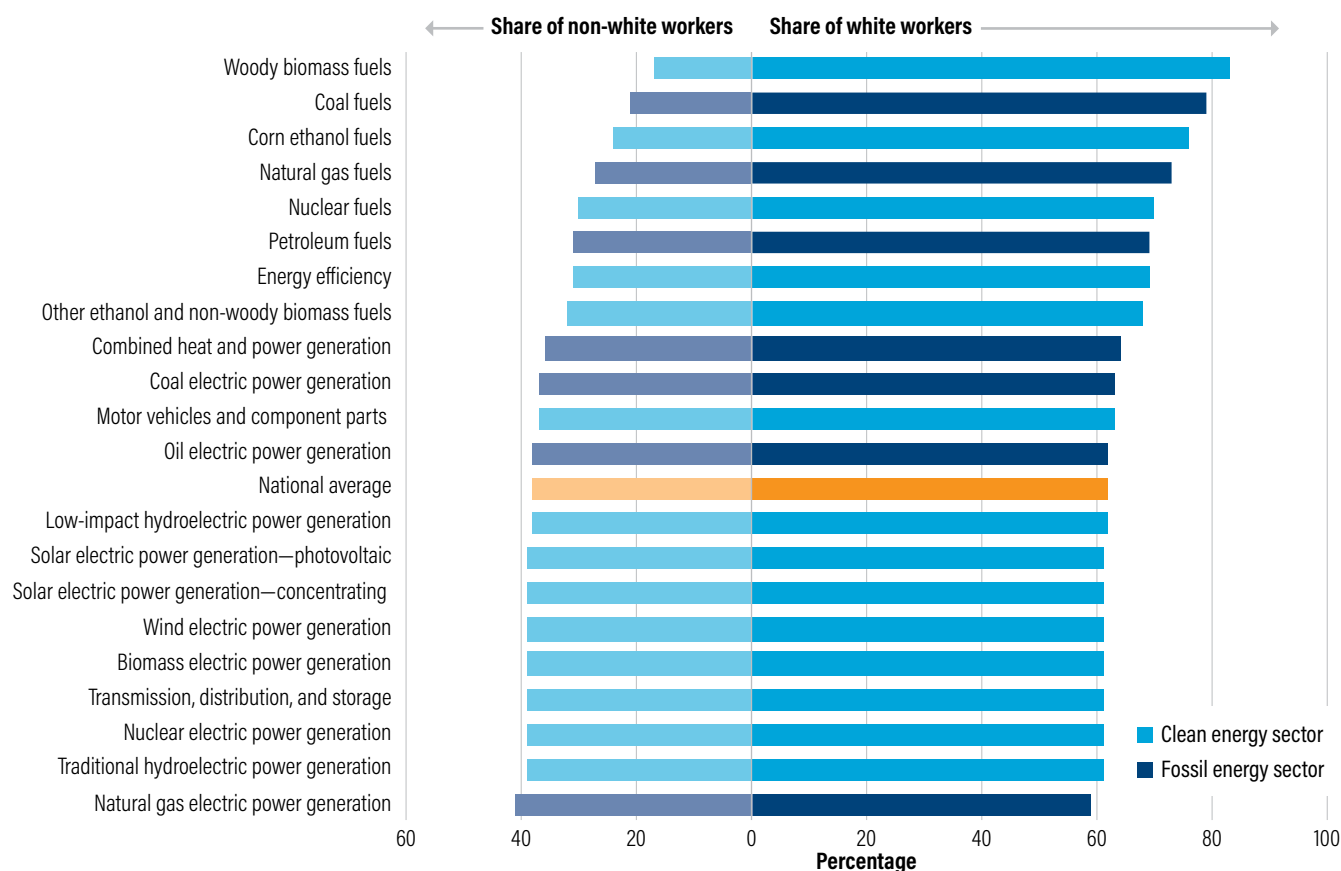


Source: DOE et al. 2021.



FIGURE 3

## RACIAL DISTRIBUTION OF THE ENERGY WORKFORCE IN Q4 2020 COMPARED TO THE NATIONAL AVERAGE



Source: DOE et al. 2021.

### 3. EXISTING APPROACHES FOR TARGETING CLEAN ENERGY SPENDING

Delivering the benefits of a clean energy transition to those who are usually marginalized, and disadvantaged, is a stated priority of the federal government. In January 2021, U.S. President Joseph R. Biden, Jr. issued an executive order emphasizing the opportunities associated with climate action—including, specifically, the creation of well-paying union jobs—and committing that 40 percent of the overall benefits from federal climate investments flow to disadvantaged communities, the Justice40 Initiative (White House 2021). That order was followed in May of 2021 by related recommendations from the White House Environmental Justice Advisory Council

and in July by interim guidance from the White House on implementing the Justice40 Initiative (WHEJAC 2021; Young et al. 2021).

If federal clean energy investments are going to bring greater equity to the distribution of benefits and costs in the energy system, spending will need to be targeted toward those that have faced a disproportionately high energy burden and limited access to clean energy technologies and careers thus far. This section summarizes existing federal programs and mechanisms that are useful for targeting clean energy to different households and communities. While this issue brief does not evaluate the efficacy and potential of these targeting approaches, that is an important area of further research. The purpose of this overview is not to limit equity

considerations to just these existing approaches, but to provide a background on what is currently being done that can inform the development of new approaches, or expanded application of existing targeting mechanisms, across all federal clean energy investments.

### 3.1 Forms of Targeted Federal Spending

Targeted federal spending takes several forms in different, nonexclusive combinations. Targeting is common across the federal government, including for energy-specific programming, but the equity issues discussed above suggest that much more could, and must, be done in this sector. The following section provides an overview of the categories of targeted federal spending and examples of energy equity-related programs, also featured in Appendix Table A1.

#### 3.1.1 Direct payments to households

Direct payments are federal funds provided directly to individuals based on eligibility requirements, for specific outcomes or activities, and with verification and documentation requirements. They can provide a social insurance to the population through financial assistance to individuals most in need—primarily disabled, elderly, and low-income individuals (Ben-Shalom et al. 2011). However, their effectiveness can be limited by the application, reporting and verification, pre-payment requirement, and shifting eligibility impacting access year-to-year.

Examples of direct payment programs include:

- **Weatherization Assistance Program (WAP)**, operated by the U.S. Department of Energy (DOE), provides funds to states for building envelope and energy efficiency improvements to reduce energy costs for low-income households at or below 200 percent of the federal poverty level. WAP could also be considered a formula grant program allocating funds to states based on population (DOE n.d.-a).
- **The Nonbusiness Energy Property Tax Credit (25C)**, administered by the U.S. Department of the Treasury, is an example of a direct payment through a tax credit for investments in high-efficiency technologies/appliances/materials. Covered investments include high-efficiency water heaters, energy efficient windows, electric heat pumps, and more. The credit is for up to 10 percent of costs

with a ceiling of US\$500 (Crandall-Hollick and Sherlock 2018). This tax credit is only accessible to homeowners, which limits who the incentive can reach and its effectiveness in supporting efficiency materials.

#### 3.1.2 Formula grants to state and local governments

Formula grants are federal funds provided to states or local governments according to apportionment formulas, as defined by law or the granting agency, for specified types of activities administered by the recipient organization. These activities can include direct payments, projects, technical assistance, or training. Apportionment formulas, and the activities supported by apportionment formulas, can address both energy and equity priorities.

Examples of formula grant programs include:

- **State Energy Program**, operated by the DOE, offers formula grants, in addition to other support, to states to support projects and training on energy efficiency, clean energy deployment, and energy security. The funding is apportioned to states through a combination of an equal base rate, population, and energy consumption (DOE n.d.-b).
- **Workforce Innovation and Opportunity Act Grants**, operated by the U.S. Department of Labor (DOL), establish formula grants to states for employment and training services for adults, dislocated workers, youth, and other vulnerable populations (DOL n.d.-a).

#### 3.1.3 Project-based grants, loans, and guarantees

Project grants are federal funds provided to specific projects that must apply and meet specified eligibility criteria. They may be distributed out of larger formula grants. Criteria for these projects can include equity considerations like income, access to clean energy and energy efficiency, and energy costs. Cooperative agreements are also project-specific but involve the funding agency in the design and execution of the project. Direct loans, like traditional bank loans, are provided to a business, individual, or community and must be repaid over a specific period, occasionally with special or subsidized interest rates. A loan guarantee is a legal promise made by the federal government to lenders to assume part or all of a borrower's debt in the event the borrower cannot repay the loan. These guarantees lower



the risk of borrowing for lenders and increase access to affordable financing by individuals or businesses that might not otherwise qualify.

The U.S. Department of Agriculture (USDA) houses several example programs that offer energy-related project grants, loans, and guarantees. Examples include:

- **Single Family Housing Repair Loans and Grants program** provides loans and grants to very low-income households, earning below 50 percent of the area's median income, to repair or update their homes or to remove health and safety hazards (USDA n.d.-a).
- **Electric Infrastructure Loan and Loan Guarantee Program** finances state, local, cooperative, or tribal utilities for construction of electric generation, transmission, and distribution facilities in rural areas through loans and loan guarantees. This can include demand side management, energy conservation programs, and on-grid and off-grid renewable energy systems (USDA n.d.-b).

### 3.1.4 Technical assistance and training

Technical assistance includes direct guidance on issues and goal setting; the development of strategies and plans; assistance with federal funding applications; the provision of tools, data, maps, and analysis; and the training of staff. Technical assistance that is well-designed, and responsive to need and opportunities, can advance equity in numerous ways. For example, guidance on strategies, plans, applications, and tools, when provided to state or local governments and community groups that may have less resources to start, can allow burdened actors to better capitalize on the federal funding opportunities discussed above. Workforce training is one tool for helping categories of individuals who have generally had less access to clean energy jobs prepare to capitalize on the influx of job opportunities that could come with federal spending.

Examples include:

- **Office of Indian Energy's technical assistance program** at the DOE assists tribal communities with energy planning, energy efficiency, project development, policy and regulation design, and resilience (DOE n.d.-c).
- **The Equity in Energy initiative**, operated by the DOE, looks to ensure diverse participation in all DOE

programs, including through (but not limited to) technical assistance to minority-owned businesses, educational organizations, and individuals by providing resources for their increased engagement in the energy sector and the department's programming. It also aims to deploy partnerships and resources to enhance workforce diversity in the energy sector and associated with the DOE's work (DOE n.d.-d).

Through financial resources and deployable expertise, federal clean energy spending and assistance programs provide a substantial opportunity to address energy injustice. One recent review found more than 250 geographically and technically diverse energy justice programs, and, while most of those programs are run by nonprofit organizations, 10 percent are government programs (Carley et al. 2021). Appendix Table A2 provides a list of federal programs across agencies that can be augmented, improved, or revived to address energy equity and hasten the transition to clean energy.

## 3.2 Existing Data and Tools for Targeting Spending

Data collection, the development and improvement of indicators, and screening and mapping tools can help to inform targeting investments (Sadd et al. 2011).

Examples of state and federal programs and tools using data for targeting or education include:<sup>13</sup>

- **U.S. Environmental Protection Agency's (EPA's) Environmental Justice Screening and Mapping Tool (EJSCREEN)** is an open data tool that combines and displays environmental, demographic, and justice-related indicators and indices (EPA 2019). While it is useful for understanding local context and informing activities such as outreach, permitting, and compliance, it is thought it could be improved by the application of a tiering system that acknowledges different levels of burden and the addition of pollution burden and exposure, health, and socioeconomic indicators that are included in the other state-level screens like the CalEnviroScreen (EJNCF et al. 2021; WHEJAC 2021).
- **U.S. DOE's Energy Justice Dashboard (BETA)** is a recently established pilot data visualization tool that combines environmental indicators from EJSCREEN with DOE cost data from fiscal year 2019, and energy burden information from the Low-Income

Energy Affordability Data (LEAD) Tool. It is an initial attempt to display how the DOE's investments affect communities facing a disproportionate economic, public health, carbon, or environmental pollution burden. This new effort demonstrates the necessary strides the DOE is making toward tracking the agency's contribution to the Justice40 Initiative mentioned previously (DOE n.d.-e).

**Recommendation 1:** Review existing forms of directed federal spending and programs for their suitability to address energy inequity through targeted investment, improve them, and extend resulting enhanced targeting methods to other federal investment.

## 4. POLICY CONSIDERATIONS TO IMPROVE THE EFFECTIVENESS OF TARGETED CLEAN ENERGY INVESTMENTS

Targeting clean energy spending to specific communities for specific purposes is necessary but not sufficient to achieve an equitable distribution of the benefits and costs in the energy system. Ultimately, addressing inequity in the energy system will require addressing the sociopolitical context in which it operates, including structural and systematic marginalization alongside ongoing and historic discrimination. That task is one larger than this issue brief can address, but this section reviews several supplemental investments, policy design features, and requirements that can support targeted spending in achieving its desired outcomes.

### 4.1 Addressing Data Quality, Data Availability, and Evaluation Metrics

A strong foundation of data can support robust energy-related targeting efforts. High energy burdens, as an example, are linked to multiple underlying causes that should be considered when targeting spending to address this challenge, including location and geography, housing characteristics, socioeconomic situation, energy prices and policies, and behavioral factors (Brown et al. 2020; Graff et al. 2021). When looking to leverage indicators and data sets to identify communities for targeted federal intervention, critical considerations identified by experts include:

- The purpose of targeting; for example, when targeting a protective requirement or regulation a broader definition may be more effective in securing the intended impact, but for spending, a narrower definition may more effectively concentrate spending and impact
- Measures of both the current context and risk for worsening conditions in the future
- A system of tiering for prioritization to identify levels of need and direct spending accordingly
- An accounting of compounding impacts of risk factors, like poor housing conditions and air pollution
- A focus on how indicators can account for systemic racism
- Input from the target communities in question (EJNCF et al. 2021)

Data collection and reporting can also be an important part of accountability and measuring the reach, efficacy, and equity impact of clean energy spending. Appendix Table A3 summarizes key, currently available, federal data sources to aid in understanding inequity within the economy.

The federal government serves as the major collector and aggregator of national data sets and as a technical and financial resource for state- and local-level data collection. In this capacity, the federal government can advance complementary investments and requirements for data collection, disclosure, and publication, providing an opportunity to address existing data inadequacy, more effectively target programming, and regularly evaluate if program funding is reaching marginalized communities. These kinds of investments will also allow for adaptive management that can respond to challenges and opportunities presented during implementation (Raimi et al. 2021).

Areas of data improvement include:

- **Completeness.** Effectively targeting inequity in the energy system requires the collection of related indicators, but there is a dearth of reporting on clean energy equity indicators. Further, detailed reporting on households eligible and enrolled in assistance programs or receiving financing or other incentives, among other indicators, would be critical for understanding how communities are interacting



with energy programs and any barriers to access they are experiencing (Lanckton and DeVar 2021). For example, a lack of detailed, national data from utilities on disconnections of service has made it challenging to identify and address some of the clearest energy poverty challenges or evaluate the effectiveness of related policies challenging them (Flaherty et al. 2020). The national RECS survey, which for the first time will track disconnections, provides just a national snapshot every five years, and only a quarter of states require disconnection reporting from utilities (Flaherty et al. 2020). Federal intervention could include expanding the Census Bureau and DOE's data collection related to utility, fuel costs, and disconnections at the zip code or census tract levels and encourage states to require utilities to report on disconnections.

- **Engagement and Access.** Incorporating the perspective and interests of communities and key community participants is as important for data collection as it is for policy design (Gaddy and Scott 2020). Surveys can be improved and expanded regularly through engagement with both the respondent and researcher communities. Similarly, making data results and analysis free, open, and accessible to communities empowers them with the information they need to engage with the decision-making process. Federal intervention could include leading and funding a collaborative process around indicator selection and data collection, facilitating key stakeholders and target communities defining the measures of success for projects directed at them. This engagement should build on robust existing guidance and past federal experience with creating inclusive engagement. Engagement is also discussed in later sections of this issue brief.
- **Granularity.** The more representative data are of local conditions, the more useful they can be for policymaking. Ensuring data are collected regularly and relating all energy-relevant federal and state indicators to the census tract level allows for a more consistent and clearer picture of the drivers of inequity. An example is the LEAD Tool. LEAD uses low-income household energy characteristics, such as average monthly housing energy costs and average energy burden, for custom maps at the state, city, county, or census tract level (Ma et al. 2019). Federal intervention could include reviving and improving the tracking of clean energy and “green”

jobs, formerly led by the Bureau of Labor Statistics, to better capture demographic and socioeconomic dimensions of clean energy job growth specific to energy job categories. This should include dimensions of race, gender, wages, regions, and unionization at a greater level of detail than currently housed within the annual *U.S. Energy and Employment Report*. Additionally, federal equity-focused modeling on future scenarios could support planning now for inequities that may result from a clean energy transition.

**Recommendation 2:** Implement effective, data-driven, and results-focused programming on energy equity issues by cultivating metrics, reporting requirements, qualitative and quantitative data sources, and analysis that is grounded in the experience and input of target households and communities.

## 4.2 Local Capacity Building

Given the depth of their local expertise, state and local government and nongovernmental actors are often better equipped to engage directly with disadvantaged communities. However, variation in these actors' capacity for planning and service delivery can limit the efficacy of federal spending programs. Both a lack of staff capacity and technical support throughout the federal funding application, project design, and implementation process have been cited by local governments as key factors inhibiting them from addressing issues related to the energy transition (ICMA 2019; EJNCF et al. 2021). This issue is increasingly acute for state and local governments with smaller tax bases and less funding, who may most need to access federal resources.

Challenges implementing the American Recovery and Reinvestment Act (ARRA) following the 2008–09 economic crisis demonstrate how differences in technical and administrative capacity can impact efficient and equitable program implementation (Carley 2016; Carley et al. 2015). For example, ARRA funded the Energy Efficiency and Conservation Block Grant (EECBG) Program to disburse grants to local governments to reduce energy use and emissions. The program had uneven effects, as communities with greater experience with climate and energy programs were able to establish longer-lasting programs, while communities without such experience were unable to continue their work once federal funding ended (Watson 2020). This illustrates how federal spending can benefit more affluent

localities that have the resources to manage a substantial administrative burden, and how that preference can be magnified as their experience with the funding makes them better positioned to capitalize on other opportunities in the future; capacity building could help address this cycle, particularly in the context of an influx of COVID-19 recovery spending.

To support better federal program delivery, local stakeholder engagement paired with technical assistance holds the potential to advance appropriate place-based solutions and project portfolios to reflect just energy transition activities. For example, the Federal Emergency Management Agency's (FEMA) grants support its mission by building and testing local capacity for resilience and disaster response/recovery, particularly in terms of administration and management (FEMA n.d.). Community organizations are also eligible entities under many federal energy-related grants. Grant-making agencies can ensure these organizations are established as locally representative institutions through capacity and technical support.

Local capacity building and technical assistance can result in increased access to funds for disadvantaged communities, more effective utilization of funds, and better outcomes for equity-focused programming. One challenge can be matching capacity with investment to avoid insufficient or unneeded administrative resources. Additionally, there can be tension between the time that capacity building requires and the desire to quickly expend funds and see their results, job creation, and clean energy deployment. These challenges can be managed through careful evaluation of capacity gaps, the identification of capacity that can be created or relocated and is a fit for the expressed needs, and consistent evidence-based decisions on balancing effectiveness and timeliness. Solutions will often be program- and context-specific but setting aside funding and time during policy design to make these determinations can result in effective project implementation and deliver for target communities.

**Recommendation 3:** Address the marginalization of disadvantaged communities, which have less available resources to design, secure, and implement federally funded clean energy programming. Build the capacity of states, local governments, community groups, and other

representatives of disadvantaged communities to lead on co-creating opportunities, applying for federal funds, and engaging with or implementing programming.

### 4.3 Engagement and Partnership Approaches

Inclusive stakeholder engagement is a prerequisite for clean energy investment that reaches communities whose energy needs are underrepresented in or excluded from traditional policy development. Through grants, the federal government can compensate the knowledge and expertise of grassroots and community-based organizations, while investing in the conditions that allow engaging local community voices in participatory planning around energy programming. For example, to address concerns over high energy burdens, providing financial and technical support for co-creating with impacted communities through working groups with community members, task forces, and committees can help build effective policy (Drehobl et al. 2020). Additionally, the federal government can deploy its technical expertise to support cultivating strong civil society engagement processes and to uplift leaders in communities across the United States. This is critical for the long-term equitable distribution of benefits and creating a more equitable and democratic programming process (Michel et al. 2018).

The federal government can learn from and support the work of local governments already undertaking robust community engagement on clean energy deployment. For example, the Sustainable DC Plan, ranked by ACEEE's 2020 City Clean Energy Score Card as one of the highest in the Equity-Driven Clean Energy Planning and Policy category, was based on partnering with community organizations, hosting meetings in accessible community locations, and accommodating meeting formats to ensure it was built on community engagement and particularly engagement with underserved communities (Ribeiro et al. 2020).

However, engagement and technical assistance that delivers on program objectives and meets the needs of all partners is far from guaranteed, and so federal community engagement efforts should be built on lessons learned and the wealth of existing literature on the mechanisms and spaces associated with this kind of engagement (EJNCF et al. 2021; Hays et al. 2021).<sup>14</sup>

Research built on prior experiences and the articulated needs of communities suggest the following should be considered:

- Investing in conditions that allow community engagement to bring all parts of society to the table, like accessible locations, childcare, and travel and wage reimbursement, will support more equitable access to engagement processes (EJNCF et al. 2021).
- Basing community engagement practices on the specific dynamics and history of a given community, including acknowledging previous actions by the government, will be required to build trust and gain participation in community engagement efforts (EJNCF et al. 2021; Hays et al. 2021).
- Increased funding and time for community engagement in federal programs ensure grantees can identify the right local partners and adapt based on community feedback (Reames 2016; EJNCF et al. 2021). Approaching community engagement as a two-way dialogue, rather than an opportunity to instruct community members on a project, fosters productive relationships.
- Investment in environmental education, engagement, and training offers an opportunity for communities to develop their knowledge base and deploy community experts that can foster community-led efforts in the long term (Michel et al. 2018; EJNCF et al. 2021).

**Recommendation 4:** Bring the interests of communities that have historically been excluded to the forefront of federal spending, while equipping and empowering these actors to lead in program design, implementation, and monitoring. Incorporate advance planning, community-led project design, and funding for robust, inclusive, respectful, culturally sensitive, and intentional community partnership.

## 4.4 Labor Policies to Create Quality Jobs in All Types of Communities

While federal spending has the potential to create new jobs, there is a risk that instead of creating quality jobs and a pathway for historically excluded groups to access them, clean energy investment could lead to low-wage job creation that follows historical patterns of exclusion.

### BOX 1

## UNION PARTNERSHIP AND ENGAGEMENT

Unions are an important mechanism to ensure job quality and are a priority for the Biden administration. While union engagement in clean energy and workplace inclusivity has been historically varied, their role in enhancing job quality means they are an important partner on the job quality and workforce diversity component of an equitable clean energy transition. Unions can facilitate higher wages and better benefits while providing a tool for collective bargaining and collaboration within industries. Broadly, clean energy jobs have a slightly higher unionization rate than other private sector jobs, but it varies across subsectors and is challenging to measure (E2 et al. 2020). This is the result of multiple factors, such as the labor demands of renewable energy (i.e., more temporary jobs and more jobs in less unionized categories like construction and installation) and companies discouraging worker organizing (Harder 2020). Protecting workers' existing right to organize and working with unions while designing policies will allow lawmakers and agencies to capitalize on existing structures' expertise to drive high job quality in the clean energy sector.

### 4.4.1 Prevailing wage standards

Paying a prevailing wage is one common metric for job quality. A prevailing wage meets or exceeds a wage floor for an occupation, as determined by a state or federal government (BlueGreen Alliance n.d.; Zabin et al. 2020).<sup>15</sup> Federal clean energy spending can require that workers be paid prevailing wages, typically done through provisions on federal construction projects under the Davis-Bacon Act. Applying prevailing wage requirements should also consider any resulting impacts on cost, productivity, and timing of clean energy projects, which can vary by sector. Cost increases may, in fact, be quite low as productivity improvements resulting from higher wages inducing more efficient work can mitigate additional costs—as explained by the efficiency wage theory (Mühlau and Lindenberg 2003). Research suggests that labor costs, and thus wages, are only a moderate share of the costs involved in solar and wind projects. Across both technologies, a 20 percent increase in domestic labor costs increases capital costs by 2–4 percent and operations and maintenance costs by 3–6 percent (Mayfield and Jenkins 2021). Furthermore, increases in labor productivity could offset these cost



increases for wind and solar, as worksite productivity has been found to be 14–33 percent higher in states with prevailing wage laws (Mayfield and Jenkins 2021).

#### **4.4.2 Project labor agreements, community workforce agreements, and community benefit agreements**

Project labor agreements (PLAs) are collective bargaining agreements that provide guidance and set expectations for large construction projects before they begin. They have been found to ensure better project outcomes, set wage and benefit standards, and help union contractors access federal projects (BlueGreen Alliance n.d.; Zabin et al. 2020). These agreements have had success in ensuring job quality within clean energy construction in California. Most utility-scale renewable energy construction projects in California are governed by a PLA negotiated between project developers and building trade unions to set workplace standards, union wages and benefits, engagement with apprenticeship programs, and labor requirements to avoid work stoppages.

Community workforce agreements (CWAs) are a type of PLA negotiated between developers and trade unions that include provisions to hire local and disadvantaged workers (Zabin et al. 2020).<sup>16</sup> Critics of PLAs argue that they increase construction costs by providing better wages and benefits. However, these agreements are specifically designed not to increase cost through standards of competitiveness and cost-effectiveness of public funds (Kotler 2009). Indeed, while securing adequate pay, benefits, and employee protection, these agreements can also reduce direct and indirect labor costs through standardizing holidays, the use of apprentices, ease of access to skilled labor, and expedited dispute procedures (Kotler 2009). Take for example, the I-287/Cross-Westchester Expressway construction project in New York which accrued \$8.4 million in cost savings related to the project's PLA (Kotler 2009). A PLA covering nine Cleveland University Hospital construction projects, and negotiated with the Cleveland Building and Construction Trades Council, included hiring provisions requiring 20 percent of the workforce be city residents. It also created lasting connections with union apprenticeship programs and urged contractors to create contracting opportunities for Minority and Women-Owned Business Enterprises (MWBs) (Figueroa et al. 2013).

Community benefit agreements are legal agreements between communities, local organizations, and a developer that ensure certain mitigation activities or benefits in exchange for community support for a project. The agreements are distinct from a PLA or CWA and usually on the non-construction parts of a development. Community benefit agreements can help build local support and a diverse local workforce for clean energy projects (Zabin et al. 2020).

The federal government can encourage the use of PLAs, CWAs, and community benefit agreements by providing guidance on these kinds of agreements and including them as a requirement or preference when considering applicants for federal funding. As precedent, the Obama administration's 2009 Executive Order 13502 titled "Use of Project Labor Agreement for Federal Construction Projects" encouraged agencies to consider requiring the use of PLAs for their direct large-scale construction projects (DOT 2021).

#### **4.4.3 Workforce development and inclusive workplaces**

Workforce development and training can help address the inequitable distribution of job growth and prepare disadvantaged workers to avail themselves of the influx of job opportunities that come with federal spending (Zabin et al. 2020). Training is effective in opening pathways to quality jobs for a diverse workforce when tied to a mechanism that creates those jobs, like apprenticeship programs that are tied to prevailing wages and career pathways that provide higher compensation along with newly acquired skills. Existing programming can provide a model and structure that federal spending can invest in and expand.

The Appalachian Regional Commission's Partnerships for Opportunity and Workforce Economic Revitalization (POWER) Initiative provides federal funding to local efforts to diversify communities impacted by the decline of the coal industry. This programming is a model for how the federal government can support locally driven and expert-led workforce development, apprenticeship, and community college training programs to increase access for disadvantaged communities to clean energy opportunities. An evaluation of the POWER Initiative found that so far closed projects have achieved results. Although it varies by specific measure, factors that

impacted the success of workforce development programming included early engagement of partners and tailored programming, among others (ARC 2020).

However, technical training programs will not address workplace harassment and discrimination that disincentivize some groups from participating in the clean energy workforce. In addition to the lower gender diversity in the energy sector (see Figure 2), across the economy and including within the science, technology, engineering, and mathematics (STEM) fields, women are harassed out of the workplace or forced to leave jobs that do not accommodate their caregiving obligations or physical needs (Boesch and Hamm 2020; Windham-Bannister 2018). Labor protections and training policies need to be paired with improved and sustained enforcement of anti-harassment and antidiscrimination protections.

#### 4.4.4 Investing in Minority and Women-Owned Business Enterprises through federal procurement

Beyond targeted job creation, directing federal investment to MWBEs through federal procurement requirements can transform the finances of historically disadvantaged business owners and build wealth for those generally underrepresented in leadership and ownership (often women, Black, Latino, and Indigenous individuals, and other people of color). This kind of investment has the potential to create a positive feedback system which supports owners and allows them to support their workers and communities, often providing an organizational culture that is more likely to employ a diverse workforce, creating generational and community-wide wealth for those that have historically been excluded for entrepreneurial opportunities (Fairchild and Rose 2018). Using the federal procurement marketplace to drive business for disadvantaged business owners has a long bipartisan history that has built a body of agency learnings and experience. In fact, the Department of Transportation has been reported to have the most significant success with inclusive procurement and contracting policies (Fairchild and Rose 2018). However, there remain issues with the coverage and implementation of federal procurement preference for MWBEs, often related to capacity and access to needed resources. This was an issue with ARRA funding, which MWBEs ultimately could not fully access (Fairchild and Kalima 2018). Federal clean energy spending should

not only include prioritization for MWBEs, but in consultations with these businesses provide MWBEs with the technical and financial assistance they need to access and implement these funds.

**Recommendation 5:** Ensure clean energy spending creates pathways to high-quality jobs for a diverse workforce. Require jobs created through federal spending to meet wage standards, protect the right to organize, enforce anti-harassment and antidiscrimination protections, encourage local hiring and engaging minority-owned and women-owned businesses, and train and equip currently underrepresented members of the clean energy workforce to capitalize on new opportunities in the sector.

### 4.5 Inclusive Financing

Federal policy has supported the expansion of clean energy through financial programs like tax incentives, grants, or subsidized loans, as well as inclusive financing approaches, including low-interest loans, federal green banks, and loan loss reserves, among others. For clean energy technology to be affordable and accessible for low-income households, financing mechanisms must be designed to be easily accessible for disadvantaged communities, and this is not consistently the case (see Section 2.2) (Zhou and Noonan 2019).<sup>17</sup> Low clean energy technology uptake can be a direct result of how clean energy financing and incentives are designed, through mechanisms or with cost-share requirements that exclude certain individuals. Examples of prioritizing and integrating the needs of disadvantaged communities across clean energy financial incentives include:

- **On-bill investment models** enable low-income households to finance home efficiency improvements through a frequent conditional payment mechanism (their bill) that does not require credit and where penalties for payment issues are connected to the service (rather than the individual). An on-bill tariff program is run by a utility that pays the cost for household energy efficiency improvements and then recoups that cost over time on the utility bill. This option is designed to be more effective than debt-financed investment, with higher participation, lower up-front costs, no income or credit requirements, better access to renters, and lower incidence of disconnections or nonpayment (DOE n.d.-f). The

Ouachita Electric Cooperative in Arkansas, for example, ran a loan program for qualified customers' efficiency improvements but then transitioned to an on-bill tariff program with revised eligibility. In comparing the top four months of the loan program with the first four months of the on-bill program, the on-bill option had double the number of customers subscribed and more than one-third lived in multifamily housing, compared to none under the loan program. Total investments for the on-bill program were four times larger with fewer instances of nonpayment (Lin 2018). On-bill programs, as programs based around debt, should include consumer protections; for example, ensuring energy savings will cover the cost of the repayment (Ross et al. 2018).

- **Community solar and virtual net metering** are inclusive approaches to expand access to solar energy in low-income communities that face barriers related to homeownership, roof space, and individual up-front investment (Paulos 2017). Community solar can be implemented in many ways but generally involves off-site solar generation shared by community subscribers or customers. It can also advance community ownership and a more democratic energy governance. Virtual net metering is the process by which customers can count off-site solar generation against their bill. Federal policy could support these kinds of financing approaches in multiple ways, including: modifying the existing residential and commercial investment tax credit that incentivizes solar deployment to explicitly note the eligibility for community solar ownership; allowing the tax credit to be refundable so it is more accessible in the short term and without tax liability; targeting the credit to disadvantaged groups through some kind of eligibility requirements; and changing how the utility allowance is calculated so federally subsidized housing residents can retain community solar savings (Institute for Local Self-Reliance et al. 2020).

The government can study the impacts and accessibility of different clean energy financing mechanisms and prioritize mechanisms that have already proved to be effective in reaching low-income communities; Black, Latino, and Indigenous communities; and other communities of color.

**Recommendation 6:** Support inclusive financing approaches to deploy clean energy and energy efficiency in low-income communities; Black, Latino, and Indigenous communities; as well as other communities of color.

## 5. CONCLUSION AND POLICY RECOMMENDATIONS

Major inequities exist in the distribution of costs and benefits within the energy system in the United States. Most often, these inequities are faced by low-income individuals; Black, Latino, Indigenous individuals; and other people of color. This is intertwined with the inequitable sociopolitical context that the energy system operates within, which includes structural and systematic marginalization, alongside ongoing and historic discrimination against these communities that face the greatest hardship (Healy and Barry 2017; McCauley et al. 2013; Malin et al. 2019; Sovacool 2009; Bouzarovski and Simcock 2017). Addressing this broader context is required to fully address energy inequities. While other interventions may appear to be only technocratic, it is necessary to begin making a contribution to address inequities within the existing systems through efforts at targeting spending and complementary policies that make spending more effective.

Many states, and now the federal government, have made commitments to address these inequities by better targeting their assistance and spending programs. The government has several delivery methods for targeted investments and dozens of existing programs that can be scaled, targeted, or better targeted through new or revised eligibility criteria. Increasing targeted investment would benefit from complementary federal policies that help to ensure the intended outcome.

Therefore, we make the following recommendations, detailed previously:

1. Review existing forms of directed federal spending and programs for their suitability to address energy inequity through targeted investment, improve them, and extend resulting enhanced targeting methods to other federal investment.
2. Implement effective, data-driven, and results-focused programming on energy equity issues by cultivating metrics, reporting requirements, qualitative and



quantitative data sources, and analysis that is grounded in the experience and input of target households and communities.

3. Address the marginalization of disadvantaged communities, which have fewer available resources to design, secure, and implement federally funded clean energy programming. Build the capacity of states, local governments, community groups, and other representatives of disadvantaged communities to lead on co-creating opportunities, applying for federal funds, and engaging with or implementing programming.
4. Bring the interests of communities that have historically been excluded to the forefront of federal spending, while equipping and empowering these actors to lead in program design, implementation, and monitoring. Incorporate advance planning, community-led project design, and funding for robust, inclusive, respectful, culturally sensitive, and intentional community partnership.
5. Ensure clean energy spending creates pathways to high-quality jobs for a diverse workforce. Require jobs created through federal spending to meet wage standards, protect the right to organize, enforce anti-harassment and antidiscrimination protections, encourage local hiring and engaging minority-owned and women-owned businesses, and train and equip currently underrepresented members of the clean energy workforce to capitalize on new opportunities in the sector.
6. Support inclusive financing approaches to deploy clean energy and energy efficiency in low-income communities; Black, Latino, and Indigenous communities; as well as other communities of color.

## APPENDIX

TABLE A1

### FORMS OF TARGETED SPENDING, SAMPLE ENERGY-RELEVANT PROGRAM, AND THE ENERGY EQUITY ISSUES IT ADDRESSES, FEATURED IN THE TEXT OF SECTION 3.1

| Form of Targeted Spending                   | Sample Program  | Primary Energy Equity Issues Addressed (energy burden, clean energy access, and clean energy employment or workforce training) |
|---|---|--|
| Direct payments to individuals              | Weatherization Assistance Program                       | Energy burden, clean energy access   |
|   | The Nonbusiness Energy Property Tax Credit (25C)        | Energy burden, clean energy access   |
| Formula grants                              | State Energy Program                                    | Clean energy access  |
|   | Workforce Innovation and Opportunity Act Grants         | Clean energy employment or workforce training  |
| Project-based grants, loans, and guarantees | Single Family Housing Repair Loans and Grants program   | Energy burden  |
|   | Electric Infrastructure Loan and Loan Guarantee Program | Clean energy access  |
| Technical assistance and training           | Office of Indian Energy's technical assistance program  | Clean energy access  |
|   | The Equity in Energy Initiative                         | Clean energy access, clean energy employment or workforce training   |

TABLE A2

## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE

| Program/Offices/<br>Initiatives  | Brief Description   | Relevant Form of<br>Targeted Federal<br>Spending | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|--|---|--|--|
| <b>APPALACHIAN REGIONAL COMMISSION</b>   |   |  |  |
| POWER (Partnerships for Opportunity and Workforce and Economic Revitalization) Initiative <sup>a</sup> | This initiative provides federal funding to projects across Appalachia to support recovery, economic opportunity, and new investments in communities and areas impacted by changes in U.S. energy production that have affected coal and coal-related industries.   | Project grants                                   | Yes  |
| <b>U.S. DEPARTMENT OF AGRICULTURE</b>  |   |  |  |
| Electric Infrastructure Loan & Loan Guarantee Program <sup>b</sup>                                     | Under the Rural Utilities Service, this program makes loans and loan guarantees to electric distribution, generation, and transmission providers to qualified rural areas. These loans and loan guarantees are for the recipient's facilities to finance energy efficiency, maintenance, upgrades, expansion, renewable energy systems, and the replacement of distribution, sub transmission, and headquarters facilities. | Direct loans and loan guarantees                 |  |
| Single Family Housing Repair Loans & Grants <sup>c</sup>   | Operated by the Rural Development division, this program provides loans to very-low-income homeowners to repair or improve their homes, as well as grants to elderly very-low-income homeowners to remove health and safety hazards.  | Direct loans and grants                          |  |
| Multifamily Housing Direct Loans and Loan Guarantees <sup>d</sup>                                      | Operated by the Rural Development division, this program offers financing for the construction or improvement of affordable multifamily rental housing for low-income, elderly, or disabled individuals and families in eligible rural areas.   | Direct loans and loan guarantees                 |  |
| Rural Energy Savings Program <sup>e</sup>  | This program supplies loans to rural utilities and other organizations that provide loans for energy efficiency measures that decrease energy use or cost for rural families and small businesses.  | Direct loans                                     |  |
| High Energy Cost Grants <sup>f</sup>   | This program supplies grants to power providers to lower energy expenses in areas with extremely high per household energy costs—275 percent of the national average or higher—through facilities' acquisition, construction, and improvements. Some types of costs covered by this program include renewable energy facilities, energy storage technology, electric generation, transmission, and distribution facilities. | Project grants                                   |  |
| Distributed Generation Energy Project Financing <sup>g</sup>   | Under the Rural Utilities Service, this program provides loans and loan guarantees for distributed renewable energy projects that provide wholesale or retail electricity to rural communities.   | Direct loans and loan guarantees                 |  |
| Energy Resource Conservation Program <sup>h</sup>  | Under the Rural Utilities Service, this program reduces the cost of borrowing by rural utilities and cooperatives that invest in energy conservation and renewable energy projects.   | Payment deferment on direct loans                |  |



## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE (CONTD.)

| Program/Offices/<br>Initiatives  | Brief Description   | Relevant Form of<br>Targeted Federal<br>Spending          | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|--|---|---|--|
| <b>U.S. DEPARTMENT OF AGRICULTURE (CONTD.)</b>                                     |   |   |  |
| Energy Efficiency & Conservation Loan Program <sup>i</sup>                         | This program provides loans to support energy efficiency and conservation projects for qualified commercial, industrial, and residential customers. Activities that can be funded through this program include energy audits, distributed generation for renewable energy systems, consumer and community outreach programs, and all energy efficiency measures on a consumer's premises. | Direct loans  |  |
| Housing Preservation Grants <sup>j</sup>   | The USDA provides grants for the repair and rehabilitation of housing occupied by, or owned by, low- and very-low-income rural individuals. Program funds can be used for expenses like repairing or replacing electrical wiring, roofs, insulation, and heating systems.   | Project grants  |  |
| Rural Energy for America Program Renewable Energy & Energy Efficiency <sup>k</sup> | Through this program, agricultural producers and rural small businesses can access grants and guaranteed loan financing for energy efficiency improvements and renewable energy systems, new energy efficiency equipment, and new system loans for agricultural production and processing.  | Project grants, direct loans, and loan guarantees         | Yes  |
| <b>U.S. DEPARTMENT OF COMMERCE</b>   |   |   |  |
| Revolving Loan Fund Program <sup>l</sup>   | The U.S. Economic Development Administration (EDA) provides grants to establish revolving loan funds that can make loans to business that face barriers to obtaining traditional financing. These loans can enable the growth of small businesses and create quality employment opportunities.  | Direct loans, through a fund established by direct grants |  |
| Public Works and Economic Adjustment Assistance Programs <sup>m</sup>              | Operated by the EDA, these programs provide economically distressed communities and regions with resources to support job creation and retention, increase private investment, advance innovation, enhance manufacturing capacity, and provide workforce development.   | Grants, revolving loan funds, and technical assistance    |  |

TABLE A2

## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE (CONTD.)

| Program/Offices/<br>Initiatives                                     | Brief Description  | Relevant Form of<br>Targeted Federal<br>Spending  | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|---|--|---|--|
| U.S. DEPARTMENT OF ENERGY   |  |   |  |
| Clean Cities Coalition <sup>n</sup>                                 | The Clean Cities Coalition is an initiative in the U.S. Department of Energy's Vehicle Technologies Office that works through local coalitions and in communities to meet goals around economics, environmental health, and energy security. Specifically, the coalition looks at affordable domestic fuels, fuel saving, and energy efficient mobility systems.                   | Technical assistance and training   | Yes  |
| State Energy Program <sup>o</sup>                                   | This program provides funding and technical assistance designed to support states, territories, and the District of Columbia with energy security, state-led energy initiatives, and benefits from decreasing energy waste.  | Formula grants and technical assistance and training                                      |  |
| Loan Programs Office <sup>p</sup>                                   | This office provides loans and loan guarantees to support deploying large-scale energy infrastructure. This includes support for advanced vehicles manufacturing, advanced nuclear and fossil energy, tribal energy, and renewable energy and efficient energy.  | Direct loans and loan guarantees  |  |
| Weatherization Assistance Program (WAP) <sup>a</sup>                | This program finances weatherization services for low-income households to increase energy efficiency, ensuring health and safety, and subsequently reduce energy costs.   | Direct payment programs, through formula grant funding                                    | Yes  |
| Energy Efficiency & Conservation Block Grant Program <sup>f</sup>   | This program provides block grants to communities, cities, states, territories, and tribes to support the development, promotion, implementation, and management of energy efficiency and conservation projects.   | Formula grants and technical assistance and training                                      |  |
| State Energy Efficient Appliance Rebate Program <sup>s</sup>        | State energy efficient appliance rebates created energy savings by replacing older, inefficient appliances by financing state-level customer rebate programs.  | Direct payments   |  |
| The Equity in Energy Initiative <sup>t</sup>                        | This initiative is designed to expand the inclusion and participation of individuals in underserved communities, such as minorities, women, veterans, and formerly incarcerated persons, in all the programs of the Department of Energy and in the private energy sector.   | Financial assistance, technical assistance, and training through internship opportunities |  |
| The State and Local Solution Center <sup>u</sup>                    | Managed by the Office of Energy Efficiency and Renewable Energy's Weatherization and Intergovernmental Programs Office (WIP), it provides technical assistance resources to enable strategic investments in energy efficiency and renewable energy technologies by a wide range of stakeholders, in partnership with state and local organizations and community-based nonprofits. | Technical assistance  |  |
| Office of Indian Energy's technical assistance program <sup>v</sup> | This program provides federally recognized American Indian tribes, including Alaska Native villages, tribal energy development organizations, and other organized tribal groups and communities, technical assistance to advance tribal energy projects.   | Technical assistance  |  |

## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE (CONTD.)

| Program/Offices/<br>Initiatives   | Brief Description   | Relevant Form of<br>Targeted Federal<br>Spending                          | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|---|---|---|--|
| <b>U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES</b>                         |   |   |  |
| Low-Income Home Energy Assistance Program (LIHEAP) <sup>w</sup>             | This program provides federal funds to mitigate the costs associated with home energy bills, weatherization, minor energy-related home repairs, and energy crises.  | Direct payments, through formula grants and emergency contingency funding | Yes  |
| <b>U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT</b>                     |   |   |  |
| Community Development Block Grant Programs <sup>x</sup>                     | These community development funds support state and local infrastructure, economic development, public facilities, housing rehabilitation, and other community priorities. Programs address specific needs like disaster recovery, areas suffering from foreclosures and abandonment, housing for those recovering from a substance-use disorder, and more. | Formula grants  |  |
| Energy Efficient Mortgage Program <sup>y</sup>                              | This program with the Federal Housing Administration (FHA) enables households to finance energy efficiency improvements through their FHA-issued mortgage.  | Loan guarantees   |  |
| HOME Investment Partnerships Program <sup>z</sup>                           | Through formula grants to states and localities, this program can be used, often in partnership with local groups, to fund activities related to creating affordable housing for low-income households. It includes building, buying, and rehabilitating housing, as well as direct rental assistance.  | Formula grants  |  |
| <b>U.S. DEPARTMENT OF LABOR</b>   |   |   |  |
| Workforce Innovation and Opportunity Act Grants <sup>aa</sup>               | Establishes formula grants to states for employment and training services for adults, dislocated workers, youth, and other vulnerable populations. It supports the American Jobs Centers System, workforce development boards, and work-based training.   | Formula grants  |  |
| Job Corps <sup>ab</sup>   | The country's largest residential training program, helping youth between the ages of 16 and 24 complete their education, gain technical skills, and transition to the workforce.   | Training  |  |
| Indian and Native American Employment and Training Programs <sup>ac</sup>   | These programs support employment and training activities in Native communities to develop academic, occupational, and literacy skills; make individuals more competitive in the workforce; and promote economic and social development.  | Training and technical assistance   |  |
| State Apprenticeship Expansion, Equity, and Innovation Grants <sup>ad</sup> | This program supports states in the development, modernization, and diversification of registered apprenticeship programs.  | Project grants  |  |



TABLE A2

## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE (CONTD.)

| Program/Offices/<br>Initiatives   | Brief Description  | Relevant Form of<br>Targeted Federal<br>Spending          | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|---|--|---|--|
| U.S. DEPARTMENT OF TRANSPORTATION   |  |   |  |
| Surface Transportation Block Grant Program <sup>ae</sup>  | This grant program provides funding to states and localities to preserve and improve highways, bridges and tunnels, pedestrian and bicycle structures, and transit projects.   | Project grants  |  |
| Formula Grants for Rural Areas Program <sup>af</sup>  | This program funds public transportation projects in rural areas by supporting capital expenses, project planning, and operations. Funds are apportioned to states based on land area, population, revenue vehicle miles, and low-income individuals in rural areas.       | Formula grants and technical assistance                   |  |
| Federal Transit Capital Investment Grants <sup>ag</sup>   | Operated by the Federal Transit Administration, this program funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit.  | Loan guarantees   |  |
| Tribal Transit Program and Formula Grants <sup>ah</sup>   | Provides competitive and formula grants to federally recognized American Indian tribes for public transportation services on and around American Indian reservations or tribal land in rural areas.  | Project and formula grants                                |  |
| Congestion Mitigation and Air Quality Improvement Program <sup>ai</sup>   | Operated by the Federal Transit Administration, this program provides funding for transit or related projects that improve air quality, particularly in areas in nonattainment or maintenance for ozone, carbon monoxide, or particulate matter.                           | Project grants  |  |
| Transportation Infrastructure Finance and Innovation Act Program <sup>aj</sup>                                      | This program provides credit assistance for qualifying large-scale surface transportation projects, including projects related to highways, transit, port access, and more.  | Direct loans, loan guarantees and standby lines of credit |  |
| Grants for Bus and Bus Facilities Formula Program <sup>ak</sup>   | Operated by the Federal Transit Administration, this program provides funding to states and transit agencies through formulas and competitive grant processes to replace, rehabilitate, and purchase buses and related equipment, and to construct bus-related facilities. | Project and formula grants                                |  |
| Rural Transportation Assistance Program <sup>al</sup>   | Operated by the Federal Transit Administration, this program provides funding to states for training, technical assistance, research, and related support services for transit operators in rural areas.   | Project grants, technical assistance, and training        |  |
| Low and No Emissions Vehicle Program <sup>am</sup>  | Through competitive funding to state and local governmental authorities, this program funds the purchase or leasing of zero- and low-emission transit buses as well as associated facilities requirements.   | Project grants  | Yes  |
| Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant program <sup>an</sup> | Through this merit-based program, previously known as the Better Utilizing Investments to Leverage Development (BUILD) Program, the U.S. Department of Transportation supports road, rail, transit, and port projects, that strategically serve national interests.        | Project grants  |  |

## SELECT EXAMPLES OF FEDERAL PROGRAMS THAT COULD SUPPORT TARGETED CLEAN ENERGY INVESTMENT OR TECHNICAL ASSISTANCE (CONTD.)

| Program/Offices/<br>Initiatives                                 | Brief Description   | Relevant Form of<br>Targeted Federal<br>Spending                       | Explicitly Covered<br>under the Interim<br>Agency Justice40<br>Implementation<br>Guidance (Young et<br>al. 2021) |
|---|---|--|--|
| <b>U.S. DEPARTMENT OF THE TREASURY</b>                          |   |  |  |
| Community Development Financial Institutions Fund <sup>ao</sup> | Through support to community development financial institutions and community development entities, which have particular expertise and experience serving low-income communities, this fund seeks to generate growth in economically disadvantaged communities.  | Technical assistance and training, multiple kinds of program financing |  |
| The Nonbusiness Energy Property Tax Credit (25C) <sup>ap</sup>  | Administered through the U.S. Department of the Treasury, this is an example of a direct payment through a tax credit for investments in high-efficiency technologies/appliances/materials. Covered investments include high-efficiency water heaters, energy efficient windows, electric heat pumps, and more. The credit is for up to 10% of costs with a ceiling of US\$500. | Direct payment through a tax credit                                    |  |
| <b>U.S. ENVIRONMENTAL PROTECTION AGENCY</b>                     |   |  |  |
| RE-Powering America's Land Initiative <sup>aq</sup>             | This program facilitates and supports state and local governments, companies, and communities reusing currently problematic land (landfills, mine sites, contaminated lands) for renewable energy development.  | Project grants and technical assistance                                |  |
| ENERGY STAR <sup>ar</sup>                                       | ENERGY STAR is a government-supported certification label that communicates to business and consumers the energy efficiency of different products and solutions. The program helps deliver cost savings, address climate change, and improve air quality.   | Technical assistance and training                                      |  |
| Diesel Emissions Reduction Act Program <sup>as</sup>            | This program supports grants and rebates to states; territories; tribal governments; Alaska Native villages; regional, state, local, or tribal agencies/consortia or port authorities; nonprofits; institutions; and private entities to address diesel engine emissions and their impact on public health and air quality.   | Project grants, direct payments  | Yes  |
| EmPOWER Air Data Challenge <sup>at</sup>                        | This initiative funds academic and research institutions that propose projects using EPA's Clean Air Markets Division's emissions or environmental monitoring data sets.  | Project grants for research  |  |
| <b>U.S. SMALL BUSINESS ADMINISTRATION</b>                       |   |  |  |
| 504 Loans Program <sup>au</sup>                                 | This program provides long-term, fixed-rate financing for major fixed assets related to job creation and business growth. These loans can cover the improvement or modernization of existing facilities and utilities.  | Direct loans   |  |

*Note:* The program list is not exhaustive. It is based on a literature review of programming related to clean energy access, energy burden, and the clean energy workforce. Another resource on programs and proposed policies that could leverage existing authorities to achieve an equitable clean energy transition is Raimi et al. 2021.

*Sources:* a. ARC 2021; b. USDA n.d.-a; c. USDA n.d.-b; d. USDA n.d.-c; e. USDA n.d.-d; f. USDA n.d.-e; g. USDA n.d.-f; h. USDA n.d.-g; i. USDA n.d.-h; j. USDA n.d.-i; k. USDA n.d.-j; l. U.S. Department of Commerce n.d.-a; m. U.S. Department of Commerce n.d.-b; n. DOE n.d.-g; o. DOE n.d.-b; p. DOE n.d.-h; q. DOE n.d.-a; r. DOE n.d.-i; s. DOE n.d.-j; t. DOE n.d.-d; u. DOE n.d.-k; v. DOE n.d.-c; w. HHS n.d.; x. HUD n.d.-a; y. HUD n.d.-b; z. HUD n.d.-c; aa. DOL n.d.-a; ab. DOL n.d.-b; ac. DOL n.d.-c; ad. DOL n.d.-d; ae. DOT n.d.-a; af. DOT n.d.-b; ag. DOT n.d.-c; ah. DOT n.d.-d; ai. DOT n.d.-e; aj. DOT n.d.-f; ak. DOT n.d.-g; al. DOT n.d.-h; am. DOT n.d.-i; an. DOT n.d.-j; ao. U.S. Department of the Treasury n.d.; ap. IRS n.d.; aq. EPA n.d.-a; ar. EPA n.d.-b; as. EPA n.d.-c; at. EPA n.d.-d; au. U.S. Small Business Administration n.d.

TABLE A3

## RELEVANT FEDERAL DATA SOURCES AND INDICATORS USEFUL FOR TARGETING

| Agency  | Data Set  | Key Indicators  | Periodicity  |
|---|---|---|--|
| U.S. Department of Commerce:<br>U.S. Census Bureau              | Decennial Census of Population and Housing  | <ul style="list-style-type: none"> <li>Population</li> <li>Household demographics</li> <li>Household size</li> <li>Home ownership</li> </ul>  | Decennial  |
|   | American Community Survey   | <ul style="list-style-type: none"> <li>Community demographics</li> <li>Income, poverty, and finances</li> <li>Occupation</li> <li>Health</li> <li>Level of education</li> <li>Access to technology</li> </ul>                             | Provides 1-year and 5-year estimates. Conducted on an annual basis |
|   | American Housing Survey   | <ul style="list-style-type: none"> <li>Housing stock and characteristics</li> <li>Household income and demographics</li> <li>Geography and rural/urban classification</li> <li>Housing affordability</li> <li>Exposure to lead</li> </ul> | Biennial survey with 1- and 5-year estimates                       |
| U.S. Department of Commerce:<br>U.S. Bureau of Labor Statistics | Consumer Expenditure Survey   | Household income and consumer expenditures across demographics, including: <ul style="list-style-type: none"> <li>Food</li> <li>Housing and energy use</li> <li>Transportation</li> <li>Healthcare</li> <li>Education</li> </ul>          | Annual, semiannual   |
|   | Current Population Survey*<br><i>*Jointly sponsored by U.S. Census Bureau and the U.S. Bureau of Labor Statistics</i> | <ul style="list-style-type: none"> <li>Population</li> <li>Household and family demographics</li> <li>Employment</li> <li>Level of education</li> <li>Health insurance coverage</li> <li>Access to mobility</li> </ul>                    | Monthly survey   |
|   | National Compensation Survey  | <ul style="list-style-type: none"> <li>Employee compensation</li> <li>Employee benefits</li> <li>Employment costs</li> </ul>  | Quarterly, annual  |
|   | Current Employment Statistics   | <ul style="list-style-type: none"> <li>Changes in employment</li> <li>Worker hours</li> <li>Worker earnings</li> </ul>  | Monthly survey   |
| U.S. Department of Energy                                       | Residential Energy Consumption Survey (RECS)  | <ul style="list-style-type: none"> <li>Household appliances</li> <li>Household energy technology</li> <li>Household energy consumption</li> <li>Household energy costs</li> <li>Energy assistance</li> </ul>                              | Latest release RECS 2015   |
|   | Alternative Fuels Data Center (AFDC)  | <ul style="list-style-type: none"> <li>Alternative fuels usage</li> <li>Alternative fuels stations</li> <li>Vehicle trends</li> </ul>   | Annual   |
| U.S. Environmental Protection Agency                            | National Air Toxics Assessment (NATA)   | Census tract estimates on: <ul style="list-style-type: none"> <li>Cancer risk due to air pollution</li> <li>Respiratory hazards</li> <li>Particulate matter</li> <li>Ozone</li> </ul>   | Latest release NATA 2014   |
|   | Greenhouse Gas Reporting Program  | <ul style="list-style-type: none"> <li>Facility-level emissions from the largest sources of greenhouse gas emissions</li> </ul>   | Annual   |
|   | Toxics Release Inventory  | <ul style="list-style-type: none"> <li>Management of 770 chemicals</li> </ul>   | Annual   |

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## ENDNOTES

1. Definitions of job quality range, but core components include a family sustaining wage, significant health care and retirement benefits, opportunities for career advancement, and duration/stability.
2. *Equitable* here refers not to just an equal distribution of costs and benefits (based on dividing costs and benefits into matching amounts), but rather a distribution of costs and benefits that contributes to a fair and just outcome by addressing the historically unequal distribution of these costs and benefits.
3. Refer to Salter et al. 2018 for a review of the full range of definitions and interpretations of energy justice.
4. The literature review covered articles in academic journals, in addition to reports and factsheets from government actors at the federal, state, and local levels; research organizations; and nonprofits. Drawn from the research community, experts were interviewed directly early in the research process and invited to review interim research findings and the draft manuscript. Expert interviews informed existing gaps in research and policy, identified informative examples of investments targeted at energy inequity, and developed recommendations.
5. While this issue brief used the income-based measure of energy burden, it is not the only way (nor a sufficient way on its own) to understand energy poverty. For example, a financially focused measure may not account for behavioral factors and energy-limiting behavior that low-income households may use, in which case some studies recommend a temperature-focused metric (Cong et al. 2021).
6. Defined as below 200 percent of the federal poverty level (Drehobl et al. 2020).
7. Recent research has found that deficient housing and higher energy burden can independently predict household energy insecurity; however, they do not alone explain the racial inequity in energy insecurity. More work is required to fully understand this dynamic (Graff et al. 2021).
8. This section focuses on select examples, but there is similar research for other technologies as well. For example, learn more about electric vehicle adoption trends in Muehlegger and Rapson 2018.
9. For information on the job creation potential of clean energy investments in rural United States, see Saha et al. 2021.
10. This includes jobs in energy efficiency, renewable energy, clean vehicles, grid and storage, and fuels (E2 2021).
11. Unionization rate data are highly uncertain for individual technologies. This is a data limitation that will need to be addressed to robustly assess job quality in the diverse clean energy space.
12. When considering a comparison of energy sector job features to a national average, it is important to keep in mind that the energy sector is relatively male-dominated so the gender inequity discussed throughout the brief may impact the sector's appearance of a higher performance.
13. This set of examples is focused on a limited set of foundational data tools, but there is much more to consider, including innovative tools like the National Renewable Energy Laboratory's Solar for All app, which can be used to determine LMI technical potential.
14. There is a range of helpful literature to consider on this subject. As a starting point, refer to EJNCF et al. 2021 and Hays et al. 2021.
15. Prevailing wages are set by state and federal regulators and agencies. Established prevailing wage rates at the federal level are available online from the U.S. Department of Labor and prevailing wage determinations can be requested from the department.
16. While the terms *project labor agreements*, *community workforce agreements*, and *community benefit agreements* are not always consistently defined, the text includes how these agreements are defined in the context of this issue brief.
17. For additional details on the specific, granular policy adjustments that can support low- and moderate-income households accessing solar photovoltaics, see Cook and Bird 2018.



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## ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

### Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

### Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

### Our Approach

#### COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

#### CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

#### SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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