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For a Hearing on

Access to Renewable Energy

Before The

United States Senate

Energy and Natural Resource Committee

Subcommittee on Energy

Wednesday, June 23, 2021

Washington, D.C.

Introduction

Chairman Hirono, Ranking Member Hoeven, and members of the subcommittee, thank you for the opportunity to testify before you today. My name is Alejandro Moreno, and I am the Deputy Assistant Secretary of the Office of Renewable Power in the Department of Energy's (DOE's) Office of Energy Efficiency and Renewable Energy (EERE). As the Deputy Assistant Secretary, I direct renewable energy applied research, development, demonstration, and deployment (RDD&D) activities for the geothermal, solar energy, wind, and water power technology offices in EERE.

EERE has achieved great successes through funding technology RDD&D through competitive solicitations open to the public and through support for the National Laboratories, which play a central role in advancing America's leadership in science and technology and developing innovative solutions for the future. For example, we have achieved cost reductions of up to 82 percent in solar technologies in the last decade alone, contributing to a massive boom in solar and economic development.¹

Technology advances like these are instrumental in realizing the Administration's goals for achieving a clean energy future, including reaching a zero-carbon power sector by 2035 and a net zero carbon economy by 2050. And achieving these goals is essential if we are to avoid the worst impacts of climate change. But to be truly successful, our transition to clean energy must not only reduce emissions, but also provide widespread benefits: from stable, well-paying careers in building, installing and operating the thousands of new clean energy generation systems that will be commissioned in the coming years to ensuring equitable access to reliable, affordable energy systems and services to Americans across all regions, income levels, and races.

The Department has begun to focus intently on supporting a clean energy future that benefits all Americans, with a range of programs that support workforce development and equitable access, and we plan to build on these initial efforts moving forward and ensure a just, equitable transition to a clean energy future is a cornerstone of DOE and EERE's mission and work.

The Importance of Renewable Energy Benefitting all Americans

Today, extensive data-based evidence, including that established by EERE's Low-Income Energy Affordability Data (LEAD) tool,² and analysis on U.S. census data illustrates that low-income communities are disproportionately affected by high energy burdens, which is often defined as greater than six percent of household income spent on electricity.³ Moreover, due to historical housing segregation that results in uneven distribution of quality housing stock, low-income African American families suffer disproportionately higher energy burdens.⁴ Households

¹ [Documenting a Decade of Cost Declines for PV Systems | News | NREL](#)

² <https://lead.openei.org/>

³ <https://www.aceee.org/sites/default/files/pdfs/u2006.pdf>

⁴ Diana Hernández, Yang Jiang, Daniel Carrión, Douglas Phillips & Yumiko Aratani (2016) Housing hardship and energy insecurity among native-born and immigrant low-income families with children in the United States, *Journal of Children and Poverty*, 22:2, 77-92, DOI: [10.1080/10796126.2016.1148672](https://doi.org/10.1080/10796126.2016.1148672)

in rural communities, specifically, have a higher median energy burden than urban households, and the disparities increase substantially for minority, elderly, and renting households.⁵ Finally, recent studies demonstrate a stark racial disparity in solar adoption rates. Majority Black and Latinx census tracts have significantly lower solar adoption rates than white majority census tracts, a phenomenon that is consistent even when controlling for home ownership and household income.⁶

We recognize that energy efficiency and renewable energy can and should play an increased role in reducing energy burden. If equitably deployed, energy efficiency and renewable energy technologies can deliver enormous benefits of broader economic development in low income and rural communities. Equitably deployed clean energy can also provide lifeline infrastructure to America's communities and drive local leadership and self-sufficiency.

These already disadvantaged communities, however, can experience challenges to accessing government programs due to complexities of applications and reporting mechanisms. For example, solar energy can help to reduce the energy burden of all households, but only 15% of solar adopters are low- and moderate income due to barriers in ownership, financing, and information access.

Through our work to ensure affordable, secure, and clean energy, EERE has a goal to reduce costs of these clean energy technologies and enable access for all Americans. At EERE, we've seen how carefully designed and specifically targeted programs can result in improved livelihoods for individuals and, at a high enough volume, local energy resilience and self-sufficiency. Several of our programs take a direct approach to supporting low-income and rural populations, and we collect stakeholder input to drive continuous improvement of those programs to deliver benefits to low-income and rural Americans. Below are some examples of DOE programs that work to address these communities.

Current Activities

Within the energy efficiency sector, EERE's Weatherization and Intergovernmental Programs Office (WIP) partners with state and local organizations to significantly accelerate the deployment of energy efficiency and renewable energy technologies and practices through place-based strategies that focus on the needs of local government, community, and business stakeholders. The Weatherization Assistance Program (WAP) is a foundational building block of DOE's vision for a clean energy future for all, delivering on its national objective to increase the energy efficiency of dwellings owned or occupied by low-income persons, reduce their total residential energy expenditures, and improve their health and safety. WAP activities reduce the cost of residential household energy bills, which are significantly disproportionately higher relative to higher-income households. Through the Sustainable Energy Resources for Consumers

⁵ <https://www.aceee.org/sites/default/files/publications/researchreports/u1806.pdf>

⁶ [Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity | Nature Sustainability.](#)

(SERC) Grant Program, funded as part of WAP appropriations, DOE has flexibility to focus awards specifically on renewable energy installations, allowing WAP to deliver on the Administration's priority of renewable technologies deployed in underserved communities. Historically, WAP programs in Puerto Rico and other territories have been successfully installing cost-effective solar hot water heating systems since the territories entered the Program in 2007. In recent years, photovoltaics have been approved for use in weatherization projects and installed in low-income homes in Colorado and Minnesota.

Another program within WIP, the State Energy Program (SEP), strategically engages the leadership of states in deploying clean energy technologies across the U.S. SEP funding transforms the energy economy state by state, establishing and implementing clean energy policies, plans, and programs to reduce energy costs, enhance economic competitiveness, improve emergency planning, and improve the environment. States have used SEP funding to support efforts to promote energy efficiency and renewable energy in rural and low-income communities. For example, recognizing that participation in the solar economy can help ease lack of access to many of the benefits other communities enjoy, the Michigan Department of Environment, Great Lakes, and Energy is utilizing SEP funds to work to develop a community solar program with the goal of providing access to all of Michigan's residents regardless of income. Currently in its pilot phase, it is anticipated that the initiative will initially support one solar project that will benefit approximately 25 low- to moderate-income households. Technical assistance and future funding opportunities will be provided to additional communities wishing to build or expand a community solar array. In addition, in Washington State, SEP funds are being used to support the Low-Income Community Solar Deployment Program. The most recent grant cycle offered funding to nine solar energy projects across the state that are expected to result in a total \$6.1 million reduction in the energy burden of low-income households and nonprofits serving low-income communities over 25 years.

WIP also manages the Remote Alaska Communities Energy Efficiency (RACEE) program, which is DOE's initiative to accelerate energy cost saving efforts in remote Alaska communities that face several unique energy challenges.

The combination of harsh climate with the remoteness of communities accessible only by boat or plane contributes to high energy costs. In 2015, 64 Alaska communities and villages pledged to reduce energy consumption by 15% by 2020. A subset of 13 communities were selected to receive technical assistance, and of those 13, seven are working on competitively selected RACEE implementation grants.

Within EERE's renewable power sector, the Solar Energy Technology Office's (SETO) has begun work on a number of fronts to create a more equitable clean energy future. This starts by addressing the barriers that low- and moderate-income households face in accessing the benefits of solar through community solar, innovations in financing, and data analysis. SETO's National Community Solar Partnership (NCSP) is a coalition of community solar stakeholders working to expand access to affordable community solar to every American household and enable communities to realize other benefits, such as increased resilience and workforce development. The NCSP provides stakeholders with the opportunity to network and collaborate with DOE and each other. NCSP partners also have access to technical assistance resources from DOE,

National Labs, and third-party subject-matter experts for support on unique local challenges. SETO issued a request for information on equitable access to community solar on May 4, 2021, which will help inform future action plans for NCSP.

SETO also funds a portfolio of projects that are evaluating alternative solar financing models for low-income consumers, developing new tools and methods to better assess credit risk, and engaging community financial institutions and other capital sources in expanding solar financing in low-income communities. In addition, SETO supports data collection and analysis to improve market transparency of solar adoption trends and analyze the data to understand the barriers to and solutions for increasing solar adoption by low- and moderate-income households.

SETO is also addressing barriers specific to rural communities. The Solar Energy Innovation Network (SEIN) program brings together multi-stakeholder teams to research solutions to real-world challenges associated with solar energy adoption, such as solar-plus-storage procurement and valuation for electric cooperatives, the use of solar-plus-storage to manage rural electric distribution systems, and strategies for siting solar in rural communities.

Our work extends beyond solar to other offices and technologies as well. For example, EERE's Water Power Technologies Office (WPTO) has several existing initiatives in its hydropower and marine energy subprograms designed specifically to use clean energy technologies to meet local energy needs and increase resilience. In hydropower, WPTO is analyzing the interactions of small hydropower and microgrids in a project in Cordova, AK that aims to enhance grid resilience under harsh weather, cyber-threats, and dynamic grid conditions, while reducing the need for diesel fuel.

Another important program focused on energy resilience in predominantly rural communities is the Energy Transitions Initiative Partnership Program (ETIPP). ETIPP, which is supported by both WPTO and SETO, supports energy system transformation to reduce economic risk in remote and islanded communities. Through ETIPP, EERE has leveraged the expertise of regional Community Based Organizations that work directly with communities to provide technical assistance, enhance lessons learned between communities and the national labs, and establish a technical understanding of gaps, needs, and pathways to serve communities in increasing their energy resilience. Working through these organizations also allows DOE's efforts to reach a scale that would not be possible with direct engagement alone.

Wind energy also has an important role in rural communities, especially when installed as a distributed energy resource (DER). Distributed wind can complement solar and reduce the energy burden of households, agricultural operations, and commercial, industrial, and municipal facilities. EERE's Wind Energy Technologies Office (WETO) is working with rural electric utilities and the communities they serve to make distributed wind plants more accessible and compatible with other DER technologies. For example, WETO's Wind Innovations for Rural Economic Development (WIRED) initiative supports the development of decision support tools for rural electric utilities to evaluate different combinations of wind-hybrid DER systems. Also

under WIRED, WETO is working with the National Rural Electric Cooperative Association, Electric Power Research Institute, and academic and industry partners to identify distributed wind use cases and ownership and business models that ease access to and maximize the benefits of distributed wind projects for rural communities.

Within the transportation sector, our Vehicle Technologies Office's (VTO) Technology Integration Program supports a broad technology portfolio that can reduce transportation energy costs for businesses and consumers. Among these projects are those aimed at ensuring access to mobility options for rural communities to make sure they are the beneficiaries of our electrification efforts. For example, our ROADMAP project is developing a set of potential technology solutions for electrification in rural areas, including the implementation of electric shuttle buses for a circulator route through Athens, OH. The project also incorporates outreach to local transportation service providers, such as taxi and shuttle fleets, to encourage the adoption of electric vehicles in these fleets. These efforts are supplemented by the deployment of electric vehicle (EV) charging in the city of Athens to support more widespread electrification. Ensuring equitable access to charging for rural communities will require coordination with utilities on electric service capacity and demand charges, as well as investments in distributed energy resources.

Our country can ensure equitable access to EV charging for residents who do not currently have access to charging at home by investing in workplace charging, curbside charging, and public-access locations, such as transportation hubs, commercial destinations, libraries, and government buildings. We can also address existing barriers to installing EV charging for residents of multi-family housing through innovative charging and management technology, outreach, and education efforts targeting developers and property managers, and finance models.

Future Focused Approach

We know that while these individual programs can, and do, affect the lives of low-income and rural Americans, transformative change is required to establish an equitable transition to a clean energy economy. Individual programs operating in isolation is not enough; instead we need to work holistically through coordinated programs to address national goals that meet communities on their terms and in the context of their priorities.

This is why the Department recently established a new office within the Office of Economic Impact and Diversity led by the Deputy Director for Energy Justice. That office will focus primarily on energy justice issues, including the reduction of energy burden, increasing clean technology adoption in underserved census tracts, increasing access to capital among underserved populations, and creating new jobs and businesses in underserved communities. EERE leadership and program offices currently work closely with this new office to advance the Administration's climate and energy priorities.

As we implement these priorities, we are taking a two-pronged approach: the first is to design new specific, targeted programs focused on ensuring an equitable transition; and the second is to make sure we incorporate equity considerations throughout the entire DOE portfolio and the energy sector at large. For the first, we are intentionally including low-income and rural communities in our approach of meeting communities based on their needs to support long-term,

lasting deployment of clean energy. This includes working across programs to identify common goals, while respecting individual program RDD&D priorities. Two of our new programs proposed in the President's FY22 Budget Request focused on energy communities include our Local Government Clean Energy Workforce Program. This program is focused on fostering a community-driven approach to partner with small and medium-sized communities. This program will leverage existing tools and resources to help identify and achieve local goals, which could include economic development, energy security, and resilience. The program also helps communities' network and share best practices, which will provide them with long-term benefits.

Another example is Community Geothermal, a proposed initiative that will fund technical assistance to demonstrate and deploy community-scale geothermal district energy systems through installation of geothermal heat pumps or direct use of geothermal fluids for heating and cooling. This program is designed to increase communities' energy resilience and reduce or eliminate their dependence on fossil fuels, and geothermal district energy systems can be applied to urban centers, rural areas, and remote communities. With geothermal deployment, we also plan to prioritize disadvantaged communities to combat "fuel poverty" caused by disproportionately high fuel costs from fossil sources like heating oil and natural gas. By demonstrating this renewable energy solution in a geographically and socioeconomically diverse set of communities, DOE will show that geothermal energy is a proven mechanism to provide safe, clean, and resilient sources of thermal energy.

Equally important is providing opportunities for the existing workforce and facilities in American communities, in particular those transitioning from an economy driven largely by fossil fuels. This includes demonstrating the viability and value of alternative economic development pathways in clean energy, which is the mission of the proposed Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE) Consortium. GEODE is a new consortium designed to leverage oil and gas subsurface assets, technologies, and expertise to help solve geothermal energy's toughest challenges while providing clean energy employment opportunities and environmental benefits for communities adversely impacted by the transition away from fossil energy. GEODE will accelerate decarbonization of the electric sector via technology development, demonstration, and workforce transition. GEODE includes a major workforce development initiative to transition displaced oil and gas technologists into the geothermal industry. These efforts will build off the successful Geothermal Collegiate Competitions, which was established in 2014. This initiative has long valued not only our energy leaders of tomorrow by awarding cash prizes for student work, but also meeting communities where they are, and emphasizing stakeholder engagement and early community buy-in. Just this month, EERE was proud to announce that the first place winner for this semester's competition went to the University of North Dakota, which after working closely with the community proposed a district heating system for the small town of Mandaree on MHA Nation lands.

As part of the second prong of our approach, we are looking critically at all our programs and processes to assess the equity implications and ensure equity impacts are considered in the development of future research, technologies, and internal processes. One major element of this includes reducing barriers to entry for low-income and rural communities in accessing DOE funding and assistance. We are stepping up efforts on stakeholder engagement to inform the

development of project research portfolios so that our research results in technologies that meet the needs of low-income and rural communities. Understanding the needs of communities is critical to improving overall programming and increasing access to the broad array of programs that EERE implements across the research, development, demonstration, and deployment portfolios. In addition, we are looking at the structure of *how* we receive that feedback. We are working across the EERE portfolio to make sure we expand opportunities for feedback and that participants are adequately valuing stakeholders for their input to program design. In addition, across EERE programs, we are working to approach communities and share findings internally, where appropriate, to reduce the burden of input in already overburdened communities. Finally, we are also increasing the frequency and approaches to how we are reporting out to community stakeholders how the input is used.

We are diversifying the outcomes of our funding opportunities by working to reduce barriers to entry through our primary funding mechanism, the funding opportunity announcement (FOA). We are aiming to find diversity in projects and project teams so that the diversity of voices that receive EERE funding reflects the makeup of the population. We are working to right size barriers to entry for low-income and rural communities, such as critically evaluating cost share provisions and increasing training on how to apply for funds. We are improving the types of funding opportunities beyond FOAs, including prize authority and other funding authorities, to create an ecosystem of funding that is easier to access for a wider variety of potential applicants.

Earlier this month, EERE, in coordination with the Office of Economic Impact and Diversity (ED), released a request for information (RFI) to understand the current barriers and actions needed to make its funding opportunities and innovation and entrepreneurship activities more inclusive, just, and equitable, in line with the Administration's climate goals. This RFI is intended to inform EERE and ED on enabling an inclusive and just entrepreneurial and innovation ecosystem for climate and energy technology research. The responses to the RFI will help DOE understand barriers to entry to its funding opportunities, current resources, and support for innovation and entrepreneurial activities, experiences of those who have received funding or assistance, and resources and approaches that DOE can provide and implement towards removing these barriers. DOE will leverage the responses to this RFI to inform future funding opportunities, assistance for grant application support services, incubation and acceleration services for entrepreneurship, and/or develop other measures to support a just and inclusive innovation ecosystem.

The President's FY22 Budget Request calls for a *Next-Generation Connected Communities* in which EERE will competitively fund a new cohort of multi-building and community-level pilots focused on scaling highly efficient building solutions that support renewables integration and provide demand flexibility and efficiency. Even more than the current Connected Communities demonstrations, this new cohort will ensure that lower-income and disadvantaged communities and existing buildings are adequately represented.

We recognize that there is a lot to still be done, and we are actively looking to identify areas where we can expand the impact of the work of these programs. Going forward, we will need to do even more to address the barriers to adoption of renewable energy in low-income and rural

communities. We need to redouble our efforts to take a research, development, demonstration, and deployment portfolio approach—in which equitable demonstrations and deployments can address immediate community and economic development needs—and we can apply what we learn from communities involved in those efforts to improve the equity of longer-term research and development efforts.

Conclusion

Thank you for the opportunity to appear before the subcommittee today. I look forward to working with you to address the climate crisis while ensuring equitable access to low-cost and reliable clean energy. I look forward to your questions.