Introduction to state energy storage policy and programs:

Procurement

DC COG
November 20, 2025

Todd Olinsky-Paul
Senior Project Director
Clean Energy Group and Clean Energy States Alliance

Celebrating 20 Years of State Leadership

20 CleanEnergy States Alliance

The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy.

CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

Clean Energy States Alliance

www.cesa.org

STATE OF CALIFORNIA ENERGY COMMISSION

CONNECTICUT GREEN BANK

DEPARTMENT OF ENERGY & ENVIRONMENT

Energy Trust of Oregon

IPA ILLINOIS POWER AGENCY

GOVERNOR'S Energy Office

STATE OF NEW HAMPSHIRE DEPARTMENT OF ENERGY

MASSACHUSETTS CLEAN ENERGY CENTER

Maryland Energy Administration

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

BPU New Jersey's cleanenergy program njcleanenergy.com

NEW MEXICO emnrd Energy, Minerals and Natural Resources Department

NEW YORK STATE NYSERDA

mn COMMERCE DEPARTMENT

SMUD Powering forward. Together.

STATE OF RHODE ISLAND OFFICE OF ENERGY RESOURCES

VERMONT DEPARTMENT OF PUBLIC SERVICE Clean Energy Development Fund

VIRGINIA Energy

RHODE ISLAND COMMERCE CORPORATION

COMMISSIONER STEPHANIE GARCIA RICHARD NEW MEXICO STATE LAND OFFICE

ILLINOIS COMMERCE COMMISSION ICC

OEI Wisconsin Office of Energy Innovation

PRAIRIE ISLAND INDIAN COMMUNITY

Washington State Department of Commerce

CONNECTICUT ENERGY ENVIRONMENT

DOER Massachusetts Department of Energy Resources

OREGON DEPARTMENT OF ENERGY

COLORADO Energy Office CEO

INCLUSIVE PROSPERITY CAPITAL

MassDEP

OPC-DC Office of the People's Counsel ADVOCACY | EDUCATION | PROTECTION

Energy Storage Technology Advancement Partnership (ESTAP)

Conducted under contract with Sandia National Laboratories, with funding from US DOE Office of Electricity.

- Facilitate public/private partnerships to support joint federal/state energy storage demonstration project deployment
- Support state energy storage efforts with technical, policy and program assistance
- Disseminate information to stakeholders through webinars, reports, case studies and conference presentations

CESA also has a monthly Energy Storage Working Group meeting for member states interested in energy storage

CleanEnergyGroup

Affordable, reliable, clean energy for all.

Climate Resilience and Community Health

Distributed Energy Access and Equity

Energy Storage and Flexible Demand

Fossil Fuel Replacement

www.cleanegroup.org

Today’s Agenda:

1. Overview of State Energy Storage Policymaking
2. Best Practices for State ES Procurement Targets
3. Other state ES policy options

State policy tools for energy storage

1. Studies and planning, commissions, reports
2. Grants (demonstration projects)
3. Longer-term policy and programs
    a. Utility mandates/procurement targets
        i. Storage procurement targets
        ii. Storage in renewable portfolio standards (RPS)
        iii. Clean peak standards
    b. Customer incentives (rebates or tax incentives)
    c. Storage adders in renewables incentive programs
    d. Storage incentives in energy efficiency programs
    e. Financing through clean energy financial institutions (green banks)
    f. Market rules reform
    g. Removal of barriers/reduction of soft costs
    h. Technical assistance and resources
    i. Regulatory initiatives/reform

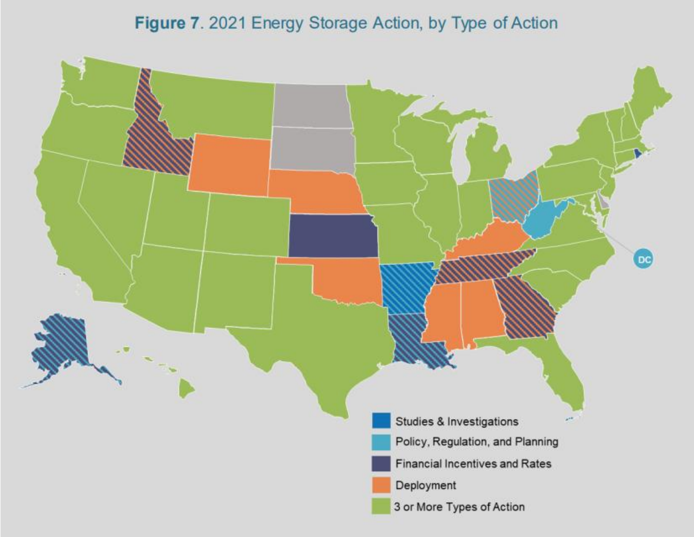


Figure 7. 2021 Energy Storage Action, by Type of Action

NOTE: State policy TOOLS should support state policy GOALS!

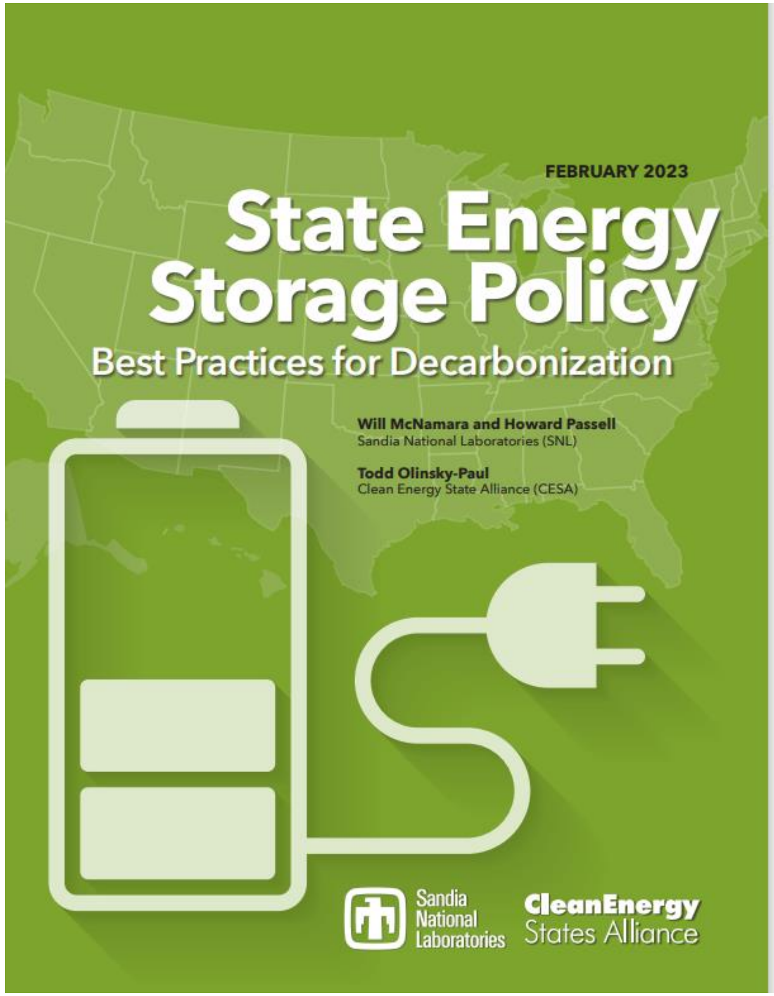
Regulatory

1. Utility ownership of energy storage
2. Inclusion of energy storage in utility IRPs
3. Distribution system planning
8. Changes to existing net metering programs/tariffs to accommodate BTM energy storage
9. Changes to legacy interconnection standards to enable deployment of BTM energy storage
10. time-variant electric rates/retail rate redesign
11. Benefit/cost analysis (accommodation of energy storage in state cost effectiveness tests such as TRC, PCT, SCT, RIM, UCT etc.)
12. Pilot programs and demonstrations

1. Best Practices in State Energy Storage Policymaking

Report: State Energy Storage Policy Best Practices for Decarbonization

1. States survey
2. Industry survey
3. State case studies



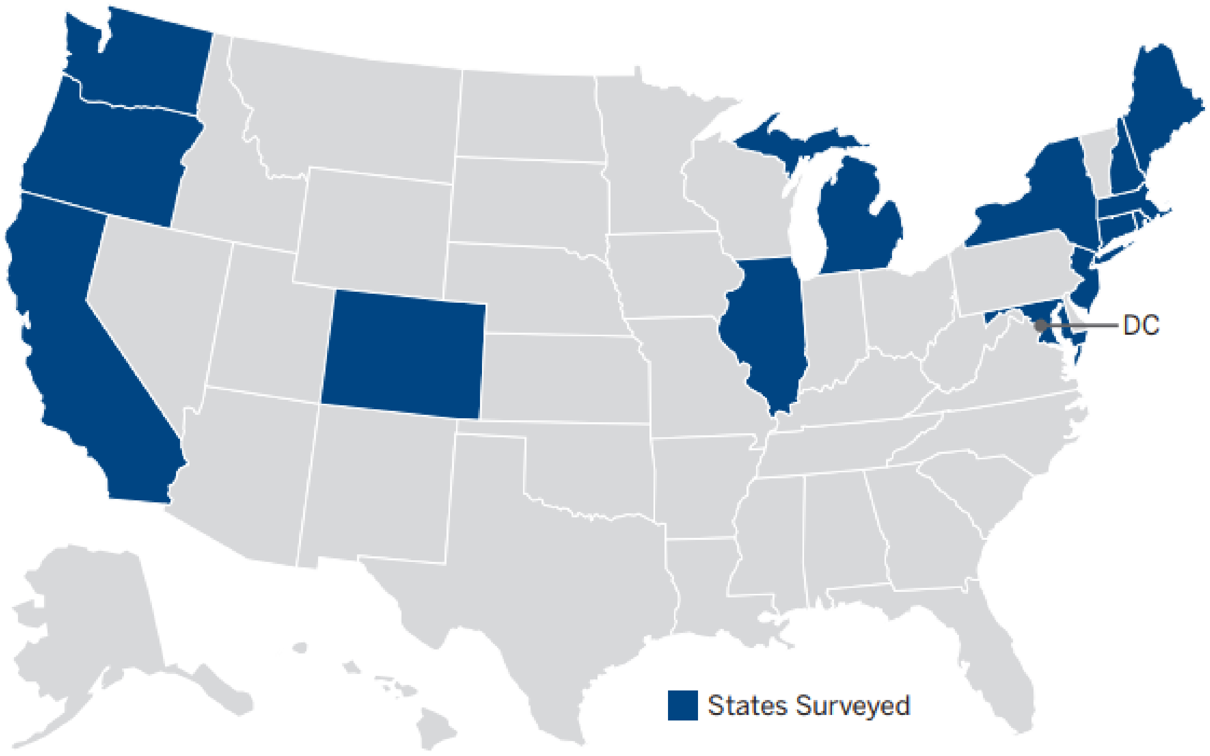
Report published by Sandia and CESA February, 2023

(SAND2023-00593O)

THE STATE SURVEY

22 responses from 14 leading decarbonization states plus DC:

California	Maine	New Hampshire
Colorado	Massachusetts	New York
Connecticut	Maryland	Oregon
District of Columbia	Michigan	Rhode Island
Illinois	New Jersey	Washington



- Respondents represented state utility commissions, state energy offices, and governors' offices
- Intent:
  - Highlight best practices
  - Identify barriers
  - Underscore the urgent need to expand state energy storage policymaking to support decarbonization

RESULTS: PRIORITY APPLICATIONS

States seek to maximize the benefits of ES while reducing uncertainty and risk. Respondents identified a number of priority applications:

- Supporting electric reliability and resilience on the distribution grid
- Cost control
  - Enabling electrification
  - Avoiding costly T&D upgrades
  - Increasing flexibility of end-use loads (such as EV charging)
  - Peak demand reduction
- Enabling higher levels of solar PV interconnected with the grid, and the use of solar coupled with storage for interconnection upgrade mitigation.
- Exploring different applications and use cases through demonstration projects and programs
- Exploring location-specific benefits, such as resilience and peak cost reductions
- Aggregating BTM storage to serve grid needs through price signals and performance payment mechanisms

RESULTS: KEY POLICY LEVERS

1. Procurement mandates, targets, or goals
2. Ownership models for ES assets
3. Inclusion of ES in utility IRPs
4. Incentives, tax credits, or other subsidies
5. Prioritization of specific use applications for ES technologies
6. State-sanctioned benefit-cost analysis
7. Distribution system modeling for location-specific siting of ES technologies
8. Changes to existing net metering programs to accommodate BTM energy storage
9. Changes to legacy interconnection standards to enable deployment of BTM ES
10. Changes to existing RPS programs to include or specifically carve out ES requirements
11. Use of time-variant electric rates to spur the development of BTM storage technologies
12. Retail rate re-design
13. Equity policies specific to ES technologies

RESULTS: THE TOP FIVE STATE POLICY LEVERS

1) **Procurement mandates/targets/goals**

    a) Twelve states have adopted a procurement target
    b) Carve-outs for specific types of storage (e.g. BTM, equity-focused, or long duration) are beginning to appear
    c) Most procurements are measured in MW – this should change going forward

2) **Utility ownership of energy storage**

    a) Largely determined by competitive status of state
    b) Some states have allowed utility ownership despite restructured status (e.g. MA, NY)
    c) Where utilities are allowed to own storage, utility resource planning becomes a priority.

3) **Incentives (subsidies, tax credits)**

    a) Incentives can be designed to support specific state policy goals (e.g., equity access, resilience and reliability, emissions reduction, peak shaving)
    b) Only one state (Maryland) has tried state tax credits (and has now abandoned the program)

4) **State-sanctioned benefit-cost analysis of ES**

5) **Distribution system modeling for locational values/siting**

    a) Challenge is a lack of available modeling tools

PROGRAM DESIGN

Energy storage is a multi-use resource: it can serve different purposes depending on how it is used. Therefore, **program design should generally follow from policy goals**.

EXAMPLES

Policy goal: reducing greenhouse gas (GHG) emissions in the electricity sector
Program design: performance based incentives to reward storage owners for charging from solar (or from the grid when there is a surplus of solar generation) and discharging at times when high-emitting fossil generators are on the margin (for load reduction, power export, or both); energy storage included in utility RPS or clean peak standard.

Policy goal: building electrification
Program design: rebates to incentivize installation of home solar+storage+heat pump systems to replace existing gas and oil heating systems, in tandem with other electrification and efficiency measures; solar+storage and electrification added into utility-administered state efficiency program.

Energy storage procurement: Mandates, Targets and Goals

Currently, 12 states have adopted an energy storage procurement mandate, target or goal:

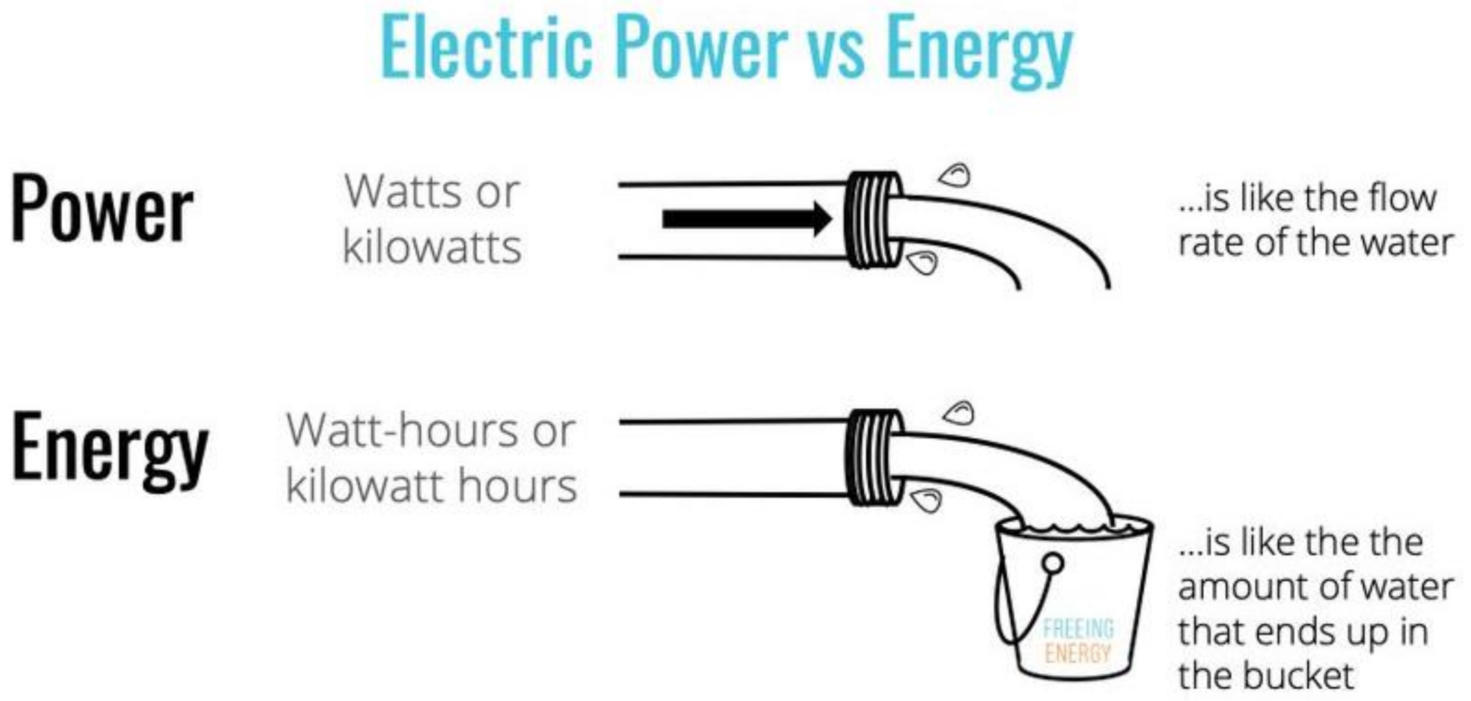
- A **Mandate** is a goal with legal liability for non-attainment (e.g. an ACP)
- A **Target** is a defined goal with measures for follow-through (e.g. regular reporting)
- A **Goal** is a number without defined accountability (e.g. an aspirational goal)

Utility Mandates / Procurement Targets: 12 states so far (Illinois is about to become #13)

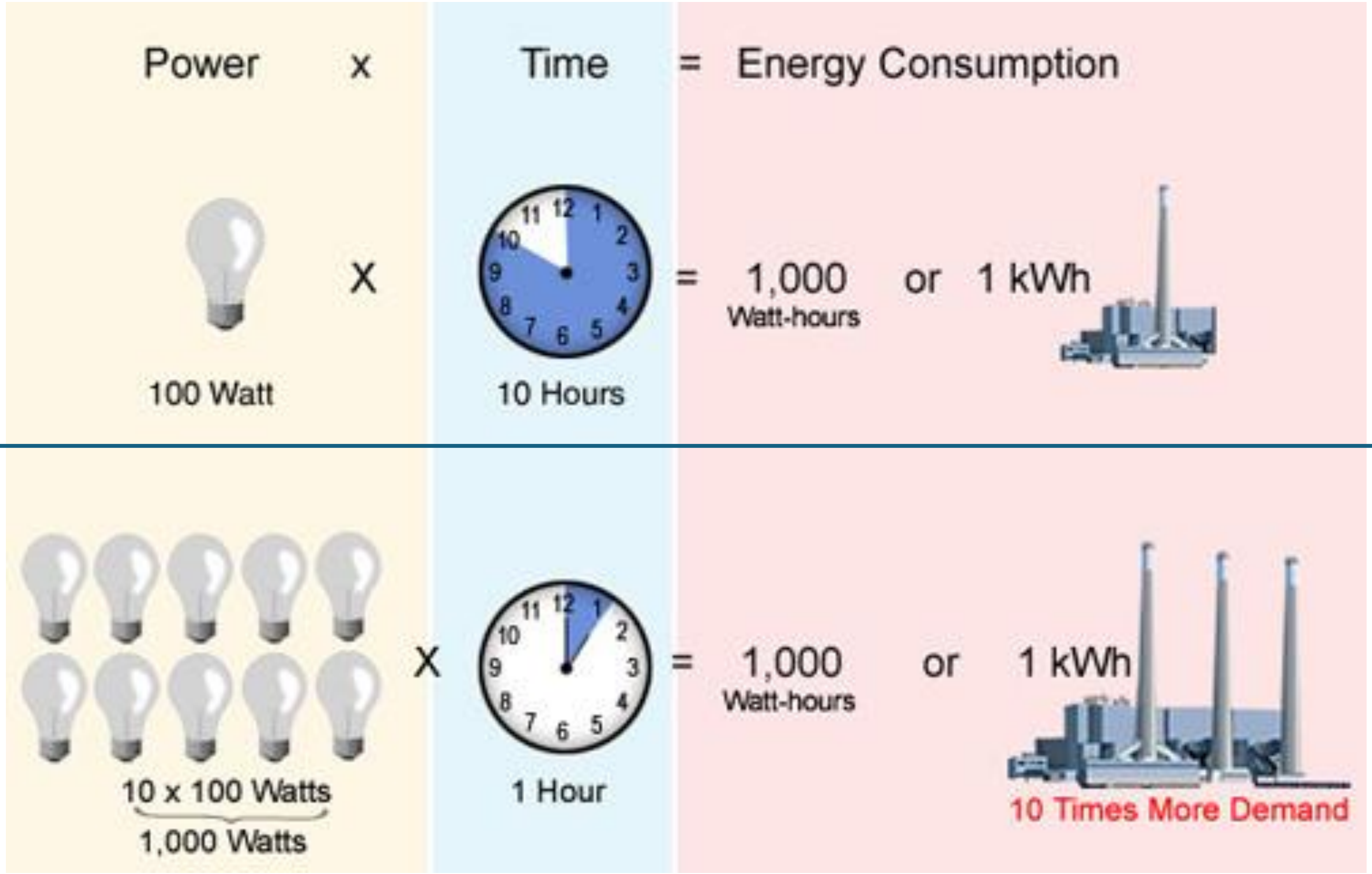
State	Energy Storage Procurement Targets	Current status*
California	1,825 MW procured by 2020 and installed by 2024. Carve-out of 500 MW for BTM	10,383 MW total (8,736 MW utility, 571 MW commercial, 1,076 residential) (4999 pending 1,193 MW BTM)
Connecticut	300 MW deployed by 2024, 650 MW by 2027, and 1000 MW by 2030. Carve-out of 580 for BTM	2 MW installed, 206 MW pending
Maine	300 MW installed by 2025, and 400 MW installed by 2030	64 MW installed, 267 MW pending
Maryland	750 MW deployed by year's end 2027, 1.5 GW through 2030, and 3 GW through 2033	20 MW installed
Massachusetts	1,000 MWh installed by 2025	257 MW installed, 665 MW pending, 30.7 MW BTM
Michigan	2,500 MW by 2030	16 MW installed, 150 MW pending
Nevada	100 MW installed by December 31, 2020, and 1000 MW installed by 2030	940 MW installed, 573 MW pending
New Jersey	600 MW by 2021, and 2000 MW by 2030	90 MW installed
New York	1500 MW by 2025, and 6000 MW by 2030	359.2 MW intsalled, 571 MW pending
Oregon	The state's two largest IOUs must each install 5MWh by 2020, up to a maximum of 1% of 2014 peak load.	35 MW installed, 2 MW pending 157 MWh BTM
Rhode Island	90 MW by 2026, 195 MW by 2028 and 600 MW by 2023	
Virginia	3100 MW installed by 2035. Carve-out of 10% for BTM	1 MW installed

Most state targets are defined and measured in MW, not MW x hours.
This is increasingly problematic as grids require longer duration services.

- MW measure <u>power</u> (how much electricity can be output at any given moment)
- MWh measure <u>energy</u> (how much electricity can be output over a period of one hour)



BUT… All MWh are NOT the same!



"Energy battery"

Keeps the train in motion: long duration low power

"Power battery"

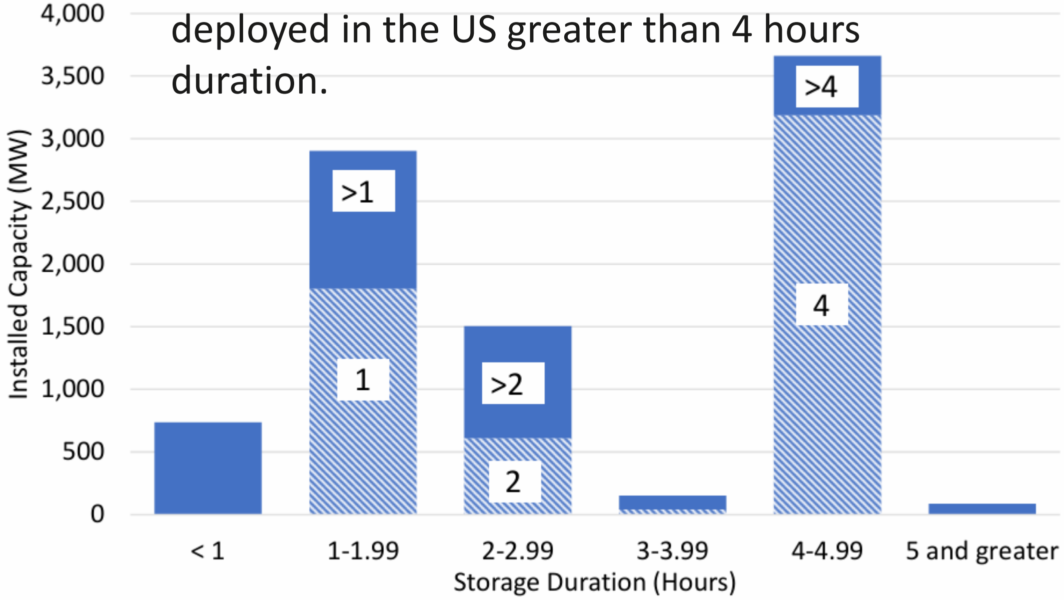
Gets the train moving: short duration high power

Ideally, capacity and duration are separately defined. Example: The target is 2,000 MW of energy storage, of at least 4 hours duration.

Most current state policymaking does not differentiate between short- and long-duration storage (and wholesale markets generally default to 4 hour storage).

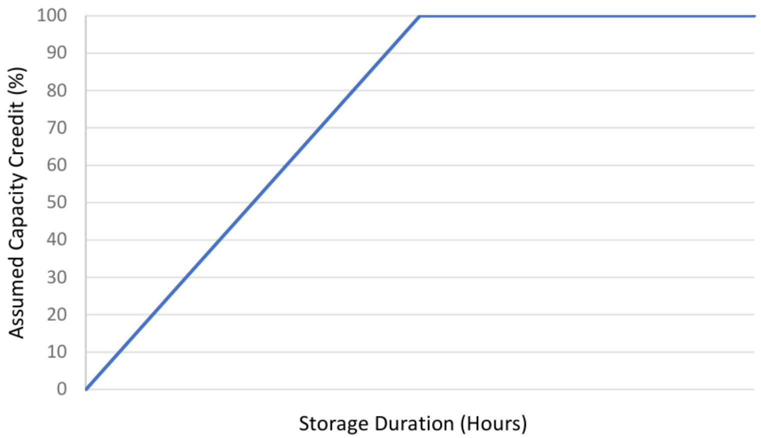
This disadvantages long duration energy storage, because there is no added incentive for added duration.

Currently, there is almost no energy storage deployed in the US greater than 4 hours duration.



Less than 7% of total capacity has a duration that exceeds 4 hours.

The Four-Hour Capacity Rule



Market Operator	Duration Minimum (hours)
ISO-NE	2
CAISO	4
NYISO	4
SPP	4
MISO	4
PJM	ELCC based

Many regions have implemented a 4-hour requirement for resource adequacy

So the marginal value of adding a fifth hour is **zero**.

Thanks to Paul Denholm of NREL for the graphics

Utility procurement best practices

- ES duration defined in target (MW x Hours)
- Carve-outs/incentives for priority technologies
  - LDES
  - Non Li-Ion
- Carve-outs/incentives for priority applications (based on policy goals)
  - Peaker replacement
  - Peak demand reduction
  - T&D investment deferral
  - Emissions reduction
- Variety of ownership (if possible)
  - Utility ownership
  - Customer ownership
  - Third party (merchant) ownership
- Variety of locations on grid/behind meter
- Equity provisions
- Enable distributed storage/virtual power plants

Example: California procurement targets (2013)

Proposed Energy Storage Procurement Targets (in MW)[22]

Storage Grid Domain Point of Interconnection	2014	2016	2018	2020	Total
Southern California Edison					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal SCE	**90**	**120**	**160**	**210**	**580**
Pacific Gas and Electric					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal PG&E	**90**	**120**	**160**	**210**	**580**
San Diego Gas & Electric					
Transmission	10	15	22	33	80
Distribution	7	10	15	23	55
Customer	3	5	8	14	30
Subtotal SDG&E	**20**	**30**	**45**	**70**	**165**
Total - all 3 utilities	**200**	**270**	**365**	**490**	**1,325**

Note: CA utilities may own up to 50% of required storage capacity

Other State Policy Options

1. Customer Storage Incentives

Example:

CA – Self Generation Incentive Program (SGIP)

California SGIP

Summary: Ratepayer funded. Originally conceived in 2001 as a peak load reduction program supporting mainly solar PV; modified in 2011 to focus on greenhouse gas emissions reductions; modified again in 2016 to focus 79% of the program budget on energy storage. Incentives later modified to support state emissions reduction targets.

Program design: Up-front rebate in a declining block structure, with a 25% equity carve-out, defined geographically by environmentally disadvantaged and low-income communities, and affordable housing. 15% of SGIP budget reserved for residential customers. Equity and resilience budgets target low-income customers in wildfire outage areas.

Program statistics: From 2001 to 2023, SGIP has:

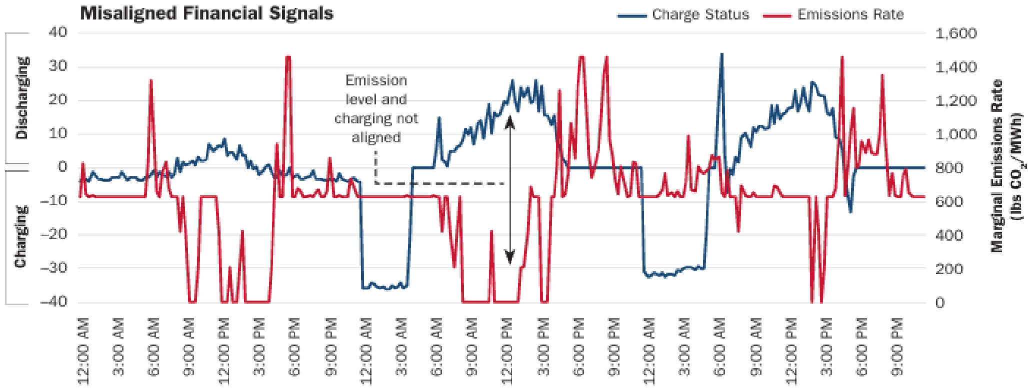
- incentivized 46,222 installations representing roughly 1,727 MWh of energy storage capacity and 312 MW of generation capacity
- Contributed to reducing GHG emissions

California SGIP Program Results – Before and After Emissions-Aligned Dispatch

Incentives Not Aligned with Emissions

Figure 1a

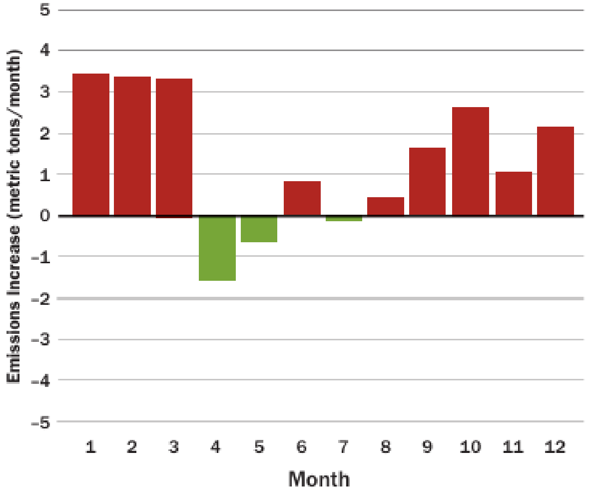
SGIP Emissions Alignment Before and After Incentives were Aligned with Goals



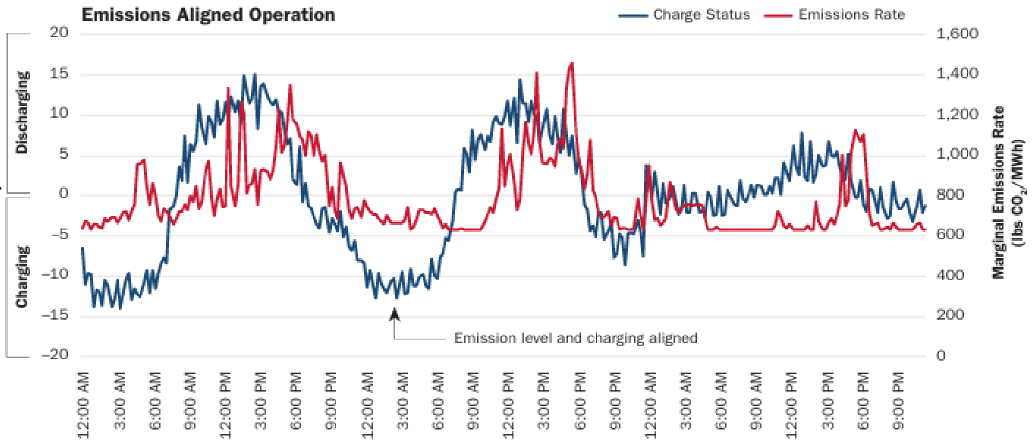
The California SGIP program initially suffered from financial signals that were not aligned with state emissions data. As a result, battery owners frequently discharged their batteries during low emissions periods, rather than charging when emissions were low and discharging when they were high.

Source: WattTime

Outcomes

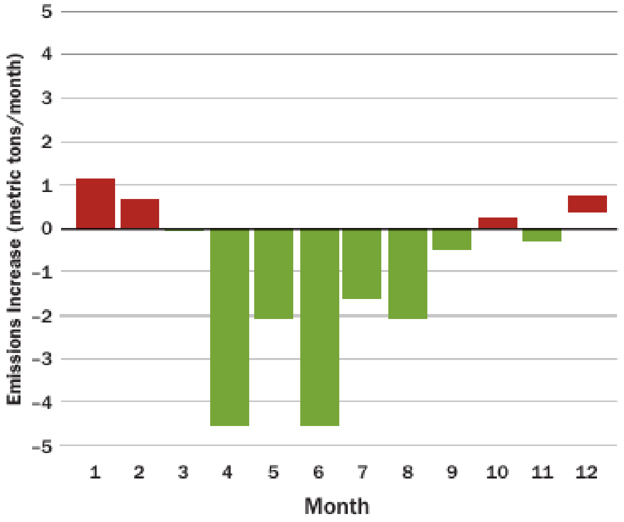


Incentives Aligned with Emissions



After program incentives were revised to encourage battery discharge during periods of high emissions, customer battery use became much better aligned with state emissions reduction goals.

Source: WattTime



2. Storage added to existing renewables incentive programs

Example: Solar Massachusetts Renewable Target (SMART)

Summary: SMART replaced the previous SREC program in 2018. SMART is a declining block tariff program that provides fixed base compensation over a 10- or 20-year term. Offers solar rebates with stackable adders including a storage adder for new batteries connected with new solar PV behind customer meters.

Stackable adders:

- Building Mounted Solar
- Floating Solar
- Solar on a Brownfield
- Solar on an Eligible Landfill
- Canopy Solar
- Agricultural Solar
- Community Shared Solar
- Low Income Property Solar
- Low Income Community Shared Solar
- Public Entity Solar
- **Energy Storage**
- Solar Tracking

3. Storage as energy efficiency and demand response

Examples: Massachusetts, Rhode Island, Connecticut, Vermont, New Hampshire

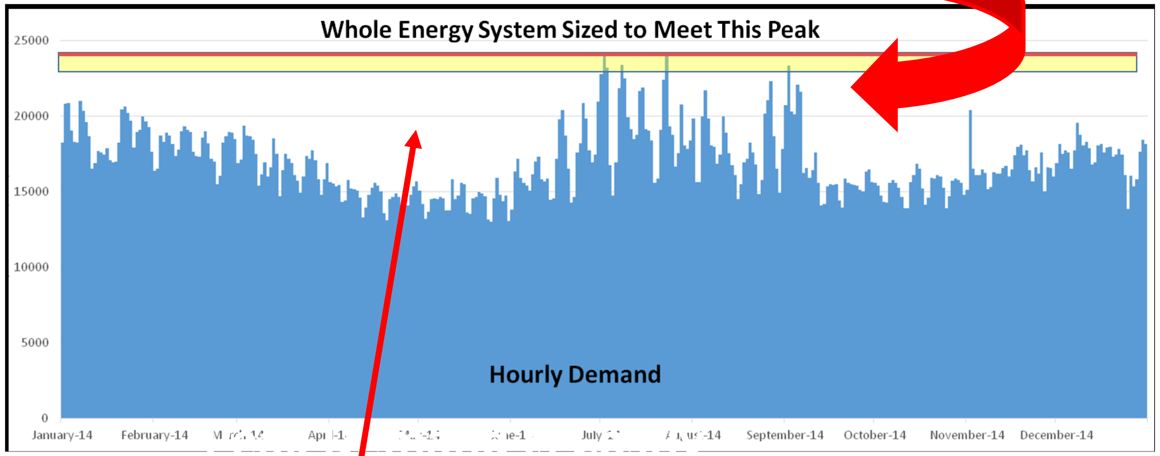
Massachusetts ConnectedSolutions program:

- Storage incorporated into the state's energy efficiency program as a peak reduction measure
- Customers enter into multi-year contract with utility for BTM storage dispatch at peak demand hours
- Utility compensates customers for storage services
- Lower peak demand saves money for ratepayers
- Developers can finance pipelines of storage projects contracted into ConnectedSolutions, creating virtual power plants

From Massachusetts *State of Charge* report

The monetizable value of storage is partly due to the high costs of our oversized grid

The highest value of storage is in providing *capacity* to meet demand peaks… *not* in providing bulk



White space = inefficiency in the system

Battery Virtual Power Plants (BVPP)

The first commercial battery-based virtual power plant (BVPP) was launched in 2014, as a collaboration between Stem and Southern California Edison. In the decade since then, battery VPPs have proliferated, with at least 23 states plus Puerto Rico now offering programs in at least some of their utility territories.

These programs have proved to be popular with ratepayers, utilities and regulators.

More BVPPs are currently in development in state energy agencies and utility regulatory dockets across the country.

There are active BVPPs in at least 23 states plus Puerto Rico

VT	TX
NH	KS
MA	MO
ME	CO
RI	UT
CT	AZ
CA	WA
HI	LA
NY	OR
MD	SC
NC	PR
ID	WY

Definition: A BVPP program creates an **aggregated system of behind-the-meter (BTM) batteries** (and other resources); enrolled customers are called upon to provide grid services, for which they are compensated.

Under this definition, a BVPP:

- Provides a grid service (such as peak demand reduction), for which participating customers are compensated in some way (distributed battery incentives/procurement alone do not comprise a BVPP)
    - Customer compensation can take many forms, including rebates, performance payments, bill credits, free or discounted equipment, and resilience
    - Resilience has value, but customer compensation ideally includes a credit or payment that contributes to end user affordability
- May include other BTM resources, such as distributed generation and controllable loads
    - The combination of batteries with solar PV, EVs, managed EV chargers, smart thermostats and water heaters, traditional efficiency measures and electrification can create powerful, flexible and cost-effective BVPPs
    - Batteries may be owned by customers, utilities, or third parties
- May be administered by utilities, state agencies, third party developer/aggregators, or combinations of these

Common practices:

- Most BVPPs are administered by utilities, often in partnership with aggregators
- Most enroll residential customers; some are also open to commercial customers
- Most enrolled batteries are owned or leased by customers; a few programs feature utility ownership
- Most programs feature a contract between the customer and the utility or third-party aggregator, with durations ranging from one to 10 years
- Some programs include added affordability provisions (carve-outs, incentive adders, low-cost financing)
- Grid services vary, with peak demand reduction being the most common; a few BVPPs provide other services such as air emissions reduction, frequency regulation, resource adequacy, distribution system investment deferral and increased deployment of distributed generation
- Customer compensation mechanisms also vary, and may include:
  - Annual or monthly flat rate compensation/bill credit
  - Performance payments based on kWh of load reduction/power export
  - Up-front rebate/enrollment incentive
  - Free or discounted equipment
  - Host facility resilience

- Most BVPPs were launched in 2019 or later (a few pilots were developed earlier). Currently, program creation is occurring at various levels:
  - Regional utilities like Eversource, National Grid, Duke, Evergy, and PG&E have established programs across multi-state service territories
  - Third party developer/aggregators like Tesla and Sunrun have launched programs in various areas where they can partner with utilities
  - Grid operators, such as ERCOT in Texas, and state energy agencies, such as the California Energy Commission, have created BVPPs that allow participation by utilities and third parties
- Most BVPPs incorporate Distributed Energy Resource Management Systems (DERMS) and smart meters
- Typically, the utility and/or aggregator remotely dispatches enrolled resources, with customers having an “opt-out” option (no dispatch before major storms)
- Most programs only discharge batteries to a set minimum capacity, leaving enough power to cover unexpected outages and preserve battery life
- Many programs provide a list of eligible batteries and/or inverters; customers must choose from this pre-approved equipment list in order to participate in the BVPP

Program Example - North Carolina: Duke Energy Power Pair

Launched in 2024, the Power Pair program, administered by Duke Energy, offers an up-front rebate plus monthly performance payments to enrolled residential solar+storage customers. Up to 6,000 systems may enroll through 10-year contracts with Duke Energy. Incentives comprise a one-time, $0.36/watt-AC payment for solar panel installation up to 10 kW-AC, plus a one-time $400/kWh payment for battery storage installations up to 13.5 kWh (up to $5,400).

Customers agree to provide a reliable internet connection and complete the steps necessary to provide access to operating data. Qualifying PowerPair installations that also enroll in Power Manager® Battery Control (allowing Duke to remotely control and discharge batteries) may be eligible for an additional monthly bill credit based on battery capacity, up to a maximum of 20 kW per home. Grid benefits from the program include peak demand reduction, increased solar adoption, and carbon emissions reductions.

More: https://www.duke-energy.com/home/products/powerpair

Program Example - Connecticut: Energy Storage Solutions program

Connecticut adopted Energy Storage Solutions (ESS) in 2022 as a replacement for the earlier ConnectedSolutions program. Unlike ConnectedSolutions, ESS is not part of the state's energy efficiency program, but is a stand-alone program co-administered by the utilities and the Connecticut Green Bank. Residential and commercial customers receive an up-front rebate from the Green Bank, and performance payment from the utility. The residential up-front incentive ranges from $162.50/kWh to $600/kWh, and the commercial up-front incentive ranges from $73/kWh to $182/kWh, depending on customer type and incentive step. There are also up-front adders for "priority customers" including critical facilities, grid edge customers, and customers replacing fossil fuel generators. Customers from low-income and underserved communities receive 2x rebate adder, including multi-family affordable housing facilities which are considered "residential" and thus qualify for the rebate adder. Performance payments start at $200/kW summer and $25/kW winter, and decline to $115 and $15, respectively, after the first five years of program operation.

The program was quickly fully subscribed on the commercial side, but enrollments lagged on the residential side, leading administrators to increase the residential incentives.

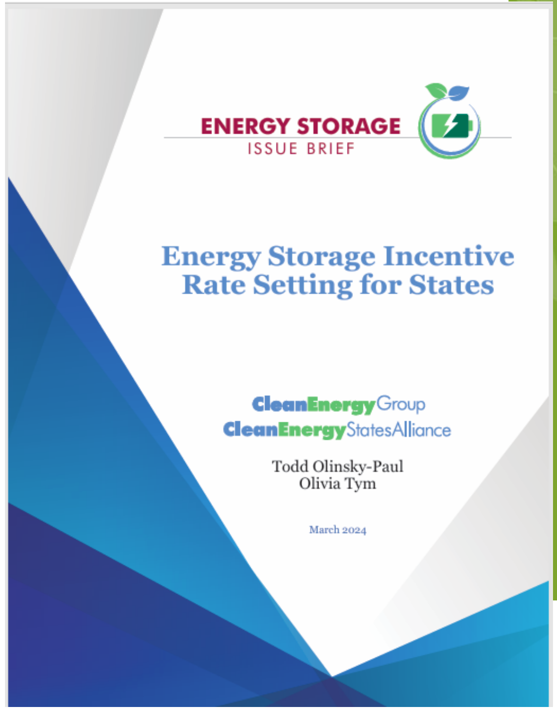
More: https://energystoragect.com/

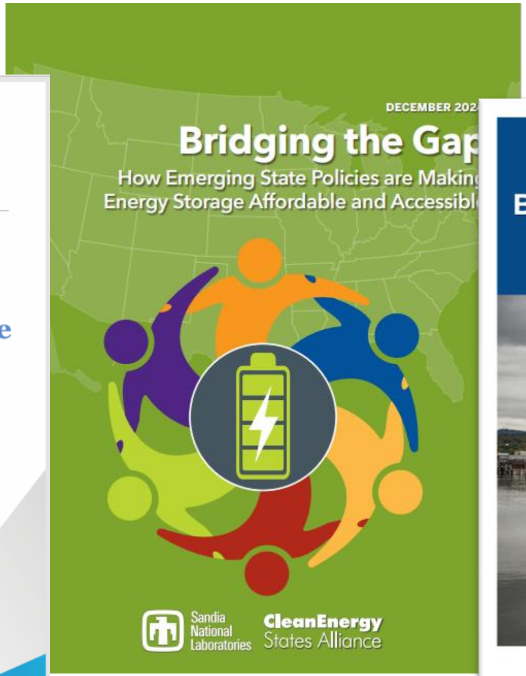
Best Practices

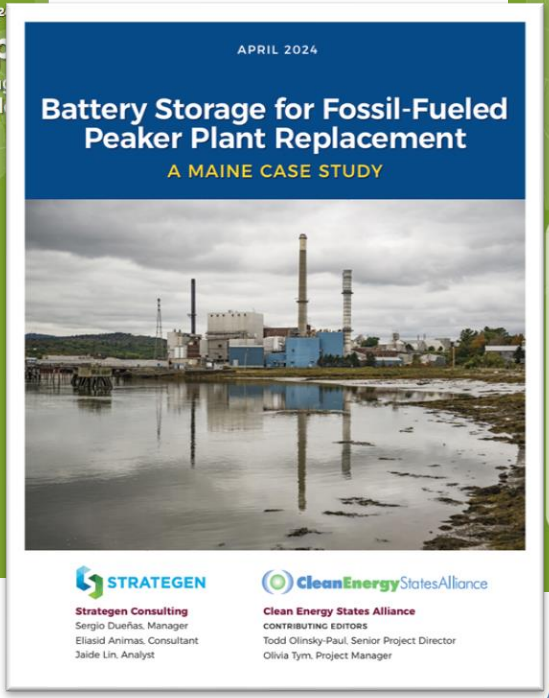
- **Incentives**: Combining up-front rebates with performance payments balances affordability with effectiveness
  - Up-front payments help customers defray capital costs
  - Performance payments ensure batteries are dispatched optimally to achieve desired grid benefits
- **Affordability**: Programs should result in both grid services provision, and enhanced affordability for customers; Special provisions such as carve-outs, incentive adders and low/no-cost financing can further enhance affordability
- **Contracts**: Contracts of 7-10 years with locked payment rates can help make projects financeable; if shorter contracts are used, a renewal option may be offered
- **Ownership**: A variety of options (utility owns, customer owns, customer leases) can enhance program accessibility
- **Third parties**: Third-party aggregators can help market the program, provide financing and leasing, bring private investment to the table, lower utility risk, and develop pipelines of customers for enrollment
- **Equipment**: Allowing a variety of eligible battery and inverter options can help make the program broadly accessible
- **Technologies**: Incorporating other existing BTM resources (controllable loads, EVs/managed EV charging, etc.) can help make the program more cost-effective
- **Dispatch**: Remote dispatch can help optimize grid benefits. Most programs give customers an opt-out option
- **Residential resilience:** Studies have shown that resilience is the primary driver for residential BAP participation
- **Decommissioning**: Battery decommissioning/recycling can help de-risk participation for customers

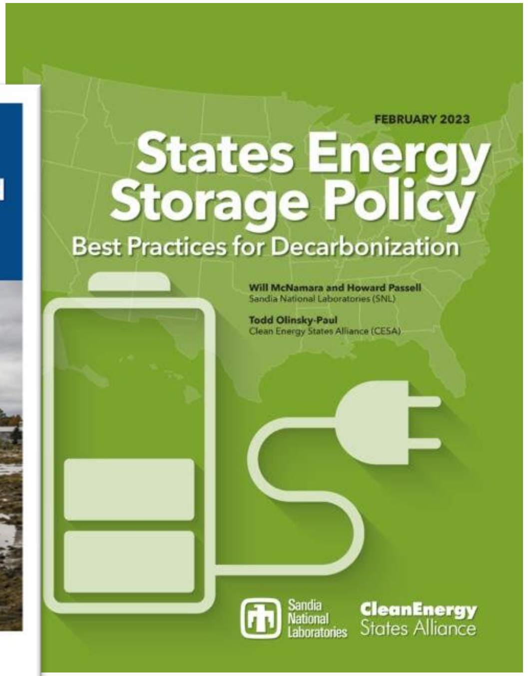
REPORTS and RESOURCES

CESA Energy Storage Policy for States resource page:
https://www.cesa.org/projects/energy-storage-policy-for-states/









CleanEnergy States Alliance

Burning Questions?

More Information: www.cesa.org

Thank You!

Todd Olinsky-Paul
Senior Project Director
Clean Energy States Alliance
Todd@cleanegroup.org

CleanEnergyGroup

CleanEnergy States Alliance