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Policy Levers for Energy Storage Deployment

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Jeremy Twitchell

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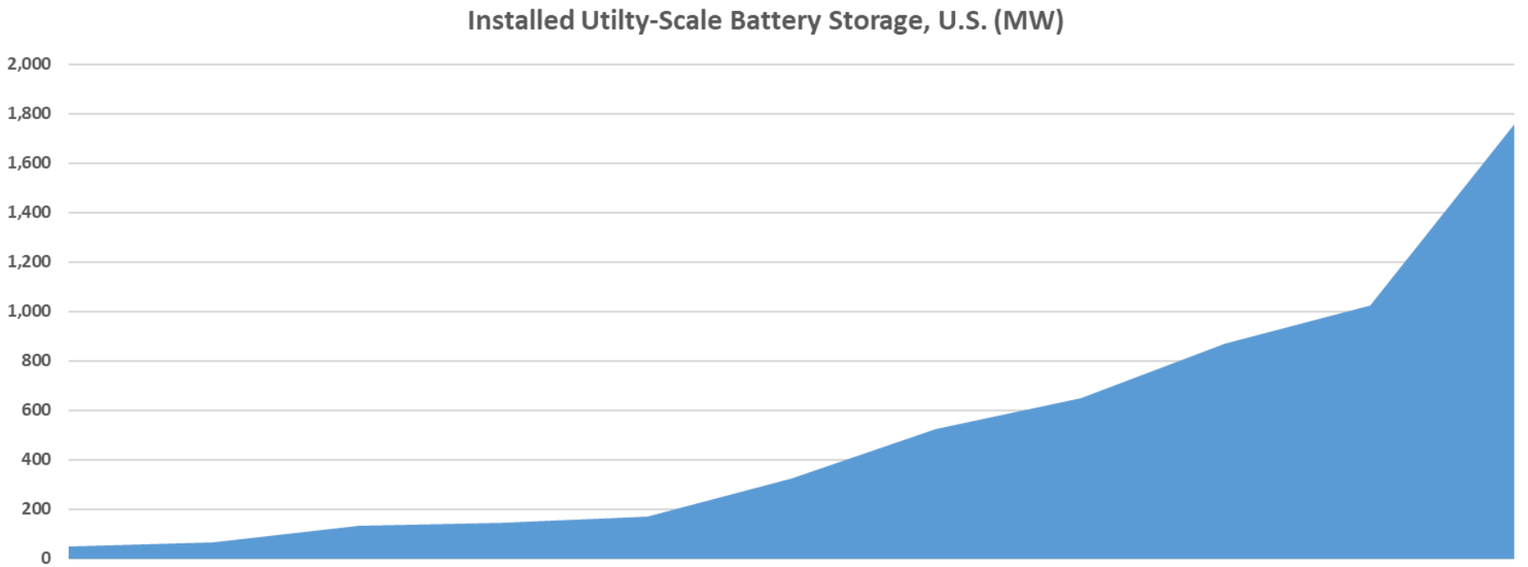
Agenda

- Overview of State-Level Policies
- Case Studies: Programs in States with Storage Mandates
- Solar + Storage Programs

Overview of State-Level Policies on Energy Storage

Recent Energy Storage Policy Activity



2010
- CA: Target legislation

2011
- FERC: Order 755

2012

2013
- CA: 1,325 MW Target
- WA: $14m demo fund
- HI: MPIR mechanism

2014

2015
- OR: 10 MWh target
- NY: REV demo project
- HI: Inter-connection changes

2016
- CA: SGIP storage focus
- CA: 500 MW target increase
- AZ: $4m aggregation pilot
- UT: Demo project

2017
- MA: 200 MW target
- MA: $20m demo fund
- NV: Target legislation, incentives, storage as a right
- NY: Target legislation
- WA: Policy statement
- NM: IRP rule
- AZ: $2m BTM pilot
- MD: Tax credit
- VT: Study, demo fund

2018
- FERC: Order 841
- MA: 1,000 MWh target, planning requirements
- NJ: 2,000 MW target
- NY: 1,500 MW incremental target
- CA: Planning requirements
- CO: Storage as a right
- VA: Planning requirements, demo projects

2019
- OR: Solar + storage rebates
- MA: Storage in public retrofits requirements
- NY: Resilience incentives
- CO: Storage in dist. plans
- MD: Ownership pilot program
- SC: Storage in net metering
- NH: Property tax exemptions
- MN: Storage in IRPs; storage study; pilots
- DE: Storage in cooperatives
- MT: Storage in net metering
- NC: End of life management
- ME: Storage

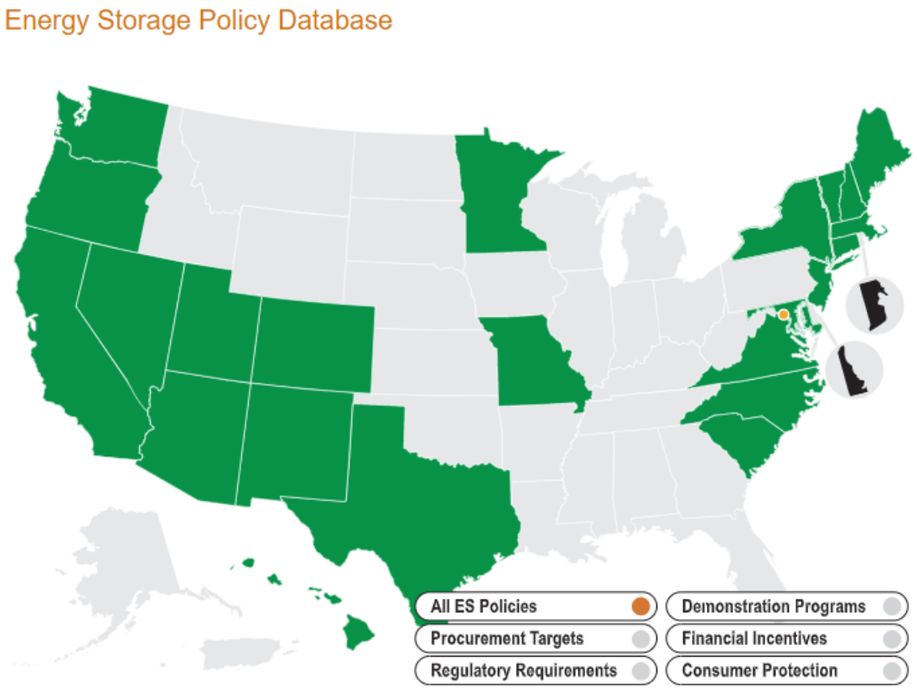
2020
- Federal: BEST Act
- VA: 3,100 MW target; plan requirements
- AZ: 5% of 2035 peak target; aggregation; res. pilot
- MA: Clean peak implemented
- NM: Grid modernization
- WA: Storage in PACE
- PR: Storage for backup power
- OR: Resolution on long-term storage
- MD: Storage as economic dev.
- CA: Storage for local RA and equity

Energy storage policy development has accelerated and diversified in recent years.

Report on energy storage policy types available at https://link.springer.com/article/10.1007/s40518-019-00128-1.

Energy Storage Policy Database

In recent years, several states have begun to identify and address barriers to energy storage. PNNL tracks these policies in an interactive database available at https://energystorage.pnnl.gov/regulatoryactivities.asp:



The policy database tracks five types of state-level energy storage policies:

- Procurement targets
- Regulatory adaptation
- Demonstration programs
- Financial incentives
- Consumer protection

Procurement Targets

Generally adopted where a state identifies specific issues that energy storage is expected to address, and current practices that may prevent storage from adoption in the normal course of business. Currently adopted in seven states, and pending in an eighth state:

- **California:** 1,325 MW by 2020; 500 MW (distribution-connected) by 2020
- **Oregon:** 10 MWh by 2020
- **Massachusetts:** 200 MW by 2020; 1,000 MWh by 2025
- **New Jersey:** 600 MW by 2021; 2,000 MW by 2030
- **New York:** 1,500 MW by 2025; 3,000 MW by 2030
- **Nevada:** 1,000 MW by 2030 (Technically a goal)
- **Virginia:** 3,100 MW by 2035
- **Arizona:** 5 percent of 2035 peak demand (pending)

Regulatory Adaptation

Several states have adapted regulations to account for the unique capabilities of energy storage and other flexible, scalable technologies:

- **California:** CPUC adopts 11 rules covering energy storage in planning
- **Washington:** WUTC issues policy statement guiding storage modeling in IRPs
- **Hawaii:** HPUC changes to interconnection requirements encourage storage; streamlined proceedings for review of flexible resource investments
- **New Mexico:** NMPRC amends IRP rule to require storage analysis
- **Virginia:** Legislature requires distributed energy integration report
- **Maine:** Legislature creates nonwires alternative coordinator to make recommendations for non-wire investments in transmission and distribution systems
- Target legislation in OR, MA, NJ also requires PUC to develop processes for evaluating, siting storage

Demonstration Programs

Demonstration programs are state-directed initiatives in which the state authorizes, and often assists in funding, energy storage projects intended to assist utilities in gaining operational understanding of energy storage:

- **Massachusetts:** ACES program provides $20 million to 26 projects
- **New York:** REV initiative includes an open call for demonstration project proposals; four projects developed
- **Washington:** CEF provides $14.3 million for five demonstration projects
- **Virginia:** Legislation authorizes 40 MW of storage demonstration projects
- **Utah:** Legislation authorizes energy storage demonstration project
- **Maryland:** Legislation requires utilities to conduct demonstration projects testing various ownership models

Financial Incentives

Many states offer state-funded programs that provide incentives, either as direct payments or tax rebates, to customers who install energy storage:

- **Maryland:** 30% state income tax credit for residential and commercial energy storage systems
- **California:** Self-Generation Incentive Program set aside $378M for customer-sited energy storage projects from 2017-2021
- **New York:** The New York State Energy Research and Development Authority provides multiple grant programs to support energy storage developments
- **Nevada:** Legislation expands solar incentive program to include energy storage
- **Arizona:** Regulators authorize $2M incentive program to assist large commercial customers in deploying behind-the-meter storage for peak management
- **Vermont:** Legislation makes storage eligible for Clean Energy Development Fund
- **Virginia:** Solar development authority expanded to include energy storage
- **Washington:** Commercial Property Assessed Clean Energy and Resilience (C-PACER) program includes energy storage

Consumer Protection

Two states have adopted legislation that guarantees certain protections to customers who install energy storage:

- **Nevada:** Legislation establishes a right for customers to install energy storage in a timely manner, subject to reasonable standards
- **Colorado:** Legislation establishes a right for customers to install energy storage and directs the Colorado PUC to develop interconnection rules

Case Studies: Programs in States with Storage Mandates

California

Target Establishment:

- Legislature authorized the California Public Utilities Commission to establish a target if the CPUC determined that doing so would be in the public interest (2010)
- CPUC set a target of 1,325 MW, allocated across utilities and point of interconnection (transmission, distribution, BTM)
- Legislature required additional 500 MW of BTM storage in 2016

Additional steps taken:

- **Procurement rules**: The CPUC's target order also identified priority use cases and where energy storage fit in the "Loading Order" used to guide utility resource procurement
- **Incentives:** Self-Generation Incentive Program focus shifted from distributed generation to energy storage; $378M for customer-sited energy storage projects from 2017-2021
  - Incremental changes have prioritized funding for projects in overburdened communities and areas affected by public safety power shutoffs
- **Planning guidelines:** In 2018, the CPUC adopted guiding principles for how utilities should account for the various values of energy storage in the planning process
- **Interconnection:** Rule 21 establishes transparent, streamlined interconnection processes as well as a discussion forum
- **IRP reforms:** California's statewide resource planning process has received several storage modeling enhancements

Virginia

Additional steps taken:

- **Breaking down the target:** SCC's rules establish interim targets for 2025 and 2030
- **Procurement guidelines:** The rules require annual competitive, transparent solicitations
- **Financial incentives:** The rules authorize utilities to propose incentive programs for BTM storage
- **Use case prioritization:** The rules identify specific uses for storage projects, including infrastructure deferral and peak reduction
- **Aggregators:** The rules authorize energy storage aggregators to register with the commission, market to customers, and sell services to utilities (final order noted that Order 2222 may supersede these regulations)

Target Establishment:

- Legislature established a target of 3,100 MW and outlined broad procurement and cost allocation principles, but assigned the Virginia State Corporation Commission with figuring out the details
- SCC adopted implementation rules in Dec. 2020

Arizona

Target Establishment:

- As a creature of state constitution, the Arizona Corporation Commission (ACC) has broad authority over state energy policy.
- A majority (4-1) of commissioners supported a storage target of 5% of 2035 peak load in a November vote, as part of a vote to decarbonize the Arizona grid by 2050
- The proposal will now be subject to a formal rulemaking proceeding

Additional steps in place:

- **Commercial incentives**: $2 million for commercial BTM storage projects implemented through a rate case settlement
- **Residential incentives:** The ACC also authorized an APS pilot incentive program for residential energy storage
- **Storage aggregation:** In Dec. 2020, the ACC ordered APS to develop a tariff to allow third-party aggregation of DERs

Additional steps proposed:

- **Target disaggregation:** The proposed target would require 40% of the storage to be customer-owned or customer-leased
- **Decarbonization link:** Proposed reporting requirements would include documentation of the charging energy for storage
- **Planning reforms:** More transparency in load forecasting and resource needs identification
- **Procurement reforms:** All-source RFIs required to inform planning assumptions

Case Study Takeaways

- **Breaking the target into more digestible components facilitates planning and program design**
  - Use case approach: What do we want the storage to do? (Peak reduction, T&D referral, decarbonization, etc.) - VA
  - Point of interconnection approach: Where do we want the storage? (Transmission, distribution, BTM, etc.) – CA, AZ
  - Assignment responsibility: Who will be responsible for acquiring storage? – All three states make specific assignments to utilities/LDCs
- **Customer-owned and -sited storage is a major factor in reaching state goals**
  - Can be facilitated with state incentives (CA) or ratepayer-funded utility programs (VA)
  - Aggregation allows for leveraging of private investments to achieve grid benefits that flow to all customers
  - Order 2222 will greatly facilitate aggregation in NJ, but implementation is realistically several years away
- **Planning and modeling guidelines increase transparency and help utilities/LDCs identify cost-effective opportunities for deploying storage (All three states)**
- **Technical details still matter**
  - Interconnection standards, codes and safety necessary for streamlined, safe achievement of target (CA)

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Solar + Storage Programs

Massachusetts – SMART Program

The Solar Massachusetts Renewable Target (SMART) Program:

- Created in 2016 to competitively procure 1,600 MW of solar generation
  - Shares of the targets proportionally allocated to state's LDCs
  - Focus on small facilities; 5 MW cap and 20-35% required to be < 25 kW
  - Compensation: Production-based; 20 years guaranteed for > 25 kW, 10 years guaranteed for < 25 kW
- Revised in 2020 to add a variable adder for facilities co-located with energy storage
  - Significant performance requirements for storage assets
- Increased base rates and adders for generation that aligns with other policy goals, such as:
  - Serving low-income populations
  - Serving rural communities
  - Brownfield redevelopment

Solar + Storage in other settings

Net metering: Several states have taken steps in recent years to allow energy storage to participate in net metering programs. Details vary, but there are common themes:

- DC coupling: To prevent storage from charging from the grid and reselling it, states generally require storage assets to be DC coupled with the net metered solar (meaning it can only be charged by the attached solar)
- Time-of-use rates: Some states require net metered customers who add storage to go on time-of-use rates, thereby incenting grid-beneficial use of the storage
- Increasing requirements at high penetration: To address high levels of distributed generation, Hawaii has determined that to be eligible for net metering, new solar facilities must: 1) Not export to the grid; 2) Only export during designated evening hours, **or** 3) Be subject to curtailment at the utility's discretion.
  - Options 1 and 2 require energy storage

PURPA: FERC has ruled that energy storage can be eligible for PURPA contracts, if it is 75% charged by a PURPA-eligible source of generation.

- To date, there does not appear to be any energy storage assets under PURPA contract
- PURPA rates tend to be static; no economic incentive to add storage to shape output

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Thank you

Jeremy Twitchell
jeremy.twitchell@pnnl.gov
971-940-7104