Union of Concerned Scientists

POLICY BRIEF

How to Ensure Energy Storage Policies Are Equitable

HIGHLIGHTS

Energy storage is playing an increasingly critical role in accommodating high levels of renewable electricity generation. The ability to store energy and use it when it's needed the most allows the grid to operate more flexibly, while also reducing demand for electricity from dirty, inefficient fossil fuel power plants that harm local communities.

In December 2018, the Union of Concerned Scientists convened a diverse group of stakeholders who developed consensus principles of equitable policy design for energy storage. The participants envisioned these principles as guideposts for policymakers seeking to deploy energy storage in a way that puts communities' needs and interests first. This policy brief examines storage and equity policies in leading states and offers recommendations for policymakers in designing equitable energy storage policies.

The Union of Concerned Scientists (UCS) advocates for a just and equitable transition to a clean energy economy, prioritizing frontline, fenceline, and fossil-dependent workers and communities. Frontline communities bear the brunt of climate change impacts and often have the least amount of resources to adapt or move out of harm's way (USGCRP 2018). Fenceline communities live near power plants or other industrial facilities and bear the greatest burden of pollution impacts (Makati et al. 2018; USEPA 2015). And record coal plant retirements are creating severe economic challenges for workers and their communities (Gimon et al. 2019; Richardson, Gomberg, and McNamara 2017). This policy brief explores how one emerging technology—energy storage—can be deployed in a just and equitable way. Considering the equity implications of policies when setting targets for storage deployment and designing incentives, and in utility planning proceedings, can contribute significantly to building a clean energy economy that works for everyone (UCS 2019).

Background

With the potential to fundamentally change the way we generate and use energy, the widespread deployment of energy storage represents the dawn of a new era for the electricity grid (UCS 2018). The term "energy storage" refers to multiple technologies, ranging from mechanical to thermal to electrochemical, that can save, store, and discharge energy when it is needed (Zablocki 2019). Energy storage is not new—pumped hydroelectric storage was first used in the 1920s and today still represents, by far, the most installed storage capacity in the United States (ESA n.d.a.).

InsideEVs

Well-designed policies can ensure that energy storage projects drive direct benefits to local communities, such as reduced pollution from power plants, lower electricity bills, and fewer power outages.

However, lithium-ion battery costs have fallen 73 percent since 2013 (SEPA 2019), leading to a proliferation of new storage projects, and that growth is set to increase dramatically. Analysts project annual US energy storage installations will double from 311 megawatts (MW) in 2018 to 647 MW in 2019, and increase to 4,500 MW by 2024, representing $4.8 billion in market investments (Wood Mackenzie and ESA 2019).

Industry and advocacy groups have published a wealth of information about how storage technologies work and what barriers exist to greater adoption (ESA 2017; Stanfield, Petta, and Baldwin Auck 2017). These barriers involve how storage is classified as an asset and who can own it, how it is or is not included in utility planning processes, whether it has equal access to grid interconnection, and how it is valued in the market (Stanfield, Petta, and Baldwin Auck 2017). This policy brief highlights a few applications for energy storage that can benefit underserved communities (Box 1) directly and offers recommendations on what policymakers can do to prioritize those investments.

The Opportunity: Why Consider Equity

Policymakers are beginning to see the potential for storage to help achieve ambitious clean energy goals to address climate change. Storage can score multiple wins, including reductions in climate-warming emissions, flexibility in grid operations and other reliability services, improvement in public health and air quality, community resilience, and reduction in expensive demand charges. The imminent rapid growth in battery storage represents an opportunity to incorporate equity into policy design at the outset, prioritizing storage applications that directly benefit communities.

[With foresight and proper policy design, storage can improve and directly benefit frontline and fenceline communities.]

With foresight and proper policy design, storage can improve and directly benefit frontline and fenceline communities beyond accommodating high levels of renewable energy on the grid and therefore driving reductions in global warming emissions. How? First, storage can improve public health outcomes by replacing both baseload fossil fuel power plants and dirty peaking power plants, or "peakers" (Collingsworth et al. 2018). Peakers are relatively inefficient and used infrequently during times of high electricity demand, and emissions from peakers directly harm local air quality (Milford et al. 2018). In addition, peakers are most often sited in disadvantaged communities and used on days when air quality is already poor (Mullendore 2016). But batteries, when charged with much cleaner energy sources, can provide the same grid services as a peaker plant without the associated

BOX 1.

The Importance of Defining Underserved Communities

As policymakers integrate equity issues into storage and clean energy policies more broadly, they will need to confront the problem of how to address injustices facing underserved communities. Depending on the context, "underserved" can be understood as one or more of the following: environmental justice, minority, low-income, disadvantaged, indigenous, vulnerable, frontline, fenceline, economically distressed, or coal impacted. Or the term can refer to dislocated workers in the transition away from fossil fuels. Thus, it is important that legislators are specific about the communities they aim to reach—or at least provide guidance to program administrators.

In defining what counts as underserved for the purposes of funding and developing projects, stakeholder input is critical. Engaging with the populations that the policies aim to reach, and seeking input from developers to ensure that the definitions are not too restrictive, will lead to workable and impactful definitions. Stakeholder engagement will also help ensure the alignment of programs and incentives designed to reach different populations (e.g., low-income and minority communities) and their intended benefits (e.g., job creation, lower bills, reduced pollution).

Policymakers can build on existing definitions and resources in their states, such as the California Communities Environmental Health Screening Tool (OEHHA n.d.), which uses census data to identify California communities that are disproportionately burdened by and vulnerable to multiple sources of pollution. Another example is the "One Maryland" designation (MDC n.d.), referring to places that have been prioritized for development and investment through tax credits to businesses that locate there.

emissions. Further, today, batteries can compete with peaker plants economically in many cases (Denholm, Diakov, and Margolis 2015; Wisland 2018; Wood Mackenzie 2018; Denholm et al. 2019), because they avoid peaker start-up costs and provide additional services to the grid.

Second, storage can help reduce expensive demand charges—fees imposed by utilities on commercial customers based on peak usage, regardless of how much total electricity they use. Community facilities and affordable housing owners often pay the same rates as commercial customers. Battery storage that is discharged at times of high on-site electricity demand can lower peak usage and, therefore, reduce costly demand charges (Milford et al. 2018). These savings directly reduce the operating costs of community-serving facilities, and in affordable housing, the savings could be passed along to low-income residents who stand to benefit the most.

Storage also offers the opportunity to generate revenue by providing grid services—such as frequency regulation, capacity, and demand response, all of which could translate into local wealth creation for community-owned projects.

Third, storage can improve the resiliency of communities by keeping essential services—such as police, fire and rescue, and community shelters—powered during and after storms or disasters. Hurricane Maria devasted the island of Puerto Rico in 2017 and left much of the island without power for months (Alvarez 2017). Recent hurricanes that struck Texas and Florida, as well as Hurricane Sandy, have exposed the vulnerabilities of the grid and existing backup power sources, such as diesel generators (McNamara et al. 2015; Milford et al. 2018). Critical facilities, such as hospitals and emergency shelters, can be powered by battery storage and clean energy microgrids during and following disasters, to facilitate rescue efforts and keep residents safe.

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Many communities are located near power plants and bear the greatest burden of pollution impacts. Energy storage can improve air quality in these communities by reducing demand for electricity from conventional power plants.

> ***Well-designed policies that bring storage into communities can reduce local air pollution, expensive demand charges, and power outages.***

All three of these benefits depend on how and where storage is deployed. Intentionally designing policies that bring storage into communities can reduce local air pollution, demand charges, and outages. Communities can potentially realize these benefits even when storage projects are sited outside of the community, but the project details matter. Storage projects can also offer opportunities for community economic development, workforce training, and local jobs.

Community stakeholders often ask questions about the potential risks of energy storage, emphasizing the need for adequate and timely information. Although such incidents are rare in the United States, some battery storage systems can potentially catch fire and threaten property and firefighters, underscoring the need for trained installers and operators. Another potential concern surrounds the sustainability of batteries and end-of-life recycling (Box 2, p. 4).

Policymakers should carefully consider the intended drivers and outcomes of greater storage deployment, to determine the most effective set of policies and ensure those policies are aligned with other incentives for clean energy in underserved communities. By focusing on direct benefits to underserved communities, policymakers can accelerate the transition to a clean energy economy and prime community leaders and advocates as powerful new allies for storage deployment.

Making Storage Policy Equitable

Storage deployment policies range in both the type of policy mechanism and the level of ambition. Unfortunately, with a few notable exceptions, policymakers have not yet given enough thought to the equity implications of storage policy.

TARGETS

Some of the more high-profile actions on storage policy have come from state policymakers who have simply set a target for storage deployment by a certain date and required utilities to meet it. Such binding requirements are also called

BOX 2.

Sustainability of Battery Storage Systems

Battery storage can employ different chemistries, such as lead-acid (e.g., those in most conventional passenger vehicles) or lithium-ion (e.g., the batteries in most cell phones, electronics, and electric vehicles). Most new and proposed energy storage projects use lithium-ion battery technology. Cobalt, a key component of many lithium-ion batteries, is a rare-earth element that primarily comes from the Democratic Republic of the Congo, which produced two-thirds of the world's supply in 2017 (King 2018). Mining cobalt can come at a tremendous human cost in a country with poor labor safeguards, such as the Congo (Frankel 2016). However, some lithium-ion batteries do not require cobalt, and other technologies for battery storage do not require rare-earth metals at all.

Questions often arise about the sustainability of battery storage systems, specifically the sourcing of rare materials from places with poor labor practices, the safety and security of battery systems, and the recycling of batteries once the system is decommissioned. The storage industry should recognize and acknowledge these concerns; project developers would be well served by directly addressing sustainability questions early, before battery storage systems are deployed widely, and by developing recycling processes to ensure safe disposal—which can lead to new businesses and job creation.

In early 2019, the Energy Storage Association launched its voluntary Corporate Responsibility Initiative (ESA n.d.b.)—signatories will support a task force to evaluate supply chain issues and end-of-life recycling. Finally, one potential policy model comes from Washington State, which required solar manufacturers selling products in the state to provide consumers with a convenient and environmentally sound way to recycle solar panels (Washington State Legislature 2017).

procurement targets, and at present, four states (California, New Jersey, New York, and Oregon) have established them, with a few other states considering such actions or establishing goals to do so (e.g., Massachusetts).

Key considerations in setting a storage target include whether the procurement target provides a long-term policy signal, whether it is binding, what technologies qualify, and whether it ensures a competitive framework with multiple applications and ownership structures (Cramer 2017). To consider equity, policymakers can include carve-outs or set-asides specifying that some portion of the target should be met with projects that are designed to benefit underserved communities directly through reduced air pollution or improved resiliency. Cost containment mechanisms, cost recovery restrictions, and a competitive procurement process are additional requirements that can be incorporated into procurement targets to ensure that storage projects minimize costs to ratepayers and do not unduly burden low-income customers, while maximizing societal benefits.

INCENTIVES

Policymakers can also establish incentive programs that make it more affordable for utilities and consumers—especially businesses, churches, low-income households, multifamily affordable housing, and schools in underserved communities—to invest in storage, or that stimulate project developers to find new market opportunities for storage. One such incentive program, the federal investment tax credit (ITC), has been a major driver of solar deployment over the past decade. Although storage currently qualifies for the federal ITC only when paired with solar projects, there are congressional proposals to extend the ITC to all storage projects.

Equity can be explicitly included in tax policy, for example, by increasing the amount of the tax credit for projects in underserved communities. However, tax credits are somewhat limited in terms of their ability to drive equitable outcomes, simply because developers or owners with limited or no tax liability would not be able to take advantage of the credit, potentially excluding low-income households, Native American tribes, and institutions (such as nonprofits and churches) that pay no taxes. To address these limitations, policymakers should make the tax credit refundable. Grants and rebates for the installation of battery storage systems could also reach households and developers in underserved communities and prioritize desired applications or outcomes, such as community resilience.

Another form of incentive comes from storage eligibility in the renewable electricity standard (RES). An RES is a market-based mechanism requiring retail electricity providers to increase the amount of renewable energy in power supplies over time (Deyette 2016). Thanks to adoption by 29 states, Puerto Rico, and the District of Columbia, the RES has become a primary driver of renewable energy development in the United States (Wiser et al. 2016). Although RES policies represent minimum requirements, energy storage can be incentivized through this policy through eligibility for compliance—that is, providers could install storage to earn renewable electricity credits. Storage could be further incentivized through credit multipliers, or adders, tied to developing projects in underserved communities. Importantly, inclusion of storage as an eligible technology must be restricted, to prevent the double counting of renewable energy generation for compliance purposes, since storage can both discharge and store electricity (Holt and Olinsky-Paul 2014).

In addition, Massachusetts has enacted a novel Clean Peak Standard (Massachusetts General Court 2018). The standard is intended to incentivize technologies, such as energy storage, that can supply electricity or reduce demand during peak demand periods.

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Energy storage can eliminate the need for electricity from dirty, inefficient "peaker" plants, such as this one in Maryland, by saving electricity—ideally from clean energy sources—and discharging it when it's needed most.

UTILITY PLANNING AND IMPLEMENTATION

Public service commissioners can play an important role in the equitable deployment of energy storage, including through oversight of utility long-term plans and investments. Storage faces barriers to adoption that are attributable, in part, to existing market rules and the presence of multiple options for how to define storage assets, how to use storage, and how to value and capture the myriad benefits of deploying storage. Other resources offer more comprehensive summaries of market rules and regulations that need to be implemented to ensure that storage can compete with other resources (ESA 2017; Stanfield, Petta, and Baldwin Auck 2017). This section highlights just a few issues on which legislators can and should offer better guidance to regulators on how to achieve equitable outcomes and ensure that communities have a voice in the process of siting storage projects.

In 25 states, regulated utilities are required to submit integrated resource plans (IRPs) to justify future investments in power supplies and infrastructure. In many states, utility commissions must approve these plans, but none of them specifically require regulators to address equity. At a minimum, IRPs should consider storage as a resource and ensure that the services storage offers are included and valued in the analysis (ESA 2017). In addition, to help ensure equitable outcomes, utilities should be required to evaluate storage in specific applications—including as a potential replacement for peakers and other fossil fuel power plants—to avoid costly transmission and distribution infrastructure development and upgrades, and to understand local resource needs. Regulators are typically required to consider only cost and reliability, so legislation would be needed to require regulators and utilities specifically to evaluate these additional aspects of storage deployment.

Some policies have included requirements for cost-benefit studies to evaluate storage potential and pilot projects, to demonstrate the technology in selected applications or when using different ownership models. The provisions offer opportunities to require equity considerations. Several states, including Maryland, Massachusetts, and North Carolina, have required cost-benefit studies for storage potential. Such studies should explicitly evaluate the potential for deploying storage in underserved communities and quantify the economic, environmental, and resilience benefits of storage. Similarly, at least a portion of pilot projects should be required to deliver benefits to underserved communities. In both cases, processes to assess these questions or develop projects must include comprehensive and transparent stakeholder engagement and targeted outreach to affected communities.

Regulators can also consider how the deployment and dispatch of energy storage technologies can optimize public health benefits. Evaluating where the new energy resources should be located, as well as when they are used, can reduce pollution in underserved communities, particularly by avoiding the use of peakers (Krieger, Casey, and Shonkoff 2016). Importantly, utilities should be required to conduct open solicitations to meet proposed resource needs—which can allow for different ownership models, enabling distributed resources such as storage to qualify. Utilities should also have to include criteria that provide extra value for locating projects in underserved communities that have a high pollution burden or for engaging in projects that will reduce pollution in those communities, regardless of where the project is located.

State Actions

In practice, many states have combined one or more policy instruments to spur storage development. This section offers some recent examples of what states are doing on storage and how to highlight the needs of and benefits to vulnerable communities. However, this section is not intended to be exhaustive.*

Only two states—California and New York—have established broad clean energy policies aimed at addressing equity issues.

California has long been a clean energy leader. Thanks to growing pressure from environmental justice leaders and their allies, the state has been among the first to develop policies aimed at addressing the cumulative impacts of pollution in disadvantaged communities and driving clean energy investments there. California was the first to adopt an energy storage target in 2010 and has subsequently increased the target to 1,325 MW by 2020, with an additional requirement of 500 MW of distributed (behind-the-meter) storage aimed at serving the public sector and low-income customers.

Separately, California also drives storage deployment through the Self-Generation Incentive Program (SGIP) for distributed energy resources (CPUC n.d.). The program includes an equity component that directs 25 percent of funding for distributed energy storage toward "low income households and environmentally burdened communities throughout the state" (CPUC 2017). The total value of the SGIP Equity Budget is about $70 million, but it remains untouched in large part due to a difficult application process and lack of outreach and education about the program (DACAG 2019).

In addition to correcting these program design barriers, advocates recommend increasing the level of the incentive, to drive investments in low-income communities; improving pairing with low-income solar programs; and considering an additional incentive to stimulate projects in low-income areas that are particularly susceptible to climate change impacts, such as wildfires (DACAG 2019; Mango and Shapiro 2019). The California Public Utilities Commission adopted a rule that nearly doubles the energy storage incentive level for low-income projects, includes tribal communities, and increases awareness of the program through education and outreach (CPUC 2019). It also establishes a first-of-its-kind equity resilience program to prioritize storage for those facing a high risk of power outage from wildfires (CPUC 2019; Mullendore 2019).

Clean Energy Group

Massachusetts is one of several states that have implemented policies to spur energy storage development. Above, the state's first utility-scale energy storage facility in Sterling, which stores electricity from a nearby solar array.

In 2019, New York passed an ambitious economy-wide climate law, which, for the electricity sector, requires 70 percent renewable energy by 2030 and 100 percent carbon-free electricity by 2040. Broadly, the law specifies that 35 percent of clean energy revenue should flow to underserved communities, but it is vague on the source of that revenue. Advocates also note that careful planning is needed to chart a pathway for the state to meet these ambitious goals (Storrow 2019). The law sets a procurement target for energy storage of 3,000 MW by 2030 and directs the public service commission to specify the minimum fraction of storage projects that should deliver benefits to underserved communities. It mandates that storage be deployed to displace polluting peaker plants (NY-BEST 2019). Implementation of these provisions will be critical to ensuring successful outcomes, as will vigilance and engagement from affected communities.

Smaller-scale storage policies with a focus on equity have been enacted in a few states and territories, representing opportunities for learning, strengthening, and expanding the suite of policies:

- Massachusetts offers a few programs that aim to prioritize clean energy in underserved communities. One is the Solar Massachusetts Renewable Target (SMART n.d.) program, which includes an energy storage adder and incentives for projects in low-income neighborhoods (Knight et al. 2018). Unfortunately, as of March 2019, only 2.3 percent of capacity in submitted applications is eligible for the low-income incentive, because of the insufficient level of the incentive, the inability of

* *Some resources track recent developments in state policies related to clean energy, including the Database of State Incentives for Renewables and Efficiency* (www.dsireusa.org) *and the State Policy Opportunity Tracker* (www.spotforcleanenergy.org).

- developers to identify low-income customers because the data determining who qualifies are confidential, and difficulty securing financing for such projects (Shemkus 2019). The Massachusetts Community Clean Energy Resiliency Initiative has granted $40 million to support resiliency in critical facilities—such as shelters, hospitals, and wastewater treatment plants—some of which have included clean energy microgrids and solar with storage (MASS n.d.).
- Puerto Rico, as part of Community Development Block Grants for disaster recovery, has received approval to direct $436 million to its Home Emergency Resilience Program (PR 2018), which would support solar and storage installations (Milford 2018).
- Maryland is currently the only state that has adopted its own ITC for storage, which has driven modest investments in residential systems in the past two years. Lack of availability of the tax credit for third-party ownership has hampered development (Gerdes 2019), and there are no additional incentives to drive investments in underserved communities. However, in fiscal year 2019, the Maryland Energy Administration offered $5 million through its Resiliency Hub program for solar and storage projects in low- and moderate-income neighborhoods, to support residents during power outages.

Connecting Storage to Broader Economic Development

As communities transition away from fossil fuels, advance notice and planning are critical to foster other sustainable forms of economic development, retrain workers, and revitalize communities—efforts that should be driven by people who live and work in these areas. Although the closure of large, aging power plants improves local air quality, these facilities often employ hundreds of workers and support the local tax base. To address the economic fallout from these closures, policymakers could establish economic development zones around existing fossil-fired power plants to accelerate the transition to clean energy. These zones could include incentives or requirements to replace fossil generation with storage and combine such strategies with renewables and efficiency measures to support ambitious clean energy goals. Such zones could constitute more targeted versions of the federal Opportunity Zones, economically distressed communities where qualified new investments can receive tax breaks (IRS 2019).

As part of local economic development efforts, clean energy policies should emphasize hiring local, qualified installers; encourage the use of project labor agreements, where possible, to ensure fair wages and benefits; and support worker training programs. Careers in the storage industry reach beyond installers; operation of battery storage will require software developers and programmers, for example. Additionally, more jobs can be created through weatherizing and installing energy efficiency measures in homes and businesses than can be created through the installation and on-site operation of a battery storage system. Policymakers should consider the job creation potential of continued growth in the clean energy economy more broadly, with specific intention to ensure that underserved communities have access to training, career development, and job opportunities—for example, through a community benefit agreement that creates opportunities for local workers, outlines the project's contribution to the community, and holds developers accountable.

Shawn O'Connor/Getty Images

The clean energy boom has already generated hundreds of thousands of new jobs in installation, operations, and maintenance. As this trend accelerates, policymakers should ensure these jobs are high-quality, with family-sustaining wages.

Recommendations

Energy storage has the potential to drive direct benefits to underserved communities, but these outcomes will not happen automatically. Even when legislatures do enact laws to deploy storage equitably, implementation can have a big impact on the desired outcomes. To accelerate the transition to clean energy, and to do so in a way that directly benefits underserved communities in meaningful ways, UCS offers the following recommendations for energy storage policies.

Legislators should

- Design energy storage policies around specific community-centered outcomes, prioritizing storage projects that replace fossil fuel peakers and reduce harmful emissions, improve community resilience, lower energy bill burdens for low-income customers, and help support community wealth generation;
- Combine different policy mechanisms to achieve stated outcomes—including carve-outs, incentives, and financing mechanisms aimed at ensuring that underserved communities share in the benefits of storage deployment—and ensure these policies are aligned with other clean energy incentives for those communities;
- Combine storage deployment policies with ambitious targets for renewable energy and energy efficiency, and other policies to reduce emissions that drive climate change;
- Develop broad policies around and identify funding streams for economic development, workforce training, and education in underserved communities;
- Encourage the use of project labor agreements and community benefit agreements;
- Encourage or require manufacturers to develop end-of-life recycling programs and decommissioning protocols, especially for hazardous materials;
- Provide guidance to regulators for considering the equity dimensions of storage in utility planning and implementation; and
- Learn from what other states have done (especially in the context of program design and implementation) and build on the results from cost-benefit studies from other states (especially those that account for benefits that are difficult to monetize, such as resiliency).

Regulators should

- Require utilities to consider energy storage and to evaluate equitable outcomes in their long-term plans;
- Ensure comprehensive and transparent stakeholder engagement and targeted outreach, information, and education for underserved communities, along with dedicated funding for community-based organizations to support such efforts;
- Reduce barriers to participation in programs intended to benefit underserved communities;
- Ensure conformity with state and national fire safety guidance and requirements, and ensure the hiring of trained professionals for the installation and operation of battery storage projects; and
- Ensure that all consumers benefit from storage projects, emphasizing benefits to low-income consumers and enabling community ownership of projects.

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