Energy Storage as an Equity Asset Panel

This panel will discuss how deployment of energy storage can respond to local environmental and health concerns and community needs

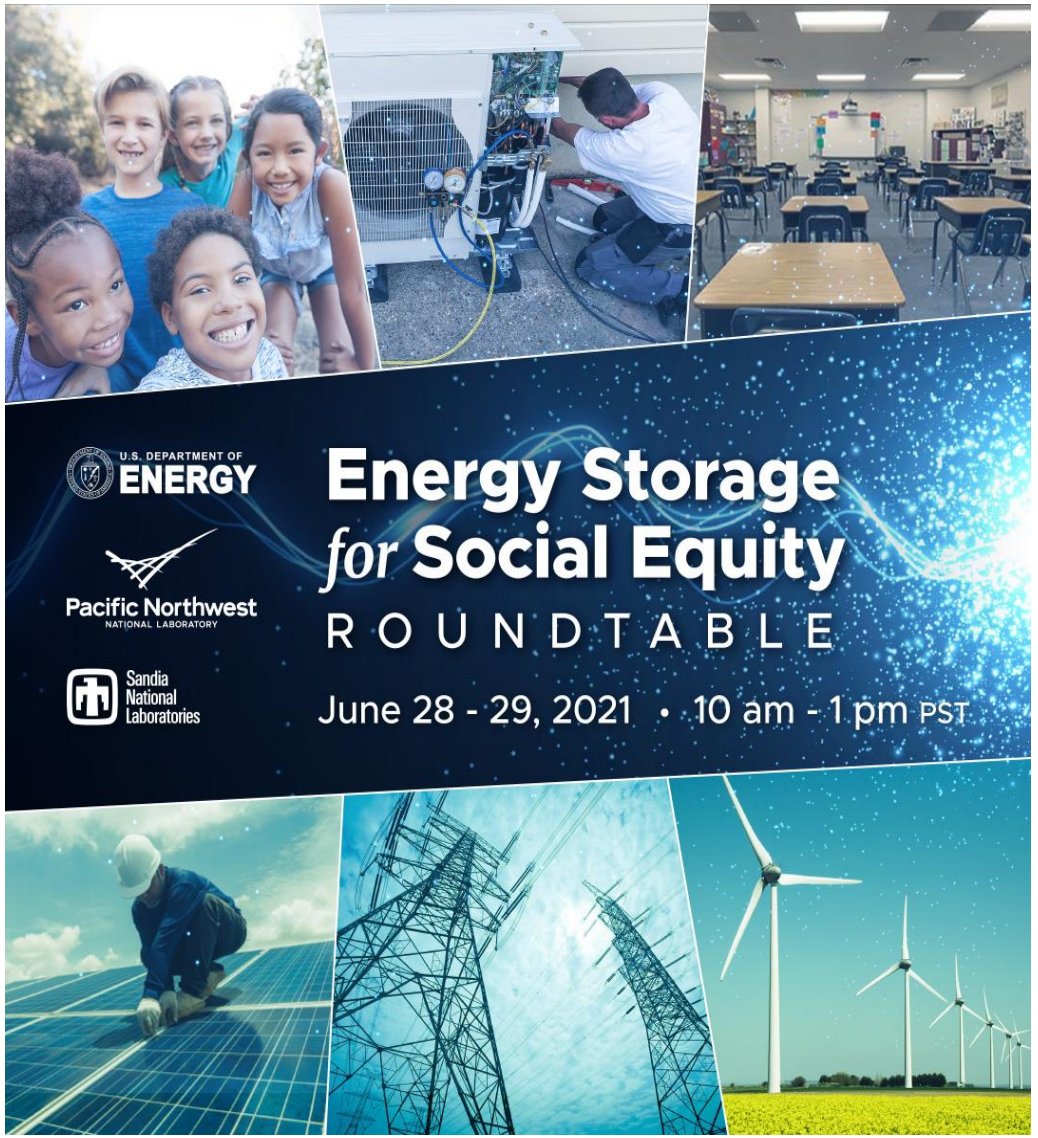
Discussion outcomes:

- Energy storage as an equity asset – priorities

Moderator: Bethel Tarekegne, PNNL

Participants:

- Julia Prochnik, LDESAC
- Jeremy Richardson, Union of Concerned Scientists
- Elena Krieger, PSE Healthy Energy
- Abbe Ramanan, CESA

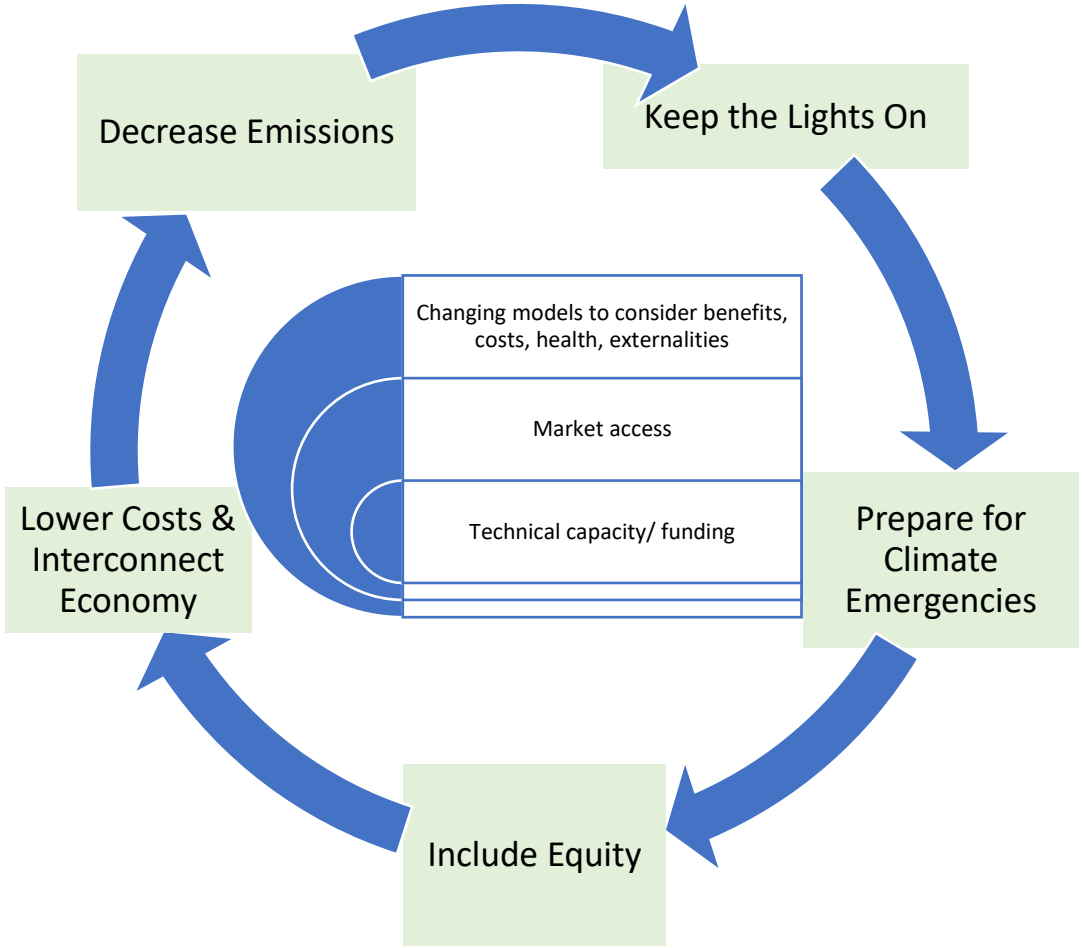


LONG DURATION ENERGY STORAGE ASSOCIATION OF CALIFORNIA

Long Duration Energy Storage

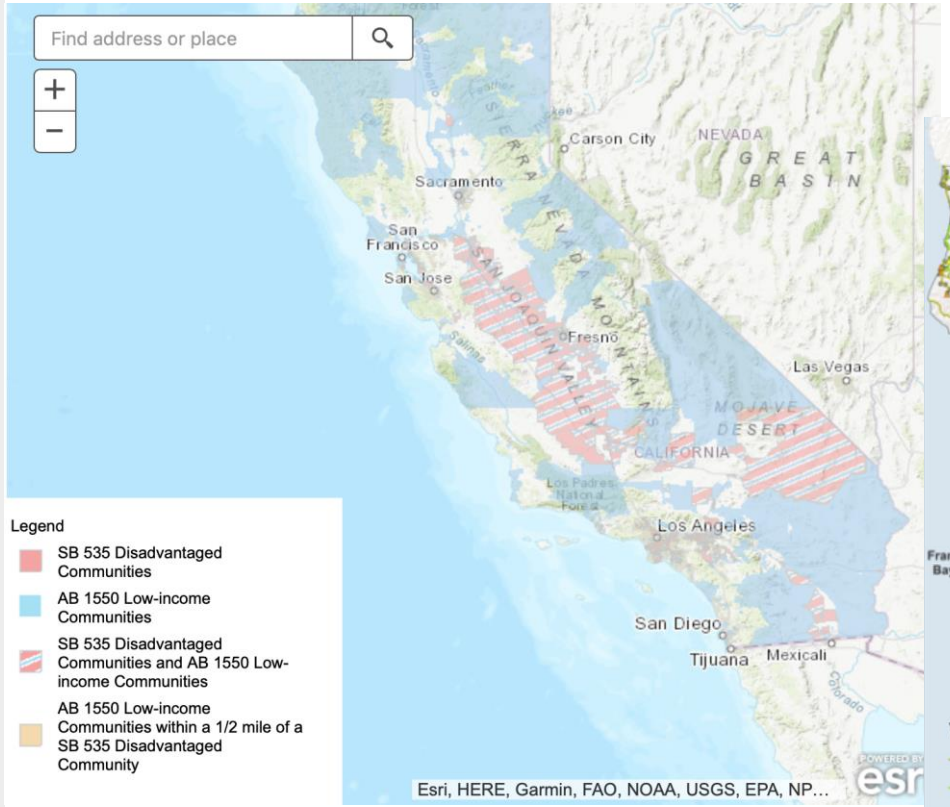
All types promote renewable energy generation and manage surplus energy (change loss is less than 1%)

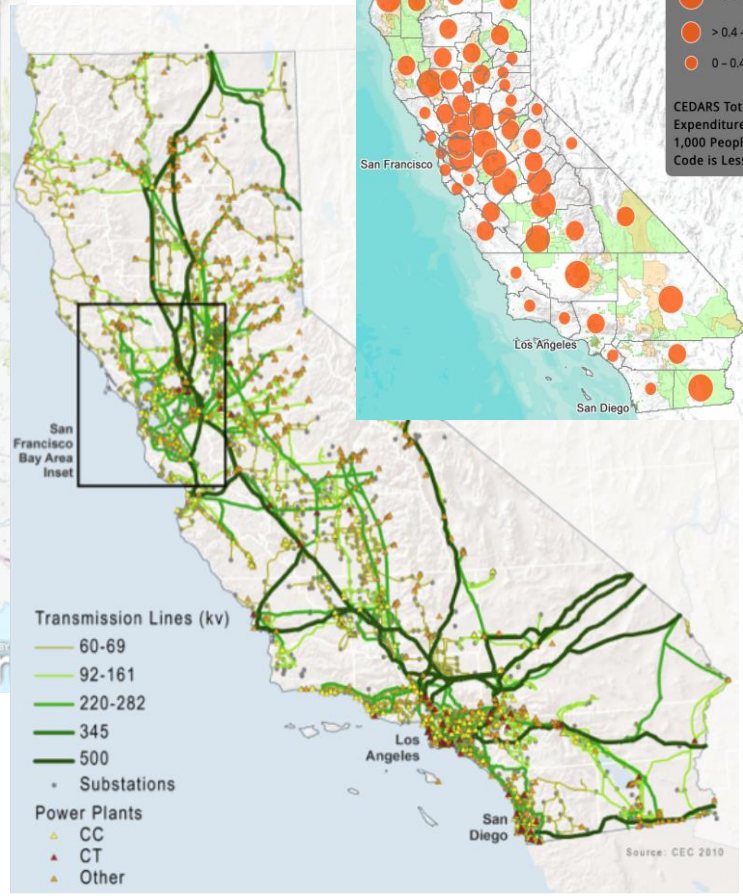
Technology Type	Capacity	Avg. Duration	Avg. Life Cycle	Ancillary Services	Resource Attributes	Avg. Deployment Stage
Thermal Battery	200kWe & up	6-20hrs	30 yrs	Grid stabilization, ESS incl. frequency control, spinning reserves, rate arbitrage	No georgraphical constraints, scalable, close load following, no degradation	Market ready
Gravity	40kW-8MW	5-24hrs	30 yrs	Resource adequacy, spinning reserve, sub-second response time (but not well suited for freqency response)	Scableable, distributed, reuse infrastructure, zero self-discharge	Pilot
Zinc Batteries	1-10MW	10 hrs	30 yrs	Frequency control	High energy density, 2% discharge rate	Pilot
Flow Battery	1-20MW	10-24hrs	25 yrs	Frequency control	Scalable, power sizing	Deployed in market
Flywheel	5-25MW	10-24hrs	35 yrs	Rotational energy, fast response time	Instant start and load following	Deployed in market
Green Hydrogen	1-100MW	10-100hrs	*20 yrs*	Discharge time, response time	Refuel and recharge	Commerical
Liquid Air	25-150MW	8 - 24 hrs	50 yrs	Synchronous inertia, frequency control, reserves, voltage support, black start capability	No georgraphical constraints, high energy density, no degradtion	Commerical
Concentrating Solar Thermal	50-250MW	10-24 hrs	75 yrs	Synchronous generation thus provides spinning reserve, frequency regulation, fast ramping and other ancillary services	High conversion efficiencies	Commerical, deployed in market
Compressed Air	300MW	10 hrs	50 yrs	Regulation service-up, regulation service-down, responsive reserve service, non-spinning reserve service	Efficiency at max generation	Commerical
Pumped Storage	10-2400MW	8 hrs- 36 hours, can be seasonal, and lose no charge over time	100 yrs	Black start, frequency regulation, voltage support, spinning reserves and operating reserves	Secure power supply, scalable, zero fuel costs	Commerical, deployed in market

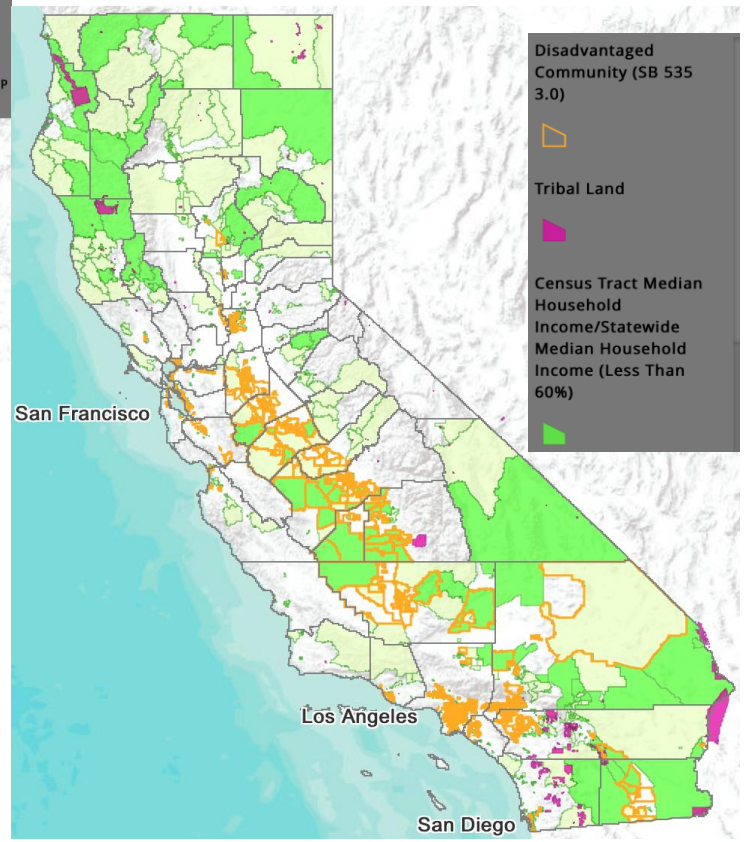


https://www.storeenergyca.org/news/#webinars

Long Duration Energy Storage and Inclusive Projects for CA Disadvantaged Communities and Low-income Communities







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How to Ensure Energy Storage Policies are Equitable

Stakeholder Convening

- How can storage be deployed to reduce emissions and improve air quality?
- How can storage make communities and residents more resilient to disasters and power outages?
- How can storage promote local economic development and job growth?
- How can storage help accelerate greater levels of renewable energy on the grid?
- How can storage help reduce electricity bills?
- How can policymakers ensure that communities have a seat at the table?

Legislative Examples

- Our next fact sheet identifies pieces of state legislation that have addressed equitable storage deployment from different angles
- Focus on three particular aspects:
  - Replacement of Peaker Plants
  - Increased Resiliency
  - Reducing GHGs and Criteria Air Pollutants
- Also included cross-cutting language, e.g., definitions, stakeholder engagement, regulatory guidance, and labor standards

Frameworks for Energy Equity and Storage

- **Air pollution:** How do energy storage and other energy resources affect the *magnitude*, *place*, and *time* of air pollutant emissions?
- **Economics:** How do distributed energy resources impact energy cost burdens and who gets access to these resources?
- **Resilience:** Where do we site storage to provide resilience in the face of heat waves, wildfires, smoke, grid outages, and other climate impacts, particularly for vulnerable populations?
- **Lifecycle:** Where are energy materials mined, processed, and disposed of at end-of-life?

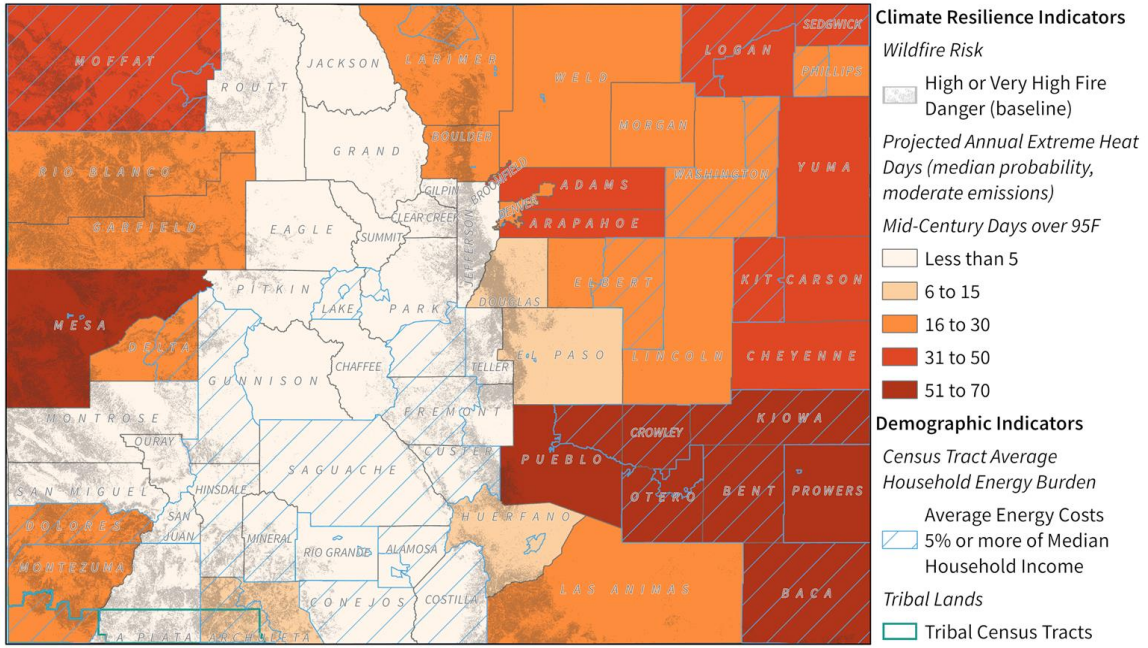
How can we integrate all of these metrics?

Research Efforts

Energy Storage Peaker Plant Replacement Project

California Solar + Storage Community Resilience Hubs

Equity-Focused Climate Strategies for Deep Decarbonization



Projected extreme heat days, wildfire risk, and average household energy cost burdens in Colorado. Certain communities face cumulative stressors from high energy cost burdens as well as climate impacts such as extreme heat and wildfires. These communities may benefit from resilience-focused and cost-saving energy measures such as weatherization and solar + storage.

PSE Bringing science to energy policy

www.psehealthyenergy.org

Krieger *et al.* Equity-Focused Climate Strategies for Colorado. PSE Healthy Energy. 2020.

- Clean Energy Group (https://www.cleanegroup.org/) promotes public and private initiatives to expand access to the benefits of clean, resilient power for all. This work includes advancing battery storage technologies to combat inequity across multiple levels:
  - The Resilient Power Project: Provides technical assistance support, capacity building opportunities, and research and policy guidance.
  - Phase Out Peakers: Advocates for the replacement of polluting peaker plants with renewable energy and battery storage alternatives to reduce harmful public health impacts in environmental justice communities
  - Energy Storage and Health: Promotes financing and policy models to facilitate access to battery storage for home health, as well as emergency service providers in underserved communities
  - Energy Storage Policy: Generates reports, data, and analysis to create informed battery storage incentives and policy structures that can reduce barriers to implementation for under-resourced communities
- CEG's sister organization, Clean Energy States Alliance (https://www.cesa.org/), also promotes equitable battery storage implementation through the Energy Storage Technology Advancement Partnership (ESTAP), under contract with Sandia National Labs, which aims to accelerate energy storage technologies in the U.S. through technical assistance and information sharing.

EQUITY CHALLENGES FACING UNDERSERVED COMMUNITIES

Energy Burden and Wealth Creation:

- Low-income households have the highest energy burdens in the U.S.
- Critical service facilities serving low-income populations are dealing with capacity limitations, lack of information, and limited budgets.
- This inhibits wealth creation and leaves households at risk from electric bill spikes from extreme heat or cold or other energy emergencies

Healthcare and Emergency Preparedness:

- Outdated and inefficient energy infrastructure can prolong outages in underserved communities.
- This limits the ability of emergency service providers to deliver services during severe weather events
- Low-income and medically vulnerable populations, particularly those who are reliant on home medical equipment are less likely to evacuate during a severe weather event and are most at risk in the event of a power failure.
- These risks will only increase as climate change increases the frequency of severe weather, including extreme cold and heat.

Public Health:

- There are more than 1,000 fossil fueled peaker power plants in the U.S., predominantly located in low-income communities of color. These plants emit health-damaging air pollutants such as NOx and harmful particulates
- Recent studies show that increased emissions of criteria pollutants have contributed to disparate health outcomes in these areas, including greater deaths from the COVID-19 virus

RECOMMENDATIONS

Energy Burden and Wealth Creation:

- Federal grants, technical assistance support, and other measures to expand the battery storage market in LMI communities can target the barriers preventing penetration now, including lack of information and access to finance.
- Battery storage, especially when paired with solar, can lower energy burden and offer revenue generating opportunities.

Healthcare and Emergency Preparedness:

- Major grid outages have increased 60 percent since 2015.
- Providing medically vulnerable, homebound populations with access to clean backup power during these events will save lives.
- Providing critical service providers resilient power will not only allow them to continue providing valuable services during these
- events but may save thousands of dollars in lost medications. Community service providers supplied with resilient power can also act as cooling centers for the thousands without access to home air conditioning during extreme heat events.

Public Health:

- Battery storage paired with renewable energy can replace polluting peaker power plants, particularly in dense urban areas.
- Replacing peaker plants with distributed renewable energy and storage not only reduces the public health burden on LMI communities but creates a more equitable and just energy system overall.
- While large-scale battery storage projects are an invaluable part of the energy transition, providing communities with access to resilient power combats decades of inequity in the centralized power system