

NH EESE Board Meeting

Policy and Economic Benefits of Pay-for-Performance Battery Programs in State Energy Efficiency Plans

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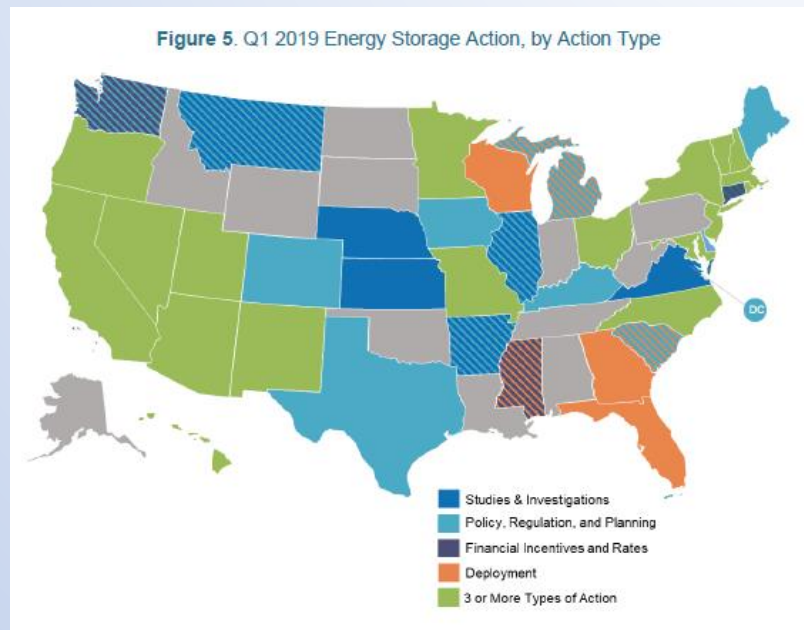
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States energy storage policy landscape

MARKETS

- Studies/Roadmaps
 - CA, NY, MA, NM, RI, OR, VT, NJ, MN, MD, others
- Grants/Demonstration projects
 - NY, NJ, MA, CA, WA, OR, VT, CT, Others
- Longer-term programs
 - Utility procurement targets
 - CA, OR, MA, NY, NJ, VA
 - Rebates/Other incentives
 - Rebates (CA, NJ, NY)
 - State tax incentives (MD)
 - Storage adder in solar incentive program (MA, OR, NY)
 - IRP reform (NM, WA)
 - BYOD programs (VT, NH, NY, OR, UT)
 - Storage in EE plan (MA, RI, CT, NH)



Source: The 50 States of Grid Modernization: Q1 2019 Quarterly Report

ConnectedSolutions type programs:

Massachusetts – effective in January, 2019; now being expanded

Rhode Island – effective in January, 2020

Connecticut – effective summer, 2020; PURA seeking additional proposals

New Hampshire – proposed for 2021-2023

- NH program is called “Storage Performance” rather than “ConnectedSolutions” but is the same program model
- Proposed by utilities as part of the “Active Demand Reduction” section of the EE plan
- Commercial and residential customers can participate with controllable devices behind the meter (batteries, thermostats and EV chargers)
- Would bring successful ADR pilots into full program status

From the draft plan: “Storage Performance is a BYOD pay-for-performance offering, which incents customers with BTM storage already at their facilities for the measured discharge when responding to an NH Utility event signal. The performance-based incentive only rewards the performance of storage systems and does not provide compensation for other project costs.”

NH proposal includes numerous references to the Massachusetts program:

“Eversource and Unitil joined with counterparts in Massachusetts and Connecticut on a regional evaluation of C&I ADR programs and pilots, which are implemented on a similar basis across multiple states. This approach allowed for more robust results at a lower cost than would be possible through a study limited to NHTSaves Program offerings.

“Recent ADR program evaluations are available from Massachusetts on that state’s residential Wi-Fi thermostats and residential battery storage programs. These evaluations will provide a strong basis for the development and implementation of New Hampshire’s Residential ADR programs.”

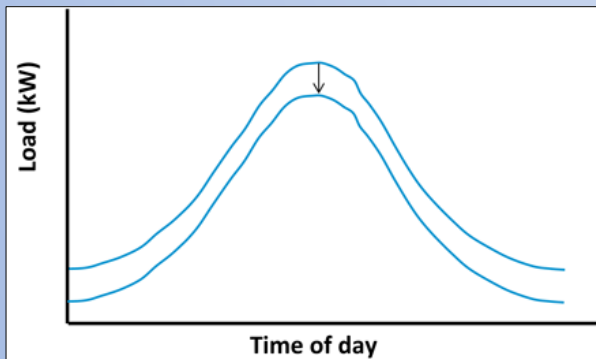
Key elements of the program model:

- Customers purchase batteries and participate under a contract with utilities. Utilities pay only for services received.
- Batteries are used to reduce system-wide electric demand peaks, not individual customer peaks, thereby providing benefits to all ratepayers
- All customers can participate
- Utility pay-for-performance contracts de-risk energy storage investments
- Storage provides grid benefits greater than costs

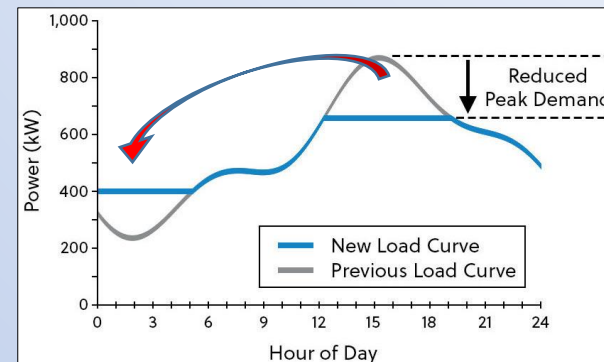
How does it work?

- Traditionally, electrical efficiency is defined as “using fewer electrons”
- Massachusetts expanded the traditional definition of efficiency to include *peak demand reduction*

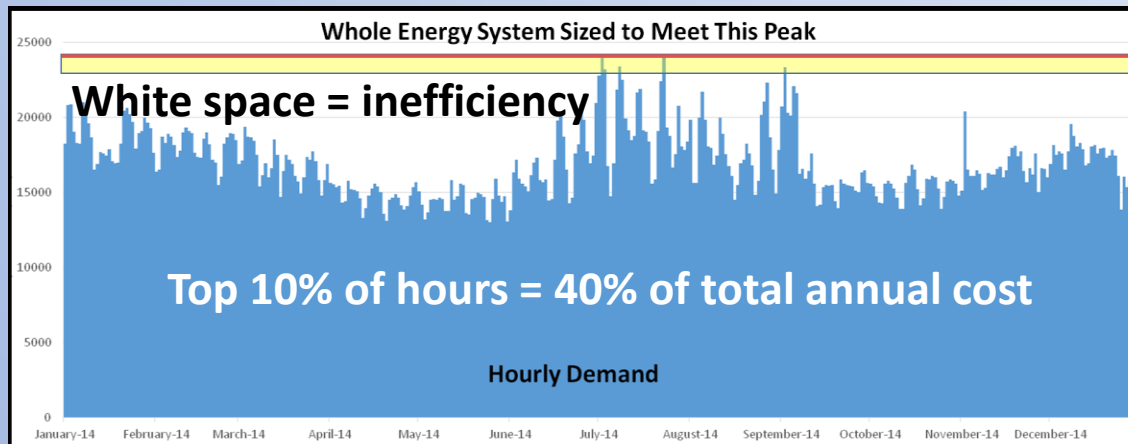
Key concept: Not all load hours should be valued the same



Traditional efficiency lowers net consumption, but does not shift peaks



Peak demand reduction shifts peaks



From Massachusetts
State of Charge
report

Traditional demand charge management: Great for some storage customers, but not for all

- Only available to commercial customers (not residential)
- Only economically feasible where demand charges are high (MA example – works in Eversource territory, but not so well in National Grid)
- Only works if customer's load is peaky
- Seen as risky by some lenders
- Customers must accurately predict their own demand peaks
- Can become uneconomic if utility changes rates, or customer changes pattern of electricity use
- Typically, smaller batteries are most economical for this model = less resilience
- Individual customer gains may not benefit other ratepayers

Demand Charges in New England

- Massachusetts
 - \$3.92 - \$6.00/kW (National Grid)
 - \$10.74 - \$41.25/kW (Eversource)
- Connecticut (Eversource)
 - Small General Electric Service = \$20.82/kW
 - Intermediate General Electric Service = \$17.34/kW
 - Large Church and School = \$18.17/kW
- New Hampshire (Eversource)
 - Small Commercial = \$15.25/kW
 - Medium Commercial = \$14.10/kW
- Maine (Central Maine Power)
 - Small General Service = \$12.18 - \$13.57/kW
 - Intermediate General Service = \$13.95/kW
 - Large General Service = \$15.38 - \$15.71/kW
- Vermont (Green Mountain Power)
 - Small General Service = \$14.30
 - Large General Service = \$14.67
- Rhode Island (National Grid)
 - Small Commercial = \$9.17/kW
 - Medium Commercial = \$8.41/kW
 - Large Commercial = \$7.03/kW



Generally, energy storage for demand charge management is economical (without subsidies) if the customer is paying at least \$15/kW for demand charges.

ConnectedSolutions Project Economics Example

A commercial customer participating in the targeted dispatch program installs a 60 kWh battery and signs up for a \$200/kW summer daily dispatch program. Assuming perfect call response:

60 kWh battery = 20 kw/hr load reduction averaged over 3-hour calls.

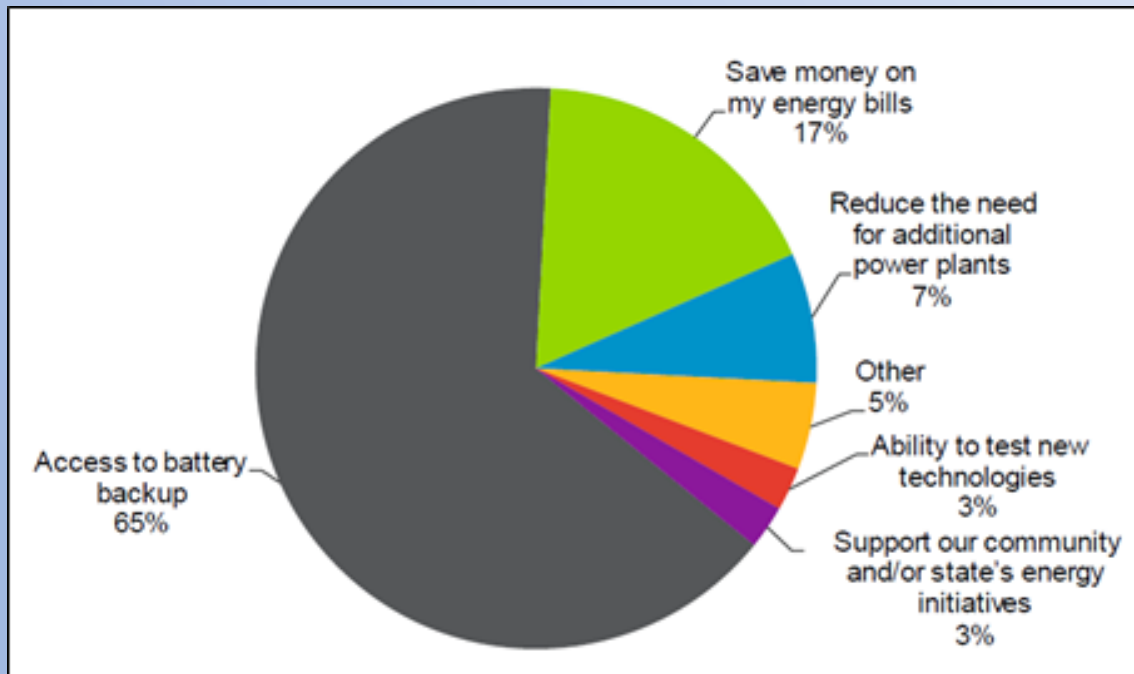
20 kW average load reduction x \$200 incentive rate = \$4,000 maximum payout

		Three Options to Curtail		
		Massachusetts	Rhode Island	
Commercial	Daily Dispatch	<ul style="list-style-type: none"> • 30 - 60 events per summer • 2 - 3 hours per event • Technology/Vendor Agnostic • \$200/kW-performed-summer • \$ 25/kW-performed-winter • Plus SMART Battery Adder 	<ul style="list-style-type: none"> • 30 - 60 events per summer • 2 - 3 hours per event • Technology/Vendor Agnostic • \$300/kW-summer 	
	Residential Batteries	<ul style="list-style-type: none"> • 30 - 60 events per summer • 2 - 3 hours per event • 4 Approved Battery Vendors • \$225/kW-performed-summer • \$ 50/kW-performed-winter • Plus SMART Battery Adder 	<ul style="list-style-type: none"> • 30 - 60 events per summer • 2 - 3 hours per event • 4 Approved Battery Vendors • \$400/kW-summer 	

Results: Customer satisfaction

Navigant Consulting published the first results from ConnectedSolutions, based on enrolled residential customers in National Grid territory (MA)

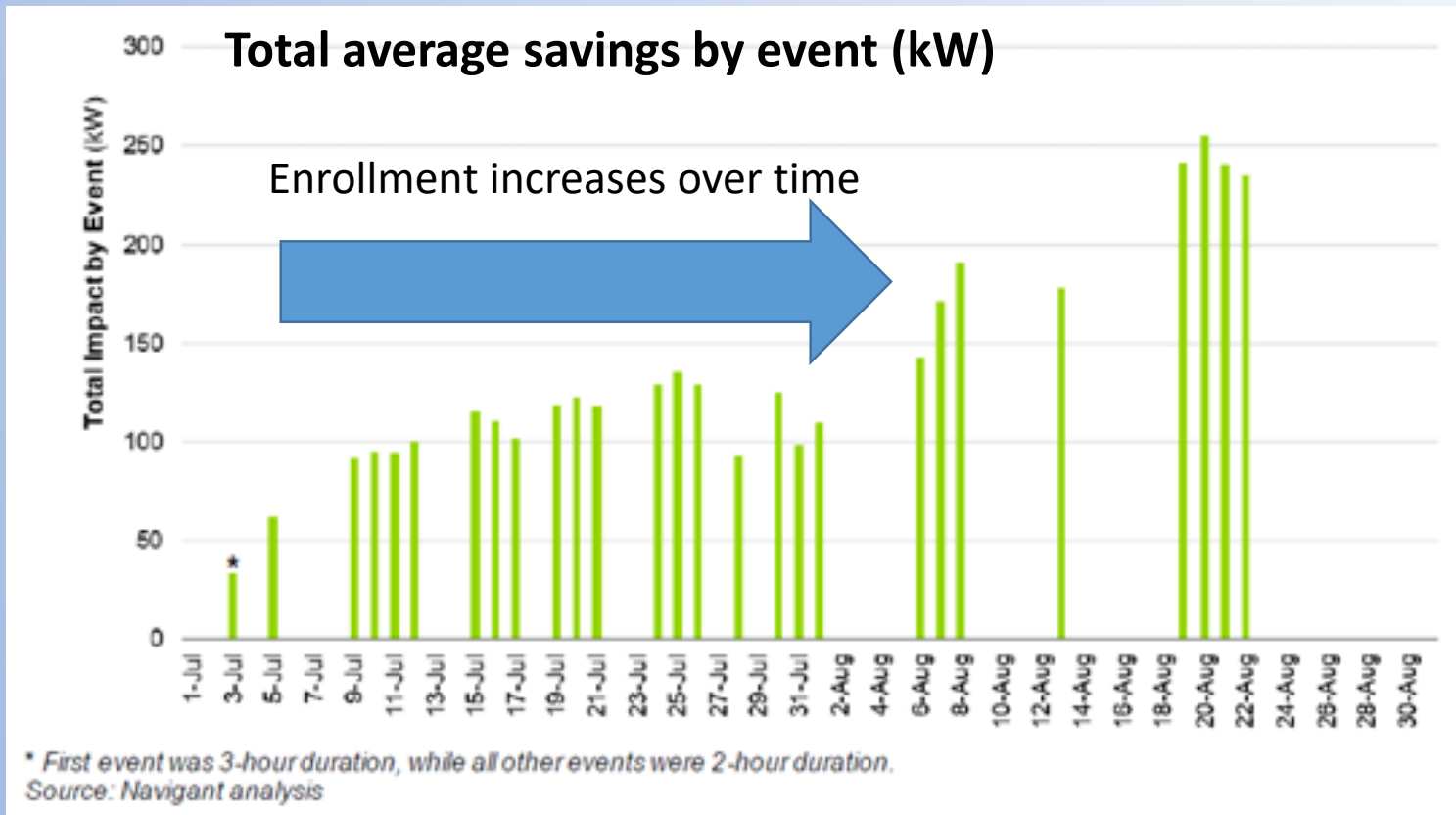
Participant motivations for battery purchase



Enrolled residential customers:

- 65% said battery backup was their primary motivation for owning a battery
- 94% never opted out of an event
- 97% would recommend the program to other customers
- 97% are likely or very likely to continue with the program

Results: Program effectiveness and economics



- Average residential customer battery discharge was 5.5 kW
- At summer payment rate of \$225/kW, average customer payment was \$1,237.5 for the summer season
- Adding winter season, this would provide customer payback in 6 years

Simple Payback Period (over 25-year project) for commercial multi-family housing

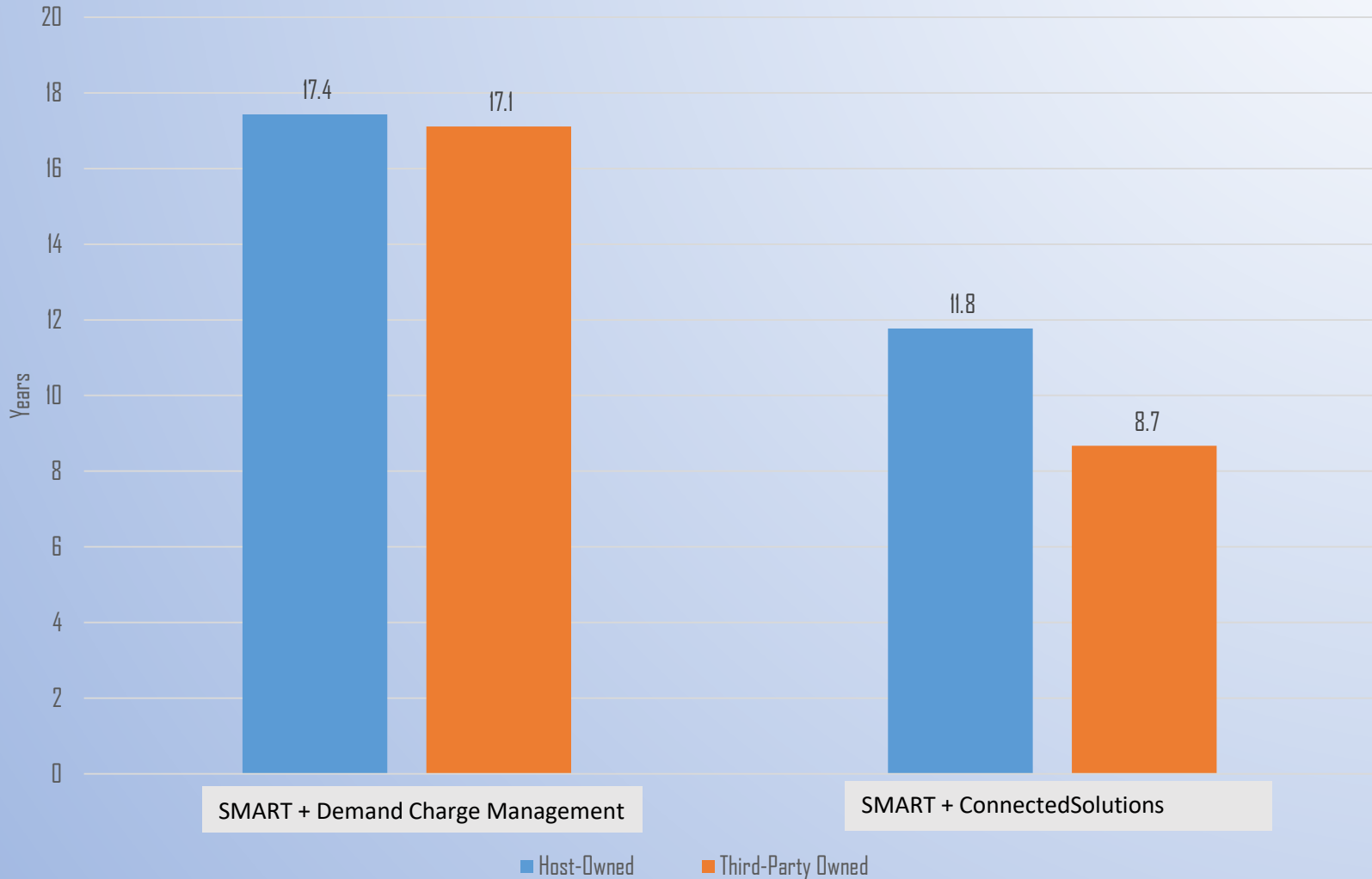


Chart shows average SPP for several projects in MA Eversource territory. Battery projects are 25-year projects with battery replacement at year 10.

Advantages of ConnectedSolutions (compared to demand charge management)

Owner Benefits

- **De-risking investment** by providing reliable, contractual revenue streams and defining standardized eligible systems, to make storage “bankable.”
- **Making storage viable for many more customers** by making storage economics work broadly, for any customer type, utility region or tariff.
- **Improving economics** by shortening payback periods.
- **Supporting more customer resilience** by supporting bigger and longer-duration batteries.

Policy Benefits

- **Providing demonstrable grid benefits** by more accurately aligning customer battery discharges with regional demand peaks.
- **Creating a tool to achieve additional societal benefits** by bringing customer batteries into state-regulated programs.
- **Addressing utility ownership issues** by giving utilities a way to manage BTM storage resources without having to own them.
- **Ensuring a diverse storage market** by involving customers and third-party developers/aggregators as partners in an aggregated system.

Thank You

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