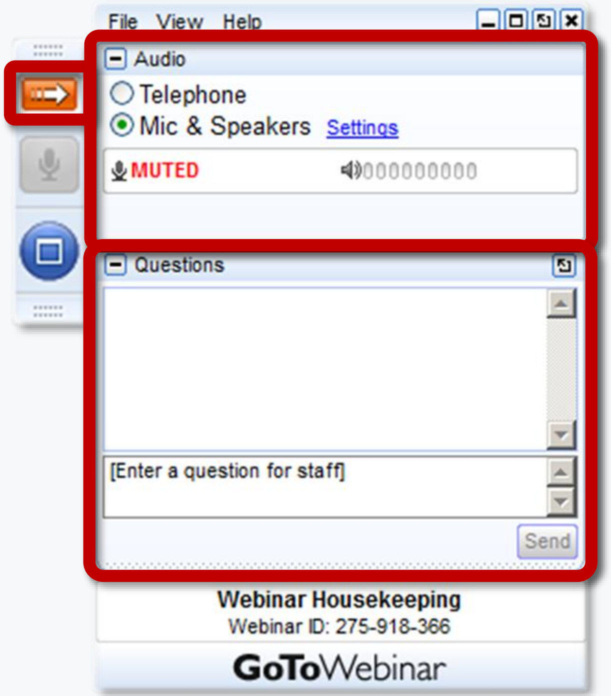
Clean Energy Group
Innovation in Finance, Technology & Policy

Energy Storage in State Energy Efficiency Plans: Lessons from Massachusetts

April 4, 2019

Todd Olinsky-Paul, Clean Energy Group (moderator)
Liz Stanton and Bryndis Woods, Applied Economics Clinic

HOUSEKEEPING



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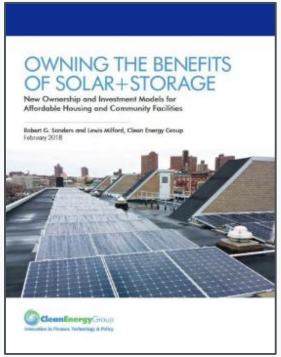
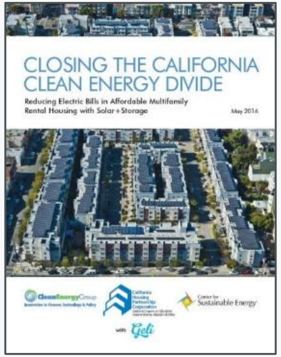
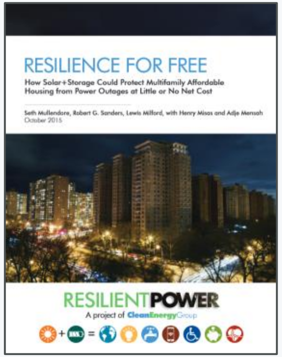
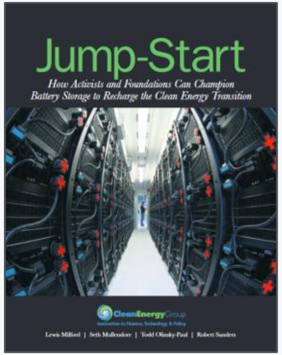
THE RESILIENT POWER PROJECT

- Increase public/private investment in clean, resilient power systems (solar+storage)
- Protect low-income and vulnerable communities, with a focus on affordable housing and critical public facilities
- Engage city, state and federal policy makers to develop supportive policies and programs
- Visit www.resilient-power.org for more information and resources

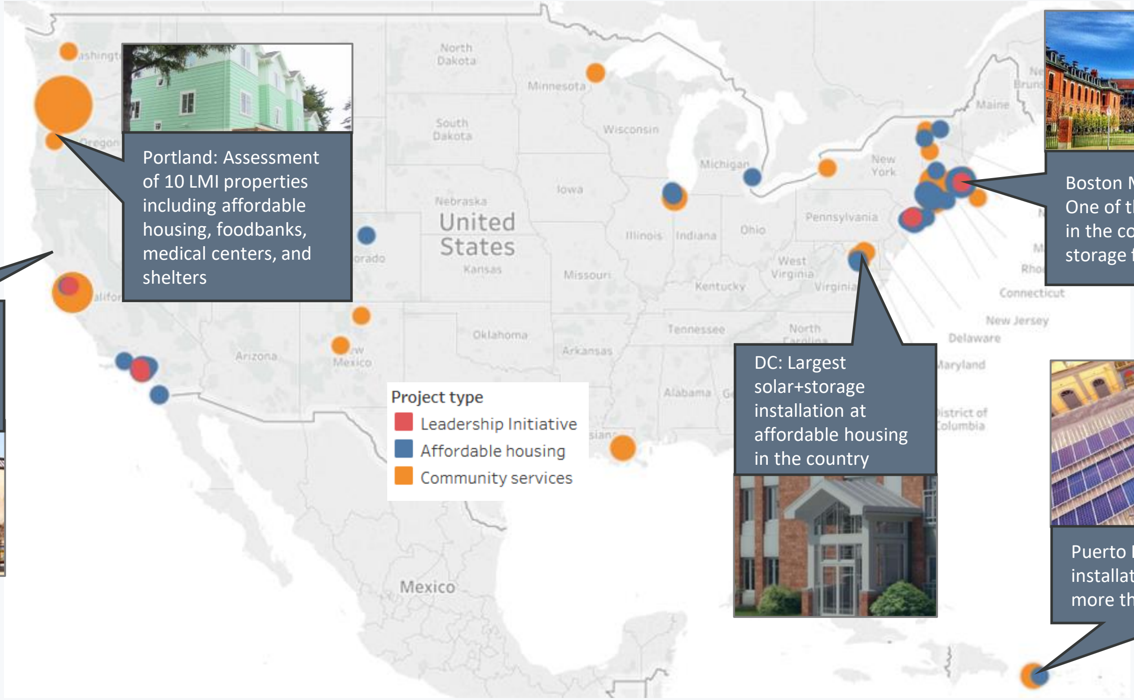








SUPPORTING 100+ PROJECTS ACROSS THE COUNTRY



Portland: Assessment of 10 LMI properties including affordable housing, foodbanks, medical centers, and shelters

California: Multiple housing properties representing hundreds of units of affordable housing

Boston Medical Center: One of the first hospitals in the country to install storage for resiliency

DC: Largest solar+storage installation at affordable housing in the country

Puerto Rico: Supporting the installation of solar+storage at more than 60 medical clinics

WEBINAR SPEAKERS

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Researcher, Applied Economics Clinic

CleanEnergyGroup
Innovation in Finance, Technology & Policy

Applied Economics Clinic
Economic and Policy Analysis of Energy, Environment and Equity

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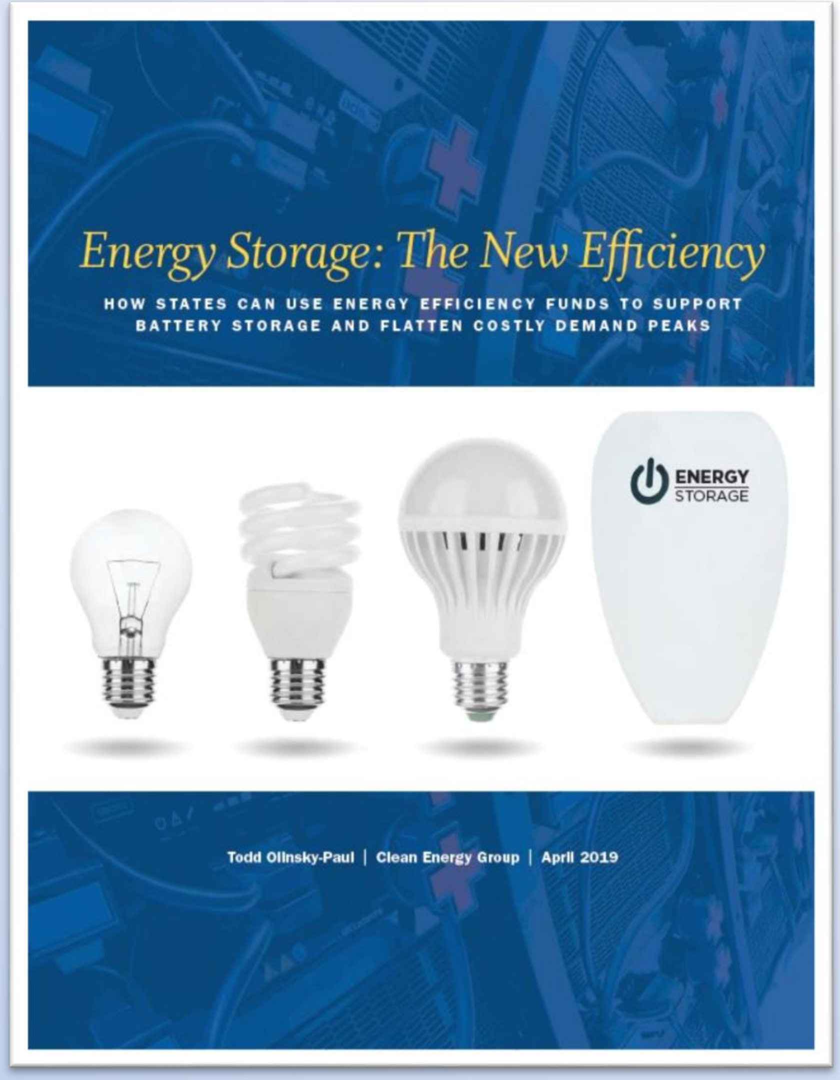
Energy Storage: The New Efficiency

How States Can Use Efficiency Funds to Support Battery Storage and Flatten Costly Demand Peaks

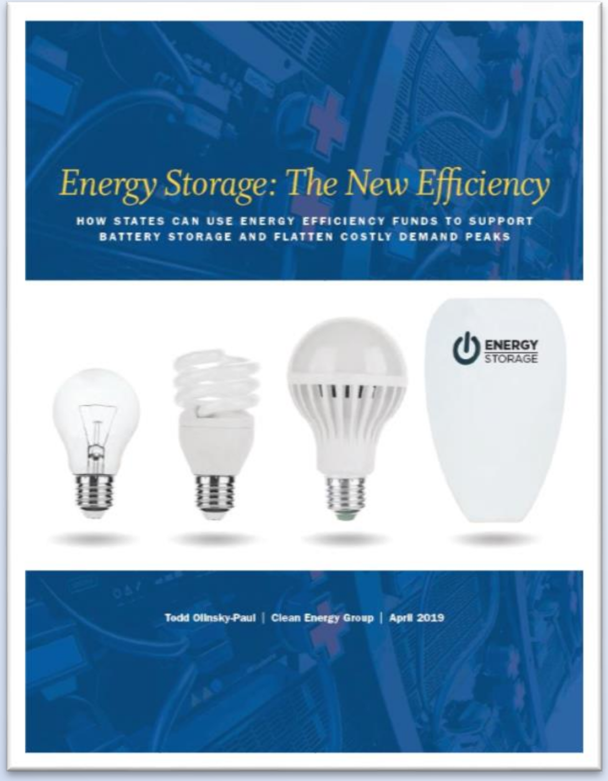
Published April 4, 2019 by Clean Energy Group



www.cleanegroup.org/ceg-resources/resource/energy-storage-the-new-efficiency

Report does four things:

1. Explains **how Massachusetts incorporated battery storage into its energy efficiency plan, and how other states can do the same**
2. Discusses issues and best practices in **battery incentive design**
3. Introduces **battery storage cost/benefit analysis**

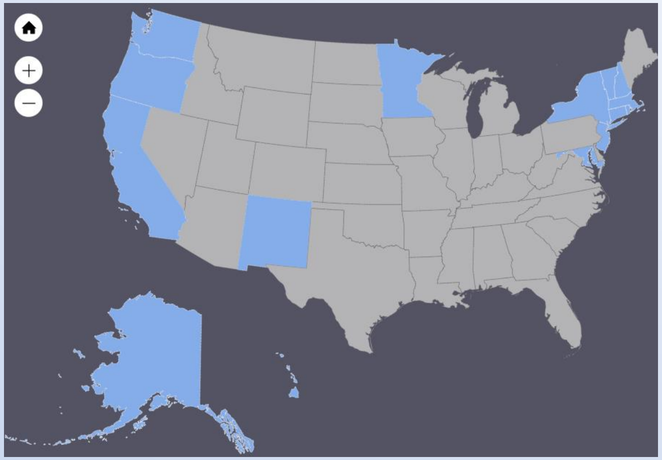


4. Assigns, for the first time, dollar values to **seven non-energy benefits of storage** (not included in previous BCRs)
   1. Avoided power outages (combines value to customer and value to grid)
   2. Higher property values
   3. Avoided fines
   4. Avoided collections / terminations
   5. Avoided safety-related emergency calls
   6. Job creation
   7. Less land used for power plants (expressed in acres)

States Policy Landscape

MARKETS

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



In Massachusetts, two conditions needed to be met before storage could be included in the efficiency plan:

1. **Redefining efficiency.** In order to include storage within the energy efficiency plan, Massachusetts first had to **include demand reduction, a major application of battery storage, within the efficiency plan.**

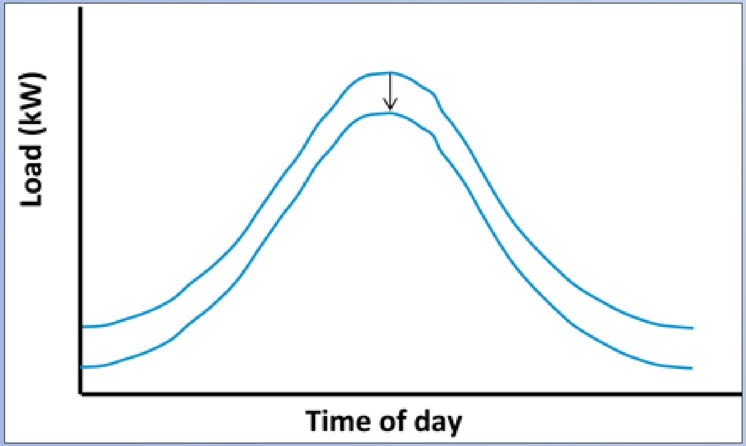
2. **Showing that storage is cost-effective.** In order for energy storage to qualify for the efficiency plan, it first had to be shown to be cost-effective. This meant that **storage had to be able to pass a Total Resource Cost** (TRC) test.

1. Redefining efficiency

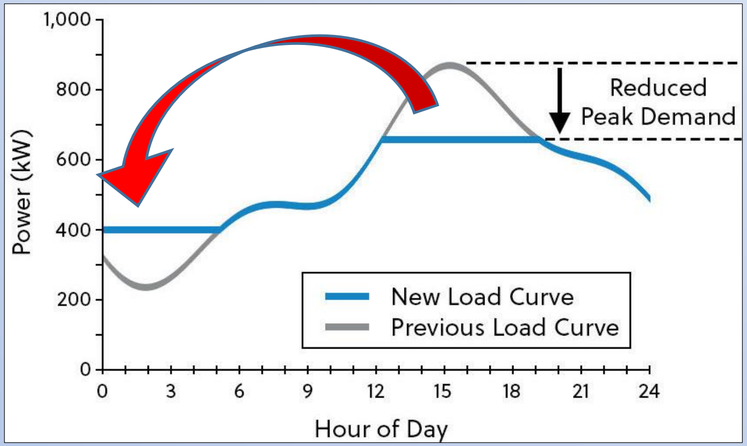
- **Traditionally, electrical efficiency is defined as "using fewer electrons"**
  - Storage does not normally qualify due to round trip losses
- **Massachusetts expanded the traditional definition of efficiency to include peak demand reduction**
  - Storage is well-suited to shifting peak demand, something traditional passive efficiency measures don't do

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

Traditional efficiency reduces overall consumption, but does not shift peaks

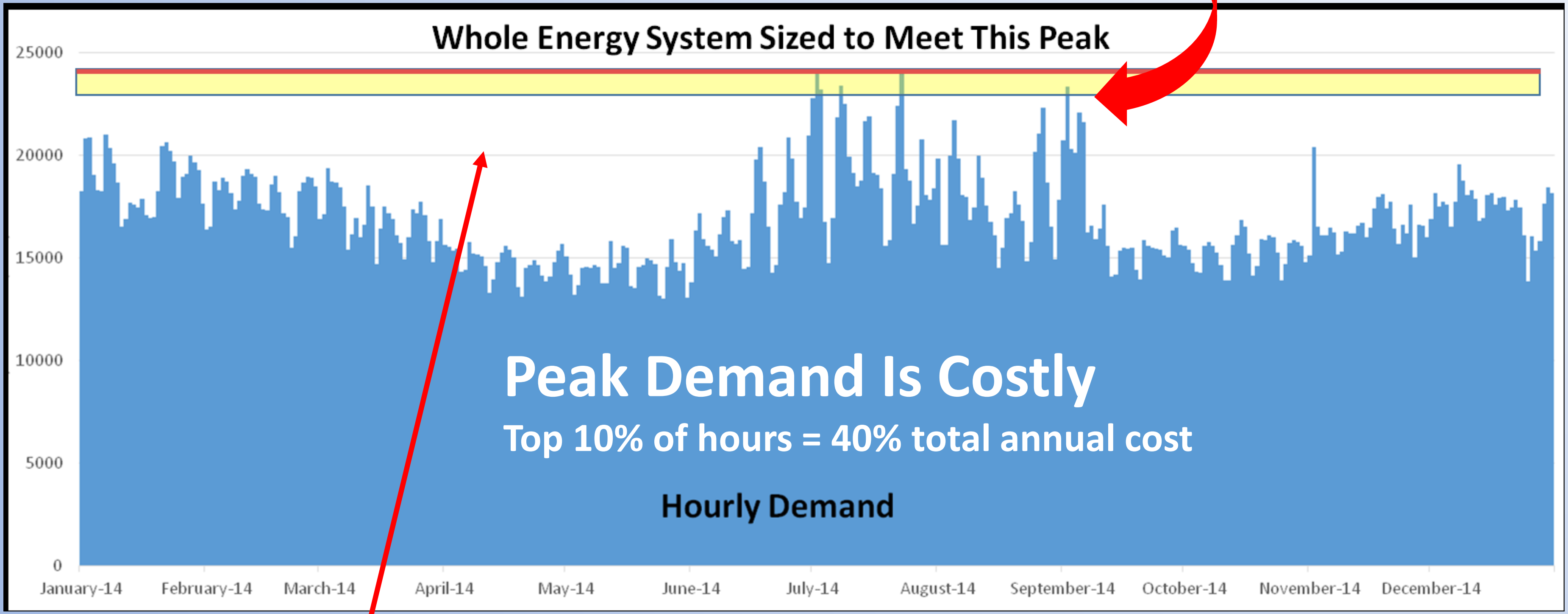


Peak demand reduction reduces peaks, but does not reduce net consumption



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 energy.



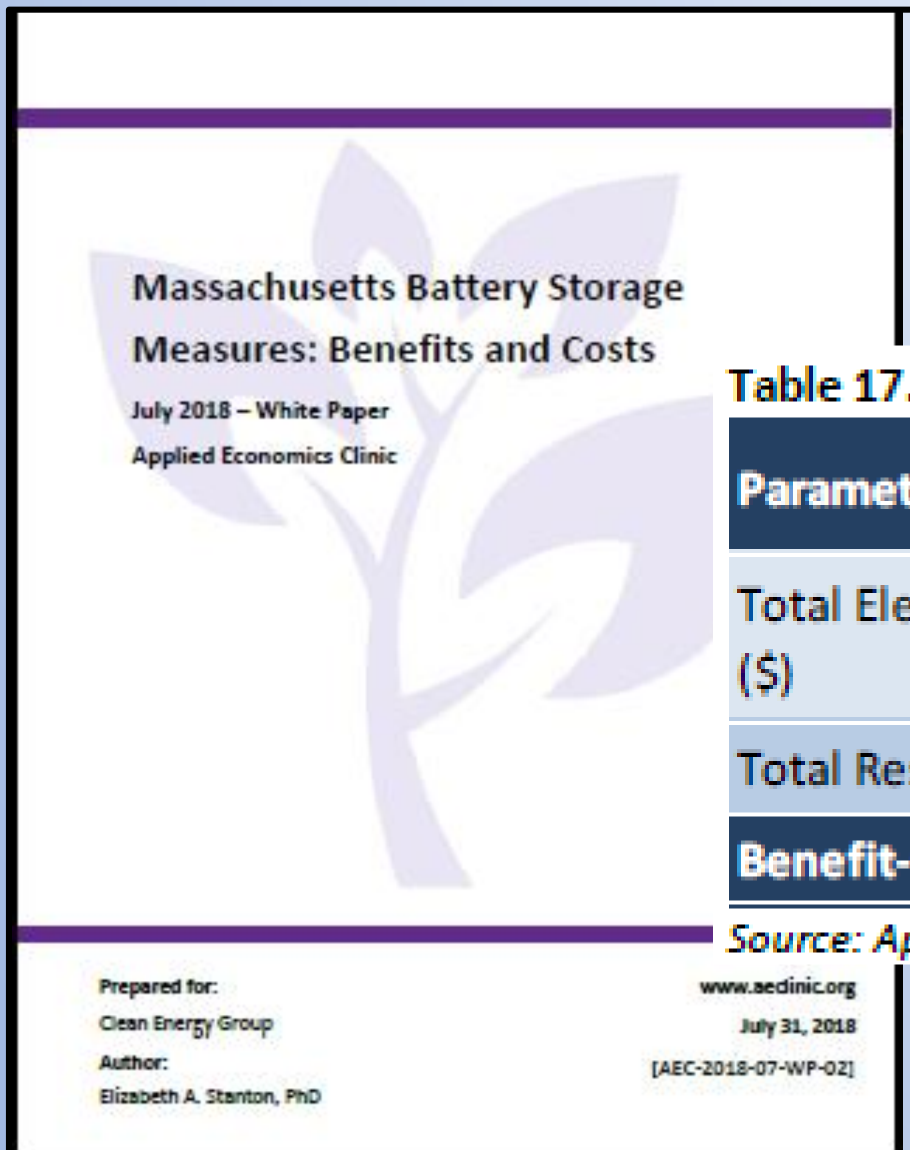
From Massachusetts *State of Charge* report

White space = inefficiency in the system

Redefining efficiency

- 2008: Massachusetts ***Green Communities Act*** requires that efficiency program administrators seek "…all available energy efficiency **and demand reduction resources** that are cost effective or less expensive than supply."
- 2016: Massachusetts ***State of Charge*** report notes that "**Storage and other measures that shift load are firmly covered by the intent of the [Green Communities] Act**" and adds, "The 2016-2018 Statewide **Energy Efficiency Investment Plan ("Three Year Plan") identifies peak demand reduction as an area of particular interest**…. **Energy storage, used to shift and manage load as part of peak demand reduction programs, can be deployed through this existing process."**
- 2018: Massachusetts **"Act to Advance Clean Energy"** specifically allows the use of energy efficiency funds to support the deployment of cost-effective energy storage "if the department determines that the **energy storage system installed at a customer's premises provides sustainable peak load reductions**."

2. Showing that storage is cost-effective


Massachusetts Battery Storage Measures: Benefits and Costs

July 2018 – White Paper

Applied Economics Clinic

Prepared for:
Clean Energy Group

Author:
Elizabeth A. Stanton, PhD

www.aeclinic.org

July 31, 2018

[AEC-2018-07-WP-02]

To qualify for state energy efficiency plans, *storage must pass a cost/benefit test*

Table 17. Total benefits and costs

Parameter for 2019	Low-Income	C&I
Total Electric Benefits ($)	$36,296	$155,782
Total Resource Cost ($)	$13,163	$46,322
Benefit-Cost Ratio	**2.8**	**3.4**

Source: Applied Economics Clinic calculations

CEG published independent economic analysis by AEC – July, 2018

Storage BCRs from Massachusetts EE plan PAs

NOTE: These numbers do not include non-energy benefits!

BCRs	Cape Light			Eversource			National Grid			Unitil		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Residential Advanced Demand Management Program (A2e)												
Program BCRs	*1.6*	*2.4*	*2.4*	*1.0*	*1.4*	*1.6*	*1.5*	*2.4*	*2.5*	*0.7*	*1.1*	*1.2*
Direct Load Control	4.9	6.6	7.4	5.0	5.0	5.0	5.3	5.5	5.3	5.2	9.6	9.6
Behavioral DR												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch				1.5	1.5	1.5	4.9	4.9	5.0			
Storage Targeted Dispatch				0.0	0.0	0.0	0.1	0.1	0.1			
EV Load Management								0.8	0.8			
Income-Eligible Advanced Demand Management Program (B1b)												
Program BCRs		*2.3*	*2.4*					*2.4*	*2.4*			
Direct Load Control												
Behavioral DR												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch												
Storage Targeted Dispatch												
EV Load Management												
Commercial/Industrial Advanced Demand Management Program (C2d)												
Program BCRs	*7.5*	*4.6*	*4.7*	*2.9*	*2.9*	*2.8*	*7.9*	*4.8*	*4.9*	*2.7*	*2.9*	*3.1*
Interruptible Load	9.7	9.8	9.8	7.9	7.9	7.9	7.5	7.5	7.5	4.2	4.2	4.2
Winter Interruptible Load												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch				1.7	1.7	1.7	4.9	4.9	5.0	6.2	6.2	6.2
Storage Targeted Dispatch				3.2	3.2	3.2	0.1	0.1	0.1	0.1	0.1	0.1
Custom	8.3	8.3	8.3		2.0	2.0	1.3	1.3	1.3			

Massachusetts Energy Efficiency Plan Incentive Structure

- Storage measures are in new Active Demand Reduction program
- **Incentive is for performance (load reduction), not installation**
- New BTM storage is eligible (with or without renewable generation)
- Residential and commercial customers may participate
- Two programs offered:
  - Daily discharge - $200/kWh (demonstration program)
  - Targeted discharge - $100/kWh summer, $25/kWh winter (full program offering)
- **Incentive payment based on *average load reduction*** during peak hours called by utility
- **Discharges will be called in *three hour blocks***
- Incentive paid at end of each year or season
- Utilities execute 5-year contract with customers
- HEAT loans available for storage

Project Economics Example

A commercial customer participating in the targeted dispatch program installs a 60 kW battery. Assuming perfect call response, 60 kW battery = 20 kw/hr load reduction averaged over 3-hour calls.

Incentive payment calculation: Assuming a 60 kW battery (maximum 20 kW load reduction average):

Summer payout = 20 kW x $100 = $2,000

Winter payout = 20 kW x $25 = $500

Annual revenue = $2,500

Note: a customer installing new solar+storage could qualify for energy efficiency performance incentive *and* the SMART solar rebate with storage adder

Customers can participate in these programs while engaging in net metering *and* demand charge management

Anticipated Results (Deployment)

- Massachusetts 2019-2021 Energy Efficiency Plan includes BTM storage as a demand reduction measure
- Incentive payments = **~$13 million** over three years
- Expected results = **~34 MW** new behind-the-meter storage

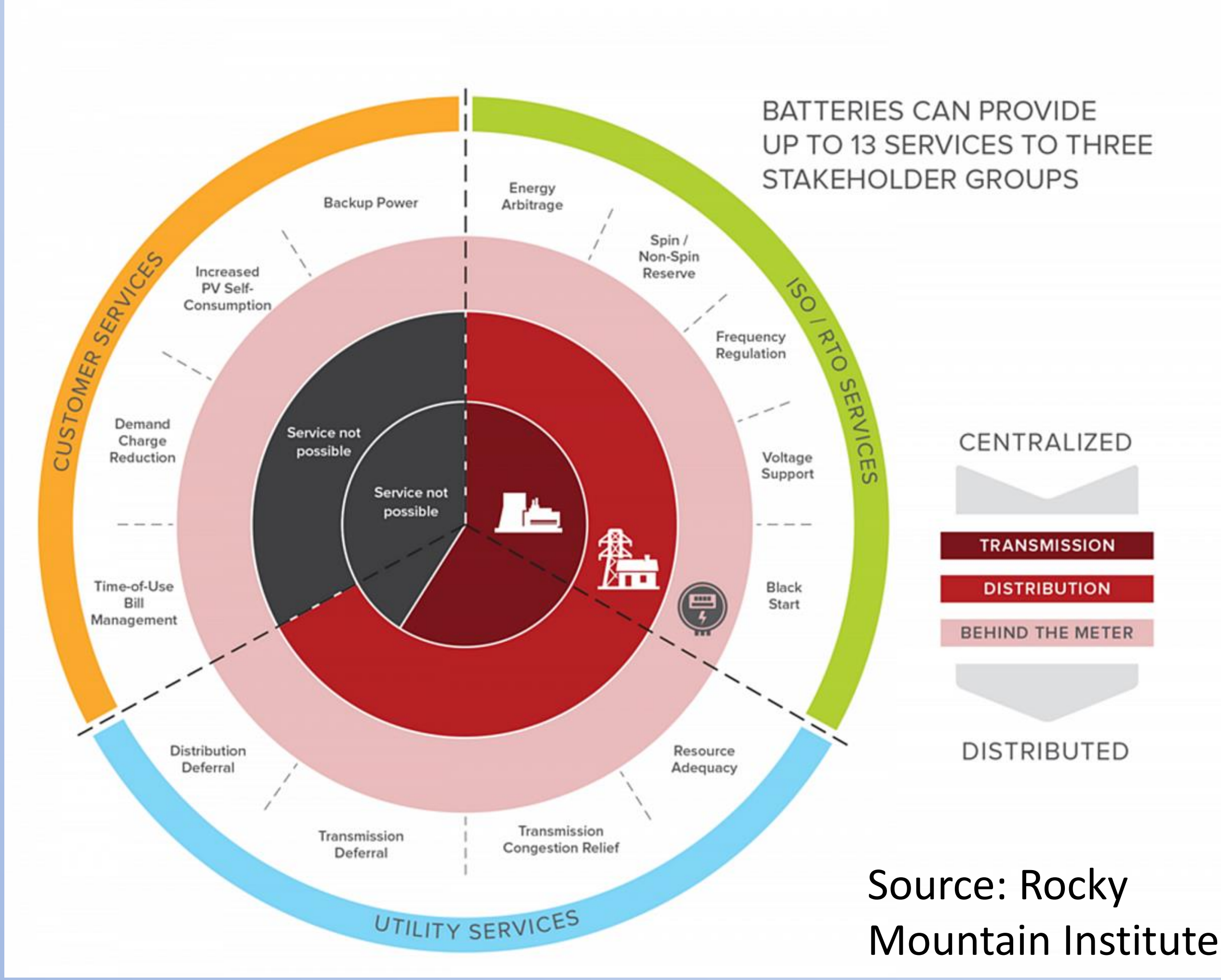
Shortcomings:

- No enhanced incentive, financing or carve-out for **low-income customers**
- No up-front **rebate**
- Numerous omissions mean **storage BCRs are likely too low**
- Daily discharge proposal downgraded to demonstration program
- Cape Light Compact proposal was NOT approved as proposed

What states should do

- **Expand the definition of energy efficiency to include peak demand reduction**
  - Energy efficiency program goals should include peak demand reduction goals
- **Fully integrate demand reduction measures, including battery storage, into state energy efficiency plans**
  - Battery storage becomes an eligible technology
- **Develop battery storage or demand reduction incentives within the energy efficiency program**
  - Incentives should include three basic elements:
    - Up-front rebate
    - Performance incentive
    - Access to financing
  - Incentives should include adders and/or carve-outs for low-income customers
  - Utility ownership should be limited
  - Third-party developers should be able to participate:
    - Market the program to customers
    - Provide private financing
    - Offer lease and PPA models
    - Aggregate capacity to meet program goals

- **Adopt, adapt and build on the economics analysis presented here**
  - Cost/benefit analyses of storage
  - Consider both the energy and the non-energy benefits of storage
  - Additional non-energy benefits of storage should be identified and valued



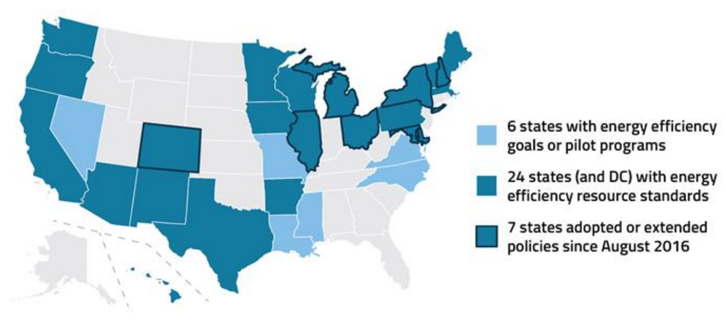
Source: Rocky Mountain Institute

Appendix B. Electric Efficiency Program Spending per Capita

State	2017 electric efficiency spending ($ million)	$ per capita
Vermont	64.0	102.42
Massachusetts	620.6	91.11
Rhode Island	83.4	78.85
Connecticut	153.9	43.03
Oregon	158.6	38.75
Washington	281.8	38.67
Idaho	64.6	38.35
California	1,412.1	35.68
Iowa	112.3	35.62
Maryland	201.5	33.50
Minnesota	165.0	29.69
Illinois	349.1	27.27
Maine	31.1	23.38
Arkansas	68.6	22.86
New York	450.1	22.80
Michigan	220.4	22.20
District of Columbia	13.9	20.41
New Hampshire	26.1	19.55
Kentucky	84.7	19.09
Delaware	18.2	19.08
New Mexico	38.7	18.60
Wyoming	10.5	17.88
North Carolina	180.9	17.82
Colorado	98.2	17.38
Nevada	51.0	17.34
Utah	51.4	16.85
Oklahoma	66.0	16.82
Arizona	115.4	16.65
Missouri	100.0	16.41
Ohio	188.9	16.09
Hawaii	20.8	14.55
Indiana	87.0	13.12
Pennsylvania	164.1	12.84
New Jersey	113.5	12.69
Montana	13.0	12.43
Wisconsin	70.6	12.22
Texas	257.7	9.25
Florida	190.3	9.23
Mississippi	27.6	9.23
Tennessee	52.5	7.89
West Virginia	14.2	7.75
South Carolina	29.8	6.01
Georgia	55.5	5.38
Nebraska	10.2	5.34
South Dakota	4.4	5.09
Alabama	16.2	3.33
Louisiana	7.3	1.57
Virginia	0.1	0.02
Alaska	—	0.00
Kansas	—	0.00
North Dakota	—	0.00
US total	6,611.7	20.25
Median	98.2	23.38

Massachusetts Energy Efficiency Plan: $2 Billion

All State Energy Efficiency Investment: $9 Billion



Thank You

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Massachusetts Battery Storage Measures: Benefits and Costs

Liz Stanton, PhD and Bryndis Woods
Applied Economics Clinic
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April 4, 2019

Applied Economics Clinic
Economic and Policy Analysis of Energy, Environment and Equity

Applied Economics Clinic (AEC)

www.aeclinic.org

AEC is an independent, 501(c)(3) non-profit consulting group housed at Tufts University's Global Development and Environment Institute.

AEC provides expert testimony, analysis, modeling, policy briefs, and reports for public interest groups on the topics of energy, environment, consumer protection, and equity, while providing on-the-job training to a new generation of technical experts.

Background Information

- **April 2018:** Massachusetts' energy efficiency program administrators submit a draft 2019-2021 plan assessing the cost-effectiveness of storage measures and including incentives for battery storage.
- **July 2018:** AEC releases white paper presenting an independent cost-effectiveness analysis of the battery storage measures in the program administrators' draft plan.
- **October 2018:** Program administrators' submit a substantially updated 2019-2021 plan to DPU for its approval, including significant changes to battery storage.
- **January 2019:** DPU approves program administrators' 2019-2021 energy efficiency plan with some exceptions and limitations (including to battery storage).
- **April 2019:** AEC releases two new white papers presenting an updated benefit and cost assessment of battery storage and a survey the non-energy benefits of storage.

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MA program administrators' benefit-cost ratios for Advanced Demand Management

BCRs	Cape Light			Eversource			National Grid			Unitil		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Residential Advanced Demand Management Program (A2e)												
Program BCRs	*1.6*	*2.4*	*2.4*	*1.0*	*1.4*	*1.6*	*1.5*	*2.4*	*2.5*	*0.7*	*1.1*	*1.2*
Direct Load Control	4.9	6.6	7.4	5.0	5.0	5.0	5.3	5.5	5.3	5.2	9.6	9.6
Behavioral DR												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch				1.5	1.5	1.5	4.9	4.9	5.0			
Storage Targeted Dispatch				0.0	0.0	0.0	0.1	0.1	0.1			
EV Load Management								0.8	0.8			
Income-Eligible Advanced Demand Management Program (B1b)												
Program BCRs		*2.3*	*2.4*					*2.4*	*2.4*			
Direct Load Control												
Behavioral DR												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch												
Storage Targeted Dispatch												
EV Load Management												
Commercial/Industrial Advanced Demand Management Program (C2c)												
Program BCRs	*7.5*	*4.6*	*4.7*	*2.9*	*2.9*	*2.8*	*7.9*	*4.8*	*4.9*	*2.7*	*2.9*	*3.1*
Interruptible Load	9.7	9.8	9.8	7.9	7.9	7.9	7.5	7.5	7.5	4.2	4.2	4.2
Winter Interruptible Load												
Storage System and Performance		3.0	3.0									
Storage Daily Dispatch				1.7	1.7	1.7	4.9	4.9	5.0	6.2	6.2	6.2
Storage Targeted Dispatch				3.2	3.2	3.2	0.1	0.1	0.1	0.1	0.1	0.1
Custom	8.3	8.3	8.3		2.0	2.0	1.3	1.3	1.3			

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Definition of measures by energy efficiency program administrator

	Cape Light	Eversource	National Grid	Unitil
Residential Advanced Demand Management Program (A2e)	Single battery provided	Aggregate of BYO batteries	Single BYO battery	Single BYO battery
Income-Eligible Advanced Demand Management Program (B1b)	Single battery provided	N/A	N/A	N/A
Commercial/Industrial Advanced Demand Management Program (C2c)	Single battery provided	Aggregate of BYO batteries	Aggregate of BYO batteries	Aggregate of BYO batteries

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Program administrators' summer kW savings for Advanced Demand Management

Summer kW Savings	Cape Light			Eversource			National Grid			Unitil		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Residential Advanced Demand Management Program												
Program Summer kW Savings	*1,055*	*2,869*	*3,400*	*2,050*	*3,150*	*4,250*	*6,099*	*8,597*	*11,033*	*94*	*112*	*135*
Direct Load Control	1,055	1,618	1,861	2,000	3,000	4,000	5,156	6,785	8,278	94	112	135
Behavioral DR												
Storage System and Performance		1,250	1,539									
Storage Daily Dispatch				50	150	250	903	1,763	2,696			
Storage Targeted Dispatch												
EV Load Management							39	49	60			
Income-Eligible Advanced Demand Management Program												
Program Summer kW Savings		*289*	*385*									
Direct Load Control												
Behavioral DR												
Storage System and Performance		289	385									
Storage Daily Dispatch												
Storage Targeted Dispatch												
EV Load Management												
Commercial/Industrial Advanced Demand Management Program												
Program Summer kW Savings	*5,798*	*6,053*	*6,080*	*28,000*	*57,500*	*96,000*	*69,500*	*79,000*	*90,000*	*300*	*500*	*500*
Interruptible Load	5,395	5,458	5,485	27,000	47,000	75,000	66,000	72,000	79,000	200	400	400
Winter Interruptible Load												
Storage System and Performance		192	192									
Storage Daily Dispatch				500	5,000	10,000	2,500	5,000	7,000	100	100	100
Storage Targeted Dispatch				500	5,000	10,000						
Custom	403	403	403		500	1,000	1,000	2,000	4,000			

Improvements in the final 2019-2021 plan

Peak shifting

- The 2019-2021 plan treats both Winter and Summer, and charging and discharging, as separate "measures". The four together make up a storage measure as one would normally understand it.
- April plan did not explicitly show charging and discharging in its calculations. New method allows for a clearer accounting of what is and is not valued.

Avoided non-embedded costs

- April draft assumed $0 per metric ton non embedded CO_2.
- Final plan includes the MA-specific $35 per short ton of CO_2 from the GWSA supplement.
- This additional avoided non-embedded cost adds to the measured benefits of storage.

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Remaining concerns in the 2019-2021 plan

- Peak emissions assumed to be lower than off-peak
- Peak/off-peak hours don't match times of highest demand
- Summer capacity values are undervalued
- Winter reliability values are valued at $0
- Non-energy benefits are valued at $0

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Remaining concerns in the 2019-2021 plan

Peak emissions assumed to be lower than off-peak emissions

- Contrary to ISO-New England historical data, AESC 2018 assumes that CO_2 emissions rates (lbs/MWh) are higher in off-peak hours than they are in peak hours.

Ozone / Non-Ozone Season Emissions (NOx)					
Air Emission	Ozone Season		Non-Ozone Season		Annual Average (All Hours)
	On-Peak	Off-Peak	On-Peak	Off-Peak	
NO_X	0.26	0.14	0.25	0.19	0.21

Annual Emissions (SO_2 and CO_2)					
Air Emission		Annual			Annual Average (All Hours)
		On-Peak	Off-Peak		
SO_2		0.22	0.11		0.16
CO_2		892	807		842

(a) The ozone season occurs between May 1 and September 30, while the non-ozone season occurs from January 1 to April 30 and from October 1 to December 31.

(b) On-peak hours consist of all weekdays between 8:00 a.m. and 10:00 p.m. Off-peak hours consist of all weekdays between 10:00 p.m. and 8:00 a.m. and all weekend hours.

	Winter		Summer	
	On Peak	*Off Peak*	*On Peak*	*Off Peak*
CO_2	978	999	952	959
NO_X	0.212	0.241	0.173	0.180

Note: Emissions rates do not vary substantially across years.
Source: EnCompass modeling outputs for main 2018 AESC case

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Remaining concerns in the 2019-2021 plan

Peak/off-peak hours don't match times of highest demand

The program administrators define peak as 9 am to 11 pm each weekday (excluding holidays) for both summer (4 months) and winter (8 months).

- Defining peak hours instead as the hours with the highest energy prices or highest MWh sales results in a very different allocation of hours between summer peak, summer off-peak, winter peak, winter off-peak.
- By energy price, all but one of the highest priced hours are in the winter months, and 43 percent of these are off peak.

	Total Count	Highest 10% by Energy Price	Highest 10% by MWh
Summer peak	1,260	0	317
Summer offpeak	1,668	1	313
Winter peak	2,565	502	128
Winter offpeak	3,267	373	118

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Remaining concerns in the 2019-2021 plan

Summer capacity is undervalued

- Massachusetts' program administrators appear to have taken a sensitivity analysis conducted on electric peak demand forecasts for the PJM region as evidence that not only demand response but most advanced demand or storage measures only operate during 10 percent of peak hours.

Winter reliability values at $0

- Because New England's peak times for electric consumption occur in summer months, it is this "summer peak" that is used to calibrate markets for generation capacity: Winter peak does not have a capacity value.
- Reduced demand for peak generation capacity in winter is called "winter reliability" and is valued at $0 in the 2019-2021 plan.

Remaining concerns in the 2019-2021 plan

Non-energy benefits valued at $0

- Massachusetts’ 2019-2021 energy efficiency plans assign values to the energy system benefits (or energy avoided costs) of storage, but not non-energy benefits; which has the same effect as assuming non-energy benefits of storage have a value of $0.

Non-energy benefits valued at $0

	Benefits of Battery Storage	
	Energy Benefits	**Non-Energy Benefits**
Who benefits?	Benefits to the energy system	Benefits to participants in battery storage programs, electric distribution companies and/or society at large
How does benefit manifest?	Benefit conferred through reductions in the cost of supplying energy	Benefit conferred directly to beneficiary
Examples	▪ Reduced peak energy demand ▪ Reduced need for new generating capacity ▪ Transmission and distribution cost reductions ▪ Increased grid resiliency ▪ Facilitates renewable energy integration	▪ Avoided value losses to cusomters and utilities from power outages ▪ Enhanced value to customers from reduced incidence of power outages ▪ Enhanced property values ▪ Enhanced ability to pay less expensive electric bills ▪ Job creation

Non-energy benefits valued at $0

1) Avoided power outages

Battery storage helps avoid outages, and all of the costs that come with outages for families, businesses, generators and distribution companies.

Non-Energy Benefit (2018$)

Residential: $1.72/kWh

Commercial/Industrial: $15.64/kWh

2) Higher property values

Installing battery storage in buildings increases property values for storage measure participants by: (1) increasing leasable space; (2) increasing thermal comfort; (3) increasing marketability of leasable space; and (4) reducing energy costs.

Non-Energy Benefit (2018$)

$5,325/housing unit for low-income single family participants

$510/housing unit for owners of multi-family housing

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Non-energy benefits valued at $0

3) Avoided fines

Increasing battery storage will result in fewer power outages and fewer potential fines for utilities.

Non-Energy Benefit (2018$)
$24.8 million in 2012

4) Avoided collections and terminations

More battery storage reduces the need for costly new power plants, thereby lowering ratepayer bills, and making it easier for ratepayers to consistently pay their bills on time. This reduces the need for utilities to initiate collections and terminations.

Non-Energy Benefit (2018$)
Terminations and Reconnections:
$1.85/year/participant
Customer calls:
$0.77/year/participant

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Non-energy benefits valued at $0

5) Avoided safety-related emergency calls

Increasing battery storage results in fewer power outages, which reduces the risk of emergencies and the need for utilities to make safety-related emergency calls.

Non-Energy Benefit (2018$)
$10.11/year/participant

6) Job creation

More battery storage benefits society at large by creating jobs in manufacturing, research and development, engineering and installation.

Non-Energy Benefit (2018$)
3.3 jobs/MW
$310,000/MW

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Non-energy benefits valued at $0

7) Less land used for power plants

More battery storage reduces the need for peaker plants, which are more land-intensive than storage—benefitting society by allowing more land to be used for other purposes.

Non-Energy Benefit (2018$)
12.4 acres/MW

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Thank You!

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Massachusetts Non-Energy Benefits of Battery Storage (AEC-2019-03-WP-01)— https://aeclinic.org/publicationpages/2019/3/15/massachusetts-non-energy-benefits-of-battery-storage
Updated Massachusetts Battery Storage Measures: Benefits and Costs (AEC-2019-03-WP-02)— https://aeclinic.org/publicationpages/2019/3/15/updated-massachusetts-battery-storage-measures-benefits-and-costs

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