



Policy Levers for Energy Storage Deployment

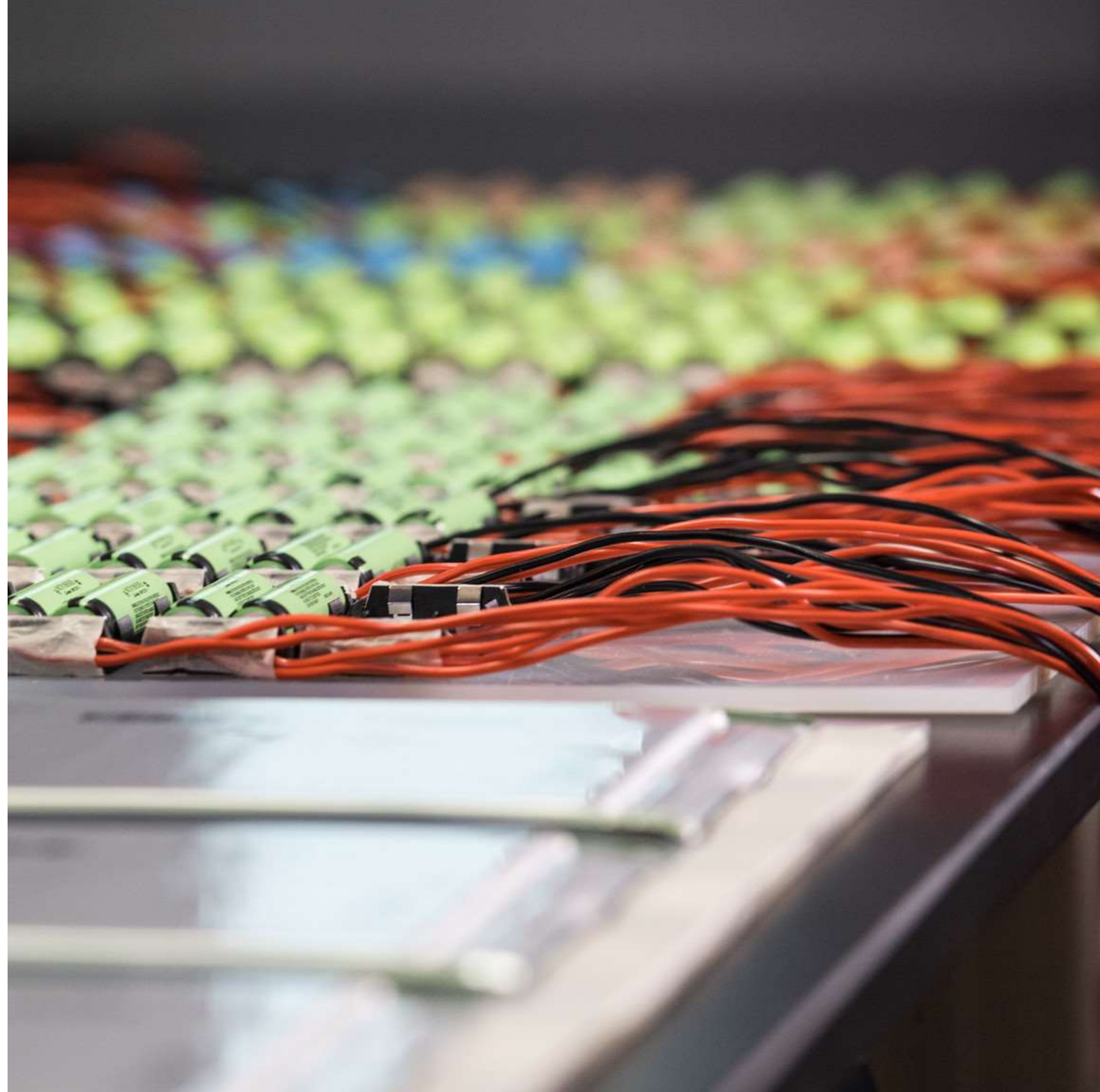
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Agenda

- ▶ **Overview of State-Level Policies**

- ▶ Procurement Targets
- ▶ Regulatory Adaptation
- ▶ Demonstration Programs
- ▶ Financial Incentives
- ▶ Consumer Protection

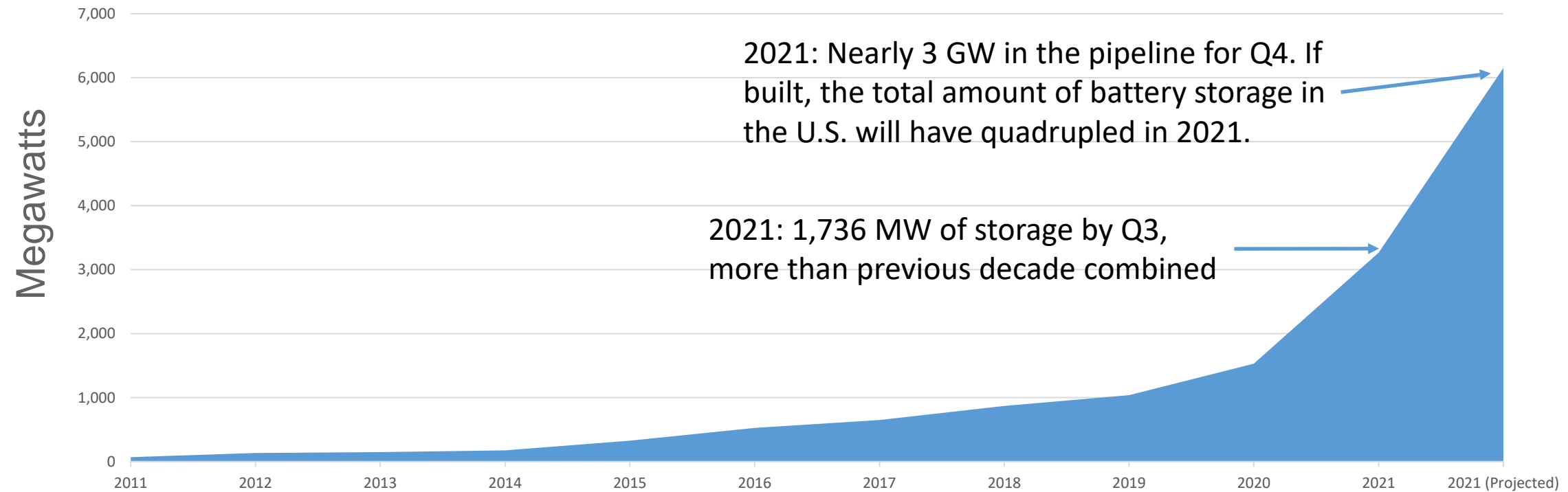
- ▶ **Case Studies: Programs in States with Storage Mandates**

- ▶ California
- ▶ Virginia
- ▶ Maine
- ▶ Connecticut

Overview of State-Level Policies on Energy Storage

Storage deployment and policy activity are accelerating

Cumulative Utility-Scale Battery Energy Storage (U.S.)



2011	2013	2015	2016	2017	2018	2019	2020	2021
<ul style="list-style-type: none"> • FEREC: Order 755 	<ul style="list-style-type: none"> • CA: 1,325 MW Target • WA: \$14m demo fund • HI: MPR mechanism 	<ul style="list-style-type: none"> • OR: 10 MWh target • NY: REV demo project • HI: Inter-connection changes 	<ul style="list-style-type: none"> • CA: SGIP storage focus • CA: 500 MW target increase • AZ: \$4m aggregation pilot • UT: Demo project 	<ul style="list-style-type: none"> • MA: 200 MW target • MA: \$20m demo fund • NV: Target legislation, incentives, storage as a right • NY: Target legislation • WA: Policy statement on storage in IRPs • NM: Storage in IRPs rule • AZ: \$2m BTM pilot • MD: Tax credit • VT: Study, demonstrations 	<ul style="list-style-type: none"> • FEREC: 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 	<ul style="list-style-type: none"> • OR: Solar + storage rebates • MA: Storage in retrofits • NY: Resilience incentives • CO: Storage in dist. plans • MD: Ownership pilot • 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 study; non-wires coordinator • MO: Storage in IRPs 	<ul style="list-style-type: none"> • Federal: BEST Act • VA: 3,100 MW target; plan requirements • AZ: BTM aggregation • MA: Clean peak implemented • NV: 1,000 MW target • 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 • CT: Storage interconnection • NH: Storage for T&D avoidance • RI: Tax credit for solar+ storage 	<ul style="list-style-type: none"> • Federal: Infrastructure Investment and Jobs Act • NY: 3,000 MW target • AZ: Expedited interconnection for solar + storage • VA: Sales tax exemption • ME: 400 MW target, critical load pilot • CT: 1,000 MW target; planning guidance; financial incentives • IL: Climate and Equitable Jobs Act (target, incentives, consumer rights)

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>:

Energy Storage Policy Database



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

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

This [article](#) discusses these policy types in greater detail.

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 10 states:

- ▶ **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](#)
- ▶ **Virginia:** [3,100 MW by 2035](#)
- ▶ **Maine:** [300 MW by 2025; 400 MW by 2030](#)
- ▶ **Connecticut:** [1,000 MW 2030](#)
- ▶ **Illinois:** [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
- ▶ **Connecticut:** PURA develops [six points of guidance](#) for utility investments in energy storage.
- ▶ **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
 - Legislature directs PUC to [design rates to incent BTM storage](#) usage during peak periods
- ▶ 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
- ▶ **Illinois:** [\\$280.5M to support storage](#) deployments at retiring coal plants
 - **PNNL Memo:** [Energy Storage for Social Equity: Capturing Benefits from Power Plant Decommissioning](#)

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
- ▶ **Illinois**: Climate and Equitable Jobs Act establishes a right for customers to use energy storage at their residence, and directs utilities to allow for the interconnection of customer-sited storage in a timely manner

Case Studies: Programs in States with Storage Mandates

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

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

Target Establishment:

- ▶ In June 2021, the Maine Legislature established a target of 400 MW by 2030 with an incremental target of 300 MW by 2025.
- ▶ After 2030, the Governor's Energy Office will update the target every two years.

Other things the target legislation did:

- ▶ **Financial incentives:** Added load shifting to the mission of the Efficiency Maine Trust and authorized the use of incentives for customer-sited energy storage systems
- ▶ **Resilience demonstration program:** Also directed the Efficiency Maine Trust to develop a 15 MW pilot program to deploy BTM storage at critical facilities
- ▶ **Rate design:** Directs the PUC to implement time-of-use rates as an incentive for customers to reduce usage during peak
- ▶ **Market assessment:** Directs the Governor's Energy Office to prepare a report identifying obstacles to the achievement of the target and options for addressing them

Additional measure in place:

- ▶ **Non-wires alternative coordinator:** 2019 legislation created an independent arbiter of utility resource plans to identify opportunities for non-wires alternatives

Connecticut

PURA's Electric Storage Program (July 2021):

- ▶ **Program objectives:** Identifies seven distinct objectives for program investments to achieve, including net positive economic benefits, resilience, reducing financial barriers, and emissions reduction
- ▶ **BTM Target Disaggregation:** Determined that the 580 MW BTM target should be used for peak management and broke it down by customer class and timing:

Table 1: Electric Storage Deployment Targets

CUSTOMER CLASS	2022-2024	2025-2027	2028-2030	TOTAL
Residential	50 MW	100 MW	140 MW	290 MW
Commercial and Industrial	50 MW	100 MW	140 MW	290 MW
Total	100 MW	200 MW	280 MW	580 MW

- ▶ **Financial incentives:** Established up-front and performance-based incentive for BTM systems participating in the program
 - Adder incentives for low-income and underserved customers

Target Establishment:

- ▶ In June 2021, the Connecticut Legislature established a requirement of 1,000 MW by 2030, with incremental targets of 300 by 2024 and 650 MW by 2027.
- ▶ Of the final target, 580 MW must be connected to the distribution system
- ▶ Authorizes the Public Utilities Regulatory Authority (PURA) to develop programs to facilitate the target's achievement.

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.)
 - Point of interconnection approach: Where do we want the storage? (Transmission, distribution, BTM, etc.)
 - Assignment responsibility: Who will be responsible for acquiring storage
- ▶ **Customer-owned and -sited storage is a major factor in reaching state goals**
 - Can be facilitated with state incentives or ratepayer-funded utility programs
 - Aggregation allows for leveraging of private investments to achieve grid benefits that flow to all customers
 - Order 2222 will greatly facilitate aggregation in ISO regions, 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 states)**
- ▶ **Technical details still matter**
 - Interconnection standards, codes and safety necessary for streamlined, safe achievement of target



Thank you

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