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BOSTON Green Ribbon COMMISSION

HARNESSING THE POWER OF ENERGY STORAGE IN BOSTON'S COMMERCIAL BUILDINGS

RICHARD DIMINO

A BETTER CITY


YVE TORRIE
A BETTER CITY
Vestas

AGENDA

PANEL 1:

ECONOMICS AND INCENTIVES

Jason Burwen
Energy Storage Association

Kavita Ravi
MassCEC

Todd Olinsky-Paul
Clean Energy Group

MODERATOR:
Jamie Dickerson
NECEC

PANEL 2:

TECHNOLOGY AND COMMERCIAL/INDUSTRIAL BUSINESS CASES

Steve Tuleja
Alternative Power Source, Inc.

Dave Hebert
EnerNOC, Inc., an Enel Group Company

Bob Gohn
NEC Energy Solutions, Inc.

MODERATOR:
Mike Kleinberg
DNV GL

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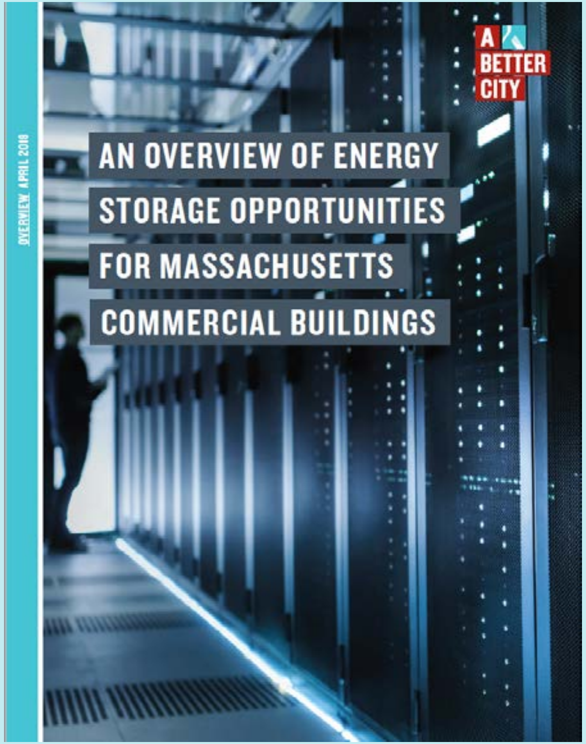
PUBLICATION RELEASE



http://www.abettercity.org/assets/images/An_Overview_of_Energy_Storage_Opportunities.pdf


KATHRYN WRIGHT
MEISTER CONSULTANTS GROUP

OVERVIEW OF COMMERCIAL ENERGY STORAGE OPPORTUNITIES IN BOSTON

ENERGY STORAGE

- Unique suite of technologies
  - Batteries
  - Thermal storage
  - Pumped hydro
- Scalable
  - Building-scale
  - Utility Scale
- Versatile Uses
  - Energy savings
  - Support on-site generation
  - Resiliency

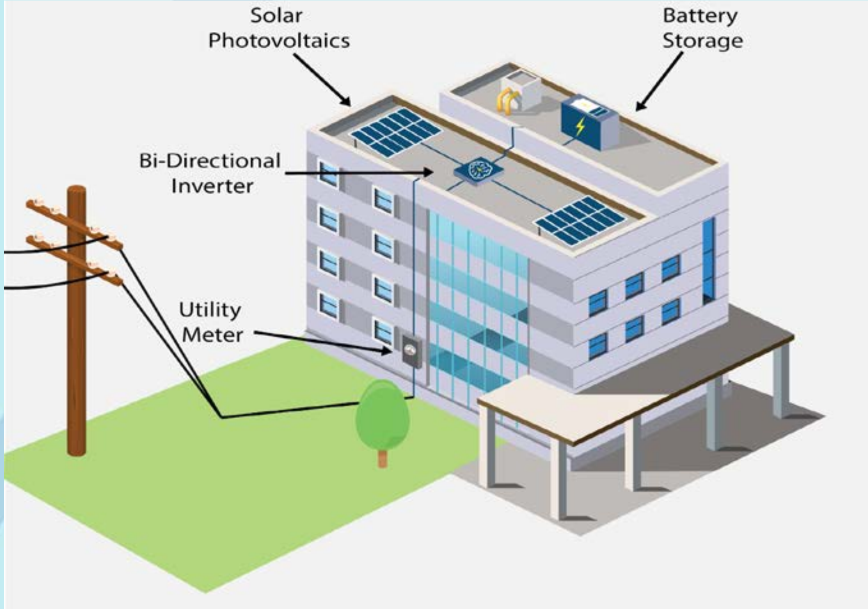


Image from Overview of Energy Storage Opportunities Report

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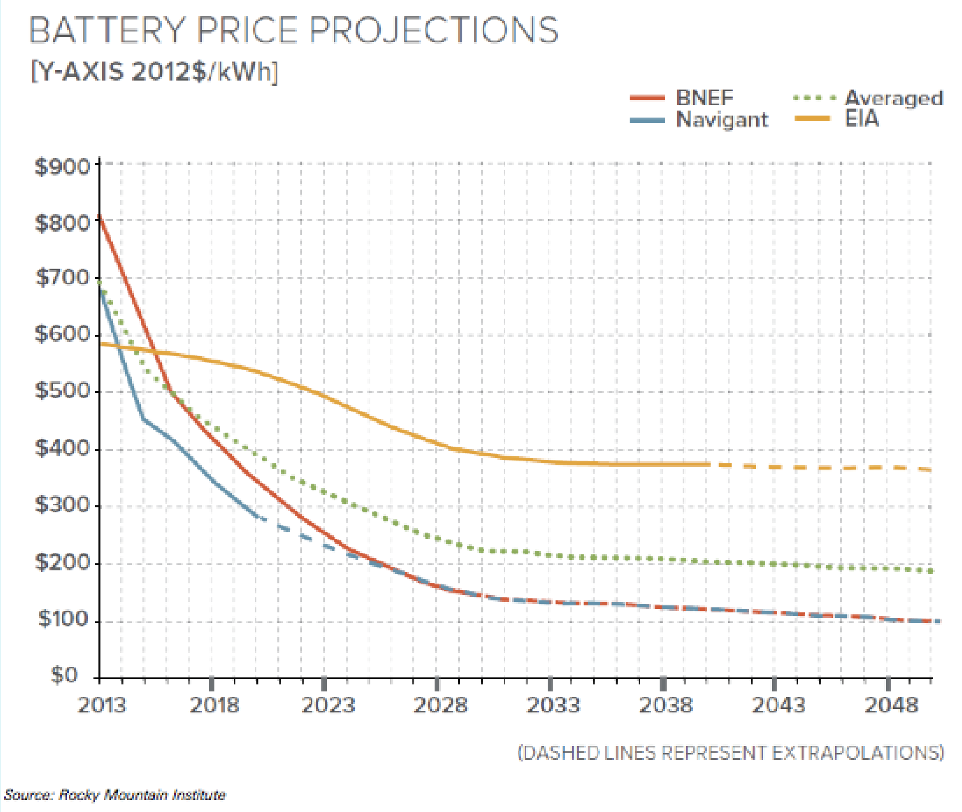
LOCAL CONTEXT

80% GHG Reduction by 2050
200 MWh Storage by 2020

80% GHG Reduction by 2050
Increase local and low-carbon energy

Analysis of 80x50 Pathways
Support City’s climate goals

MARKET CONTEXT



- **Storage system costs, and batteries in particular, are rapidly decreasing.**
- **The rate at which storage system costs is expected to continue to decrease.**

USE CASES AND BENEFITS

Emergency power

- Support critical loads
- Increase capacity and length of service of traditional generators
- Reduce business interruption costs

Demand Management

- Deliver energy savings and reduce utility bills
- Demand charges in Boston on some commercial rates meet or exceed industry cost-effectiveness tests
- System parameters tied to building load and energy use type

Grid Services

- Respond to utility demand management programs
- Potential for wholesale market services

TECHNOLOGY OVERVIEW AND DECISION SUPPORT

	Lead Acid[1]	Lithium Ion[1]	Flow[1]	Thermal
Description	A form of electrochemical battery storage, in which energy is stored and released by means of a chemical reaction. Typical types include sealed, flooded, valve-regulated, absorbent glass mat, and gel. Additives and differences in plate structure offer a variety of lifetime or performance advantages.	A form of electrochemical battery storage in which energy is stored and released by means of a chemical reaction. Many variations exist but typically contain lithium, cobalt, nickel, manganese, and aluminum.	A form of electrochemical battery storage that relies on a system of tanks, pumps, dissolved chemicals, and chemical reactions to charge and discharge electricity. This technology is in its earlier stages and has not reached the commercial scale of the others listed in this table.	Thermal storage stores energy (directly) or electricity (indirectly) in the form of heat or cold. By removing heat from or injecting heat into the storage container, thermal systems allow the warmth or cold to be used later. Among the many types are molten salt, hot water, and ice.
Typical Uses	Resiliency, limited grid support, peak load management, renewable energy firming, uninterruptible power supply (UPS)	Resiliency, grid support, peak load shifting, renewable energy firming, UPS	Resiliency, grid support, peak load shifting, renewable energy firming, UPS, bulk power management	Heating, ventilation, and air conditioning support; peak load shifting; onsite fossil fuel reduction (e.g. boiler), limited grid support, district heating
Cost	\$150–\$300/kWh	\$250–\$1,500/kWh	\$680–\$2,000/kWh	\$72–\$240/kWh
Expected Life	5–10 years	10–15 years	10–20 years	20+ years
Advantages	• Well-known, reliable technology. • Can withstand deep discharges, but at reduced life expectancy. • Relatively low cost.	• High energy density allows for high-power applications. • Can withstand deep discharges. • Has a high cycle life, allowing more intensive use or a longer life	• Relatively safe. • Easy to scale up, and well suited for higher-capacity (duration) uses. • Long useful life.	• Low cost. • Flexible sizing. • Power and capacity ratings are independently scalable. • Leverages a mature technology base. • Can utilize waste industrial heat to improve efficiency.
Disadvantages	• Shortest life expectancy, due to lower number of useful cycles. • Lower energy density, meaning that more space will be required to provide the same amount of energy storage as other technologies.	• Can be more expensive than traditional energy-storage systems. • Requires a sophisticated control system to mitigate fire risk (e.g., from thermal runaway). • Not readily recyclable and is a toxic waste issue.	• Relatively high cost. • Low efficiency (less than 70%). • Low energy density and thus can take up larger amounts of space. • High maintenance due to pumps. • Currently in the early stages of commercialization.	• Does not always directly address electric loads, because it typically covers heating and cooling. • Difficult to modularize for smaller installations.

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NEXT STEPS

Educational resources from A Better City

Share outcomes and case studies from ACES storage projects

Facilitating connections to state, local, and industry leaders

Policy tracking and briefings from A Better City and the Boston Green Ribbon Commission

THANK YOU AND ENJOY THE PANELS!

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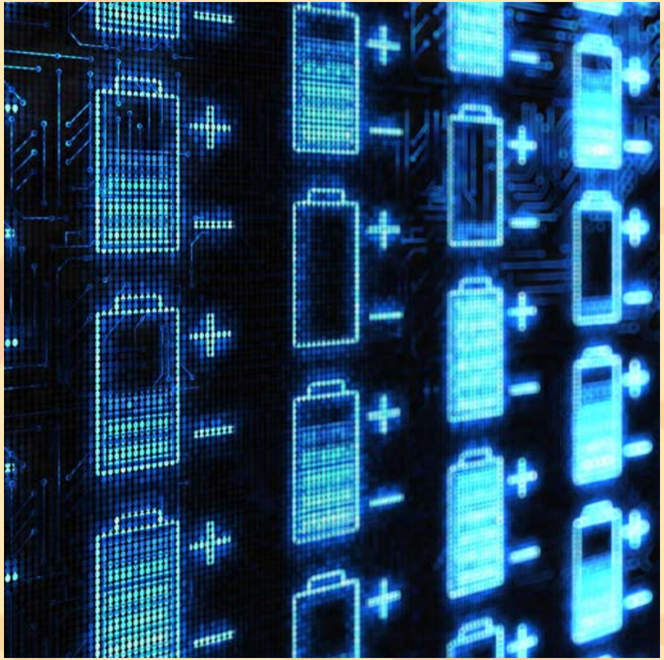

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PANEL 1:
ECONOMIC AND INCENTIVES


JASON BURWEN
ENERGY STORAGE ASSOCIATION

Energy Storage

Jason Burwen
Energy Storage Association

A Better City
April 17, 2018

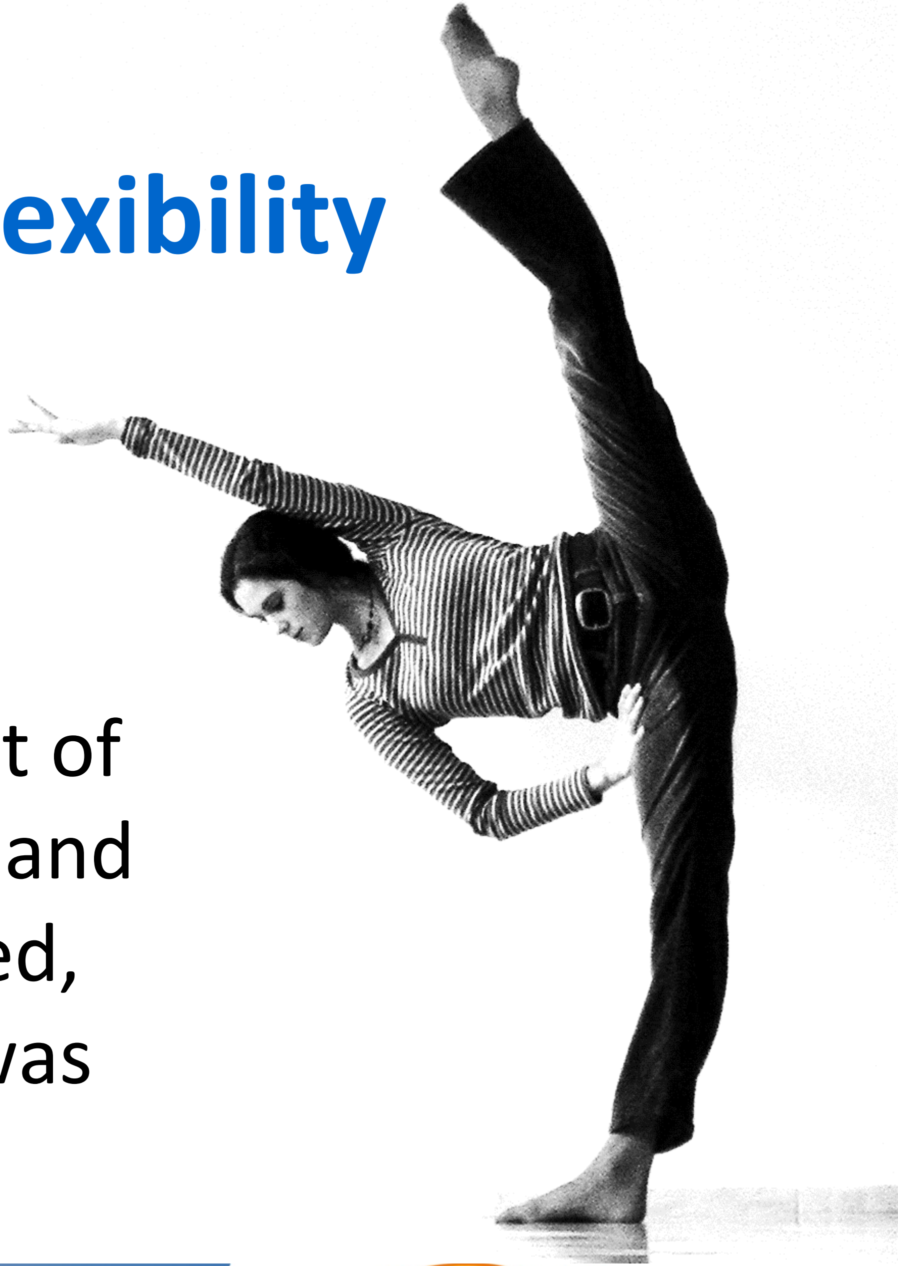
Energy Storage Association

www.energystorage.org

In this presentation…

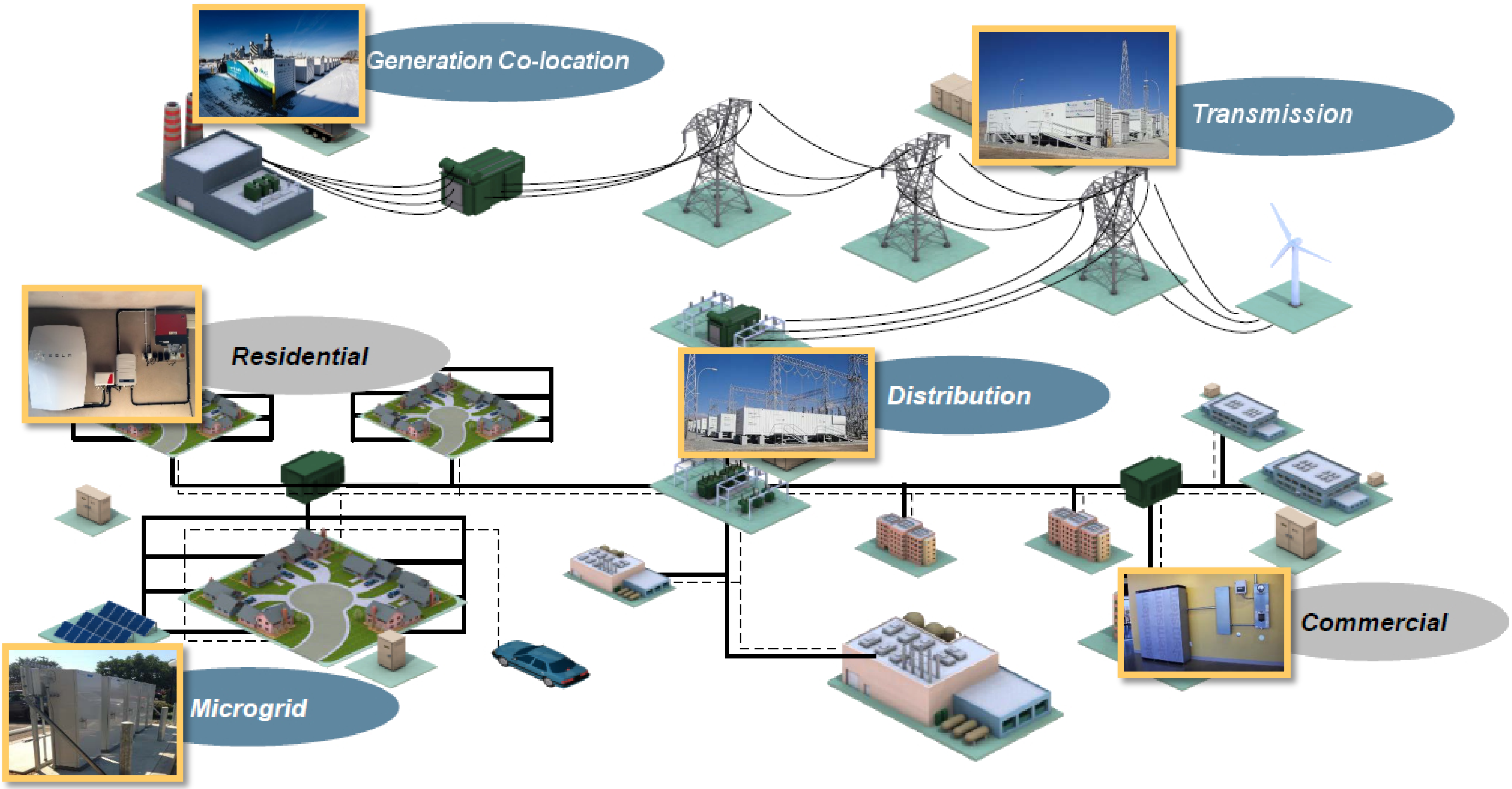
- What is storage?
- Why deploy storage?
- What offerings are available?
- Some considerations

Energy Storage = Flexibility



Supplies precise amount of electricity exactly when and where it is most needed, regardless of when it was generated

Storage is in all parts of the grid



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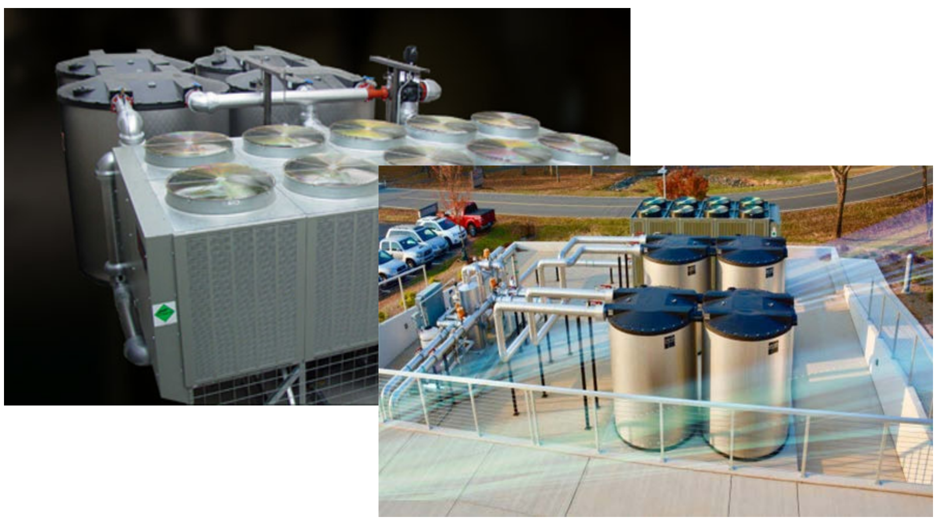
Primary kinds of customer storage

Thermal storage

- Time-shifts load (demand response)
- Integrated into or distinct from building equipment/ materials



Battery storage

- Time-shifts load (demand response) or injects to grid
- Provides onsite electric backup
- Distinct from building equipment/materials

Energy Storage Association

Why is storage important?

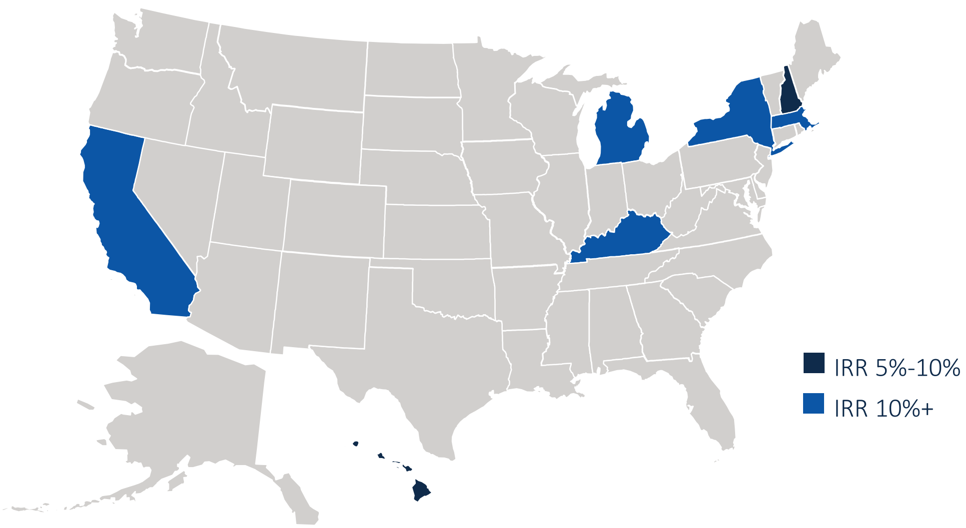
Storage optimizes use of the grid & enables system transformation

- **Saves households & businesses money** – reduces spending on excess capacity to meet peak system & local demands, optimizes use of grid assets, reduces time-varying electric costs & demand charges
- **Makes service more reliable & resilient** – balances supply & demand fluctuations; mitigates anomalies, supply disruptions, & outages; manages risk in long-term planning
- **Integrates more clean & distributed energy** – compensates natural variability of renewables; increases capacity for other distributed energy resources

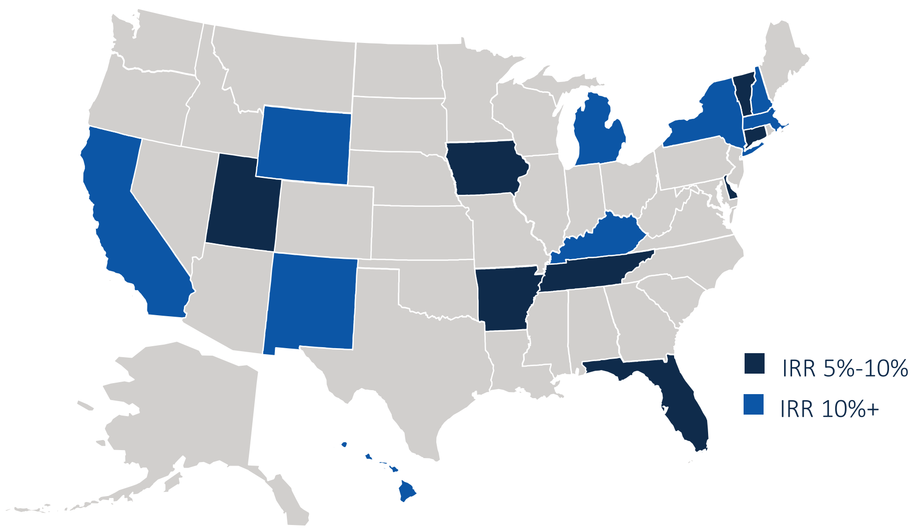
Rates as a driver of customer storage

Medium C&I Energy Storage Returns
from Demand Charge Management Alone

2016



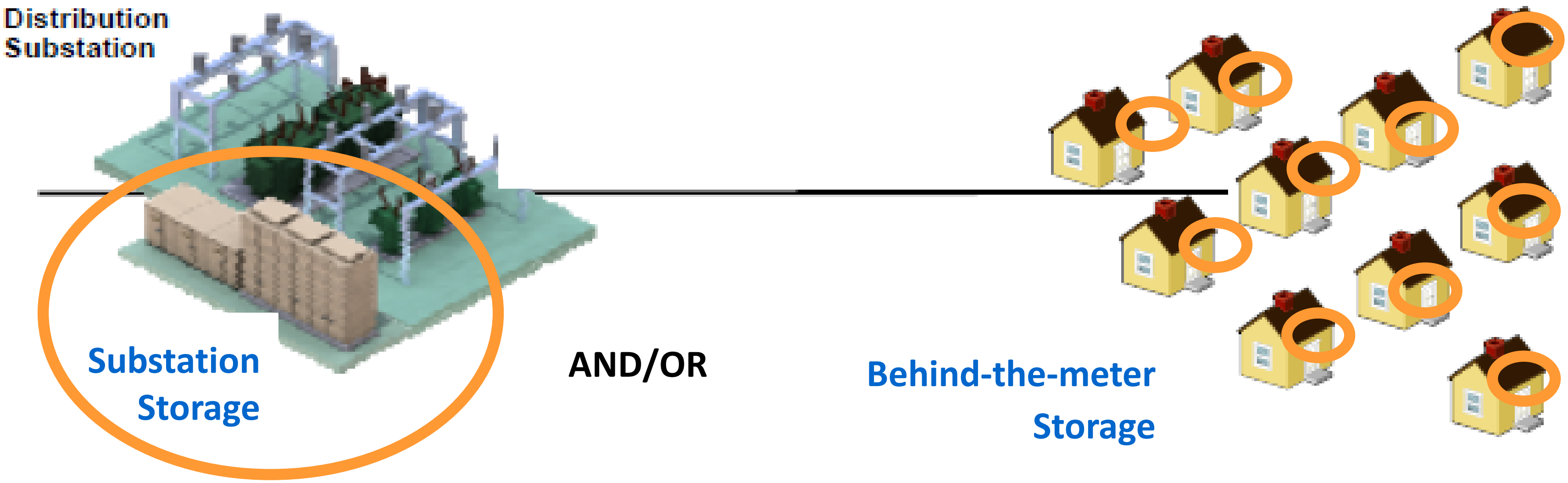
2022



Source: GTM Research The Economics of Commercial Energy Storage in the U.S.: The Outlook for Demand Charge Management, 2016

Energy Storage Association

Storage in network capacity



- Reduces local peak demand & increases circuit power quality → defers or avoids substation and circuit upgrades
- Onsite backup at municipal facilities & critical infrastructure
- Containerized storage can be re-located over time → reconfigurable grid + effective risk management

Onsite storage providing resilience

Stem: LBA Park Place, Irvine CA

LBA Realty installed the world's largest indoor energy storage system at Park Place to reduce operating costs and to support sustainability efforts. In addition to providing value for the owners and tenants, this system participates in Stem Grid Rewards with Southern California Edison to help relieve grid congestion in the West LA Basin.

System size: **1.3 MW / 2.6 MWh**

"We continue to demonstrate leadership in enhancing our properties with smart building technologies that increase sustainability, strengthen the local power grid, and reduce costs for our tenants. The installation of Stem's cutting-edge technology is the most recent demonstration of this commitment."

Perry Schonfeld, Principal and COO, LBA Realty

Energy Storage Association

Johnson Controls: University of Hawaii

System:

UH Maui College:

- 2.8 MW of solar PV and 13.2 MWh distributed energy storage

Four UH Community Colleges:

- 7.7 MW of solar PV and 28.6 MWh distributed energy storage

Applications:

- Renewable energy support
- Integration with other energy efficiency measures

Value:

- $79 million in energy savings over 20 years
- UH Maui College: 100% renewables in 2019
- Four UH Community College campuses also reducing fossil fuel use
- Education

Energy Storage Association

Recent public policy efforts

- Number of Massachusetts government initiatives to promote energy storage
  - Existing efforts: ACES grants, SMART incentives, etc
  - Pending legislation: storage deployment targets, incentive programs, clean peak standard, property tax equalization
- Increasing ability for large customers to provide services to ISO-NE bulk system
- New paths opening for potential service to local distribution systems
  - Ex: Eversource EEAC contracts

Energy Storage Association

Thank you

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Energy Storage Association

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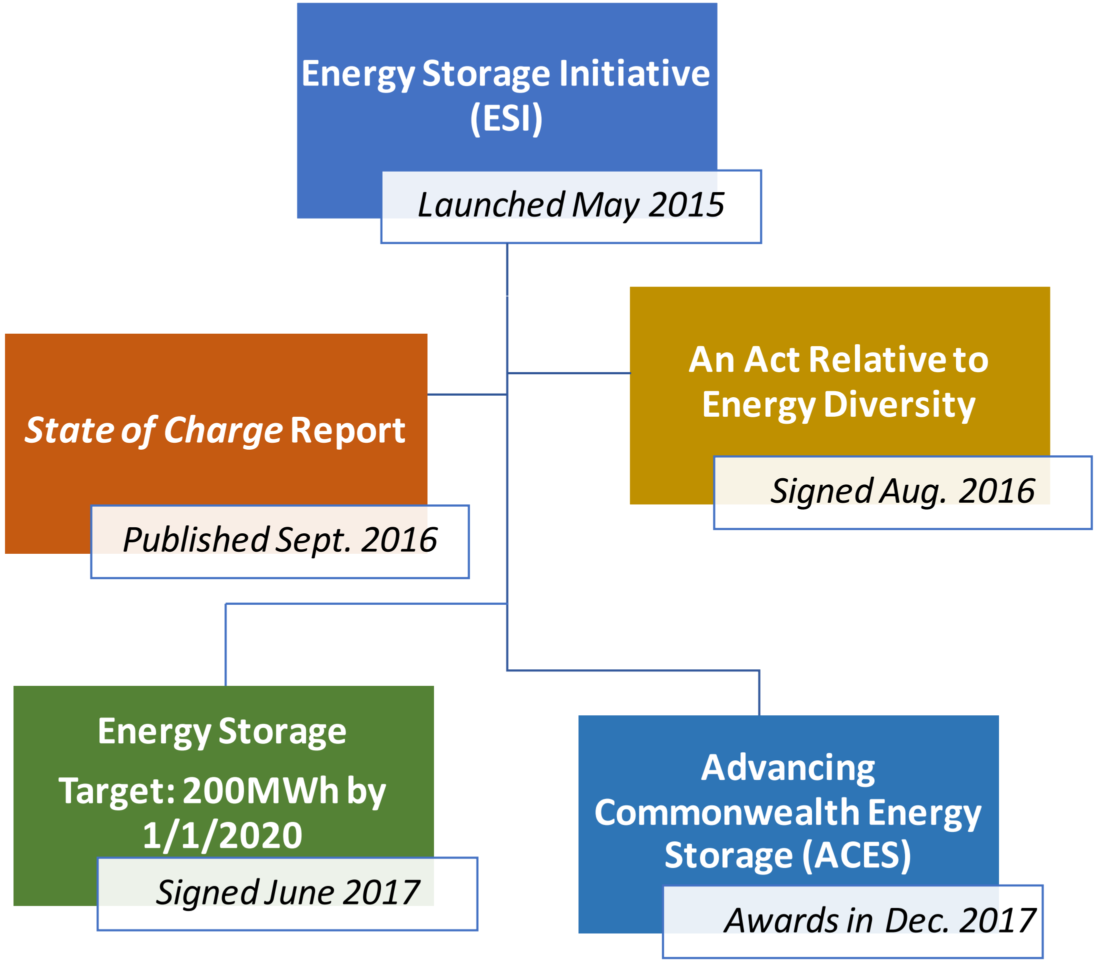
KAVITA RAVI
MASSCEC

Energy Storage in the Commonwealth: Policies and Programs

Kavita Ravi
Director of Emerging Markets

April 17, 2018

Energy Storage Initiative and Actions



Energy Storage Initiative (ESI)

- Aims to find the most cost efficient and effective way to help transform the Commonwealth energy market
  - Market expansion, valuation of storage benefits
  - Policy recommendations and development
  - Technology development

State of Charge Study and Recommendation

State of Charge Study

- DOER and MassCEC released the *State of Charge* study to analyze the potential benefits of incorporating energy storage technologies into Massachusetts' energy portfolio.
  - Energy storage can potentially provide $800 million in system benefits to Massachusetts ratepayers
  - Recommends policies to promote development of 600 MW advanced energy storage in Massachusetts by 2025

Advancing Commonwealth Energy Storage (ACES) Demonstration Projects

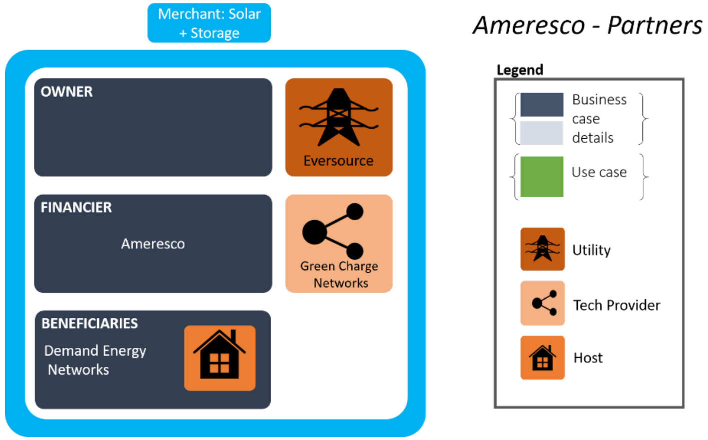
The ACES program is funding **energy storage demonstration projects** that pilot **innovative, broadly replicable use cases/business models** with multiple value streams in order to prime Massachusetts for increased commercialization/deployment of storage technologies.

The Baker Administration originally allocated $10 million but increased it to $20 million in December 2017.

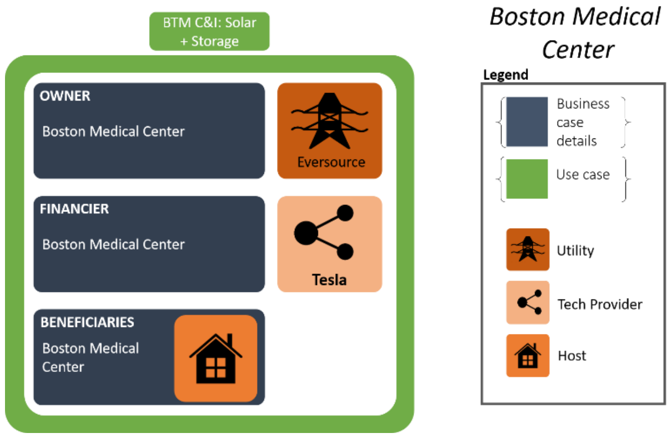
ACES Timeline

June 9th, 2017	June-Aug. 2017	Sep.-Oct. 2017	Nov. 2017	Feb. 2018-Present
Application Deadline	**Initial Reviews**	**Final Review and Recommendations**	**Award Announcements**	**Contracting**
Complete ✓	Complete ✓	Complete ✓	Complete ✓	In Progress

Example ACES Awards



Use Case:	Merchant, Solar+Storage
Technology:	Li-on Battery
Capacity:	250kW/500kWh
Host Site Type:	Commercial
Location:	Somerville
Benefits:	• Demand charge reduction • ISO NE demand response • ISO-NE capacity tag reduction • Customer resiliency • Reduced power outage-related safety threats • GHG reductions



Use Case:	BTM C&I Solar+Storage
Technology:	Li-on Battery
Capacity:	520kW/1044kWh
Host Site Type:	Hospital
Location:	Boston
Benefits:	• Demand charge reduction • ISO-NE capacity tag reduction and frequency regulation • Critical equipment support, resiliency and backup power through voltage support • Support of low income communities • Upgrade deferral • Wholesale market costs reduction, grid congestion relief • GHG reduction

Incentives on the Horizon

Community Clean Energy Resiliency Initiative (CCERI)

CCERI is a grant program to protect communities from energy service interruptions caused by severe climate events.

- Focus on critical infrastructure, technical assistance, resiliency
- $40 million in allocated funds; three rounds of grants to date

SMART Program

Massachusetts Department of Energy Resources (DOER)'s solar incentive program, with storage adder. Currently in DPU docket process, expect early summer 2018.

- Applies to electric distribution companies and owners of solar tariff generation units
- Covers 1,600MW declining block program
- Offers 10- or 20-year fixed-price terms depending on unit capacity
- Adder based on relative size and duration of storage

Storage in the Alternate Portfolio Standards (APS)

Plans for APS to include energy storage, possibly incentivizing storage with existing solar or standalone

- Stakeholder sessions in late Spring 2018

MASSACHUSETTS CLEAN ENERGY CENTER

Energy Storage Safety Training, Codes and Standards

Safety Training, Codes and Standards

- *State of Charge* study recommendations include clarification and development of safety training, codes and standards
- Will ensure robust market and facilitate smooth deployment of energy storage

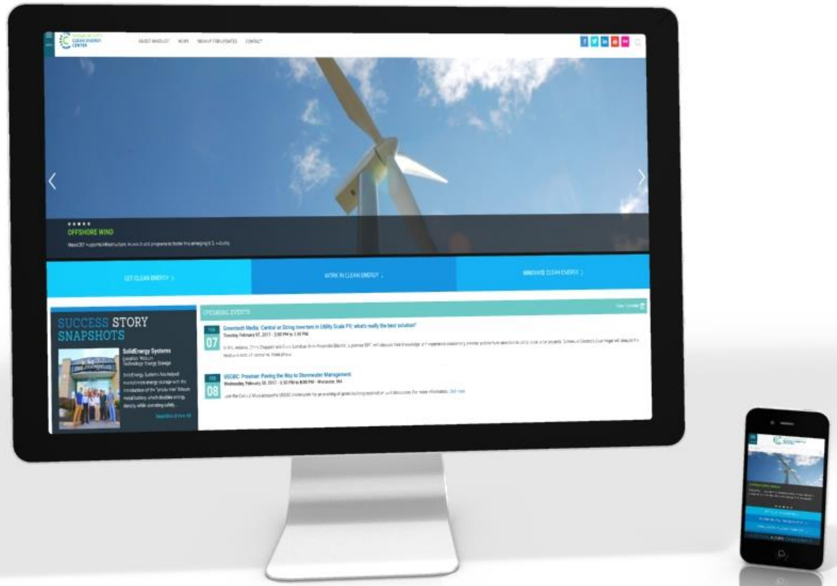
Moon Island Project

- Primary purpose: demonstrate, inform, and support the development of storage fire safety training, codes and standards with a solar plus storage system
- Secondary purpose: provide energy resilience to the Boston Fire Department training facility
- Collaboration: MassCEC, Boston Fire Department, City of Boston, DNV-GL

PHASE 1
Engineering Design
In Progress

PHASE 2
Implementation
Not Yet Started

Stay Connected



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TODD OLINSKY-PAUL

CLEAN ENERGY GROUP

The Economics of Behind-the-Meter Energy Storage in Massachusetts

HARNESSING THE POWER OF ENERGY STORAGE IN BOSTON'S COMMERCIAL BUILDINGS

Todd Olinsky-Paul

April 17, 2018

CleanEnergyGroup

Innovation in Finance, Technology & Policy

Who We Are

Clean Energy Group
Innovation in Finance, Technology & Policy

Meridian Institute
Connecting People to Solve Problems

Clean Energy States Alliance

The Kresge Foundation

The JPB Foundation

The Nathan Cummings Foundation

Surdna Foundation
Fostering sustainable communities in the United States

Barr Foundation

Energy Foundation
building a new energy future

High Meadows Fund

JANE'S TRUST

RESILIENT POWER

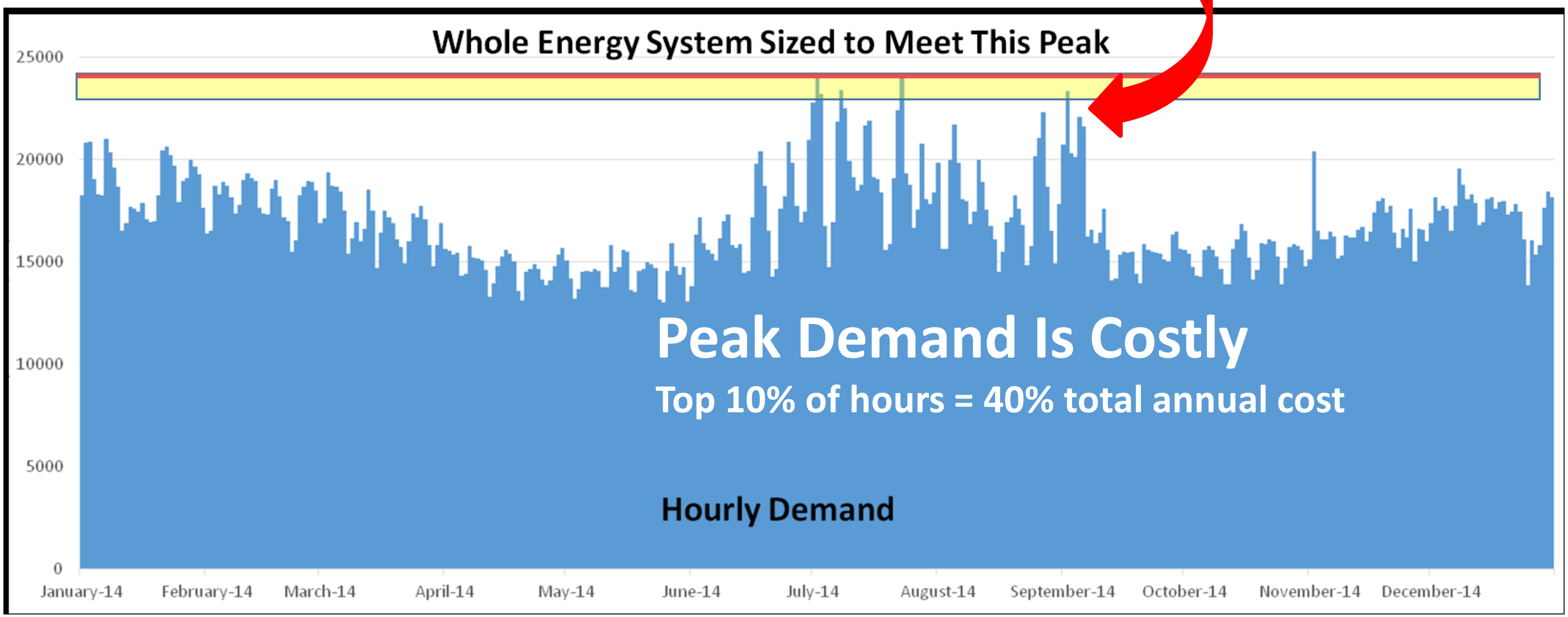
www.resilient-power.org

The Economics of Battery Storage

At current costs… the capital cost to deploy 1,766 MW of storage could be in the range of $968M - $1,355M, and the total value of storage over 10 years could be around $3.4 billion. *--State of Charge*

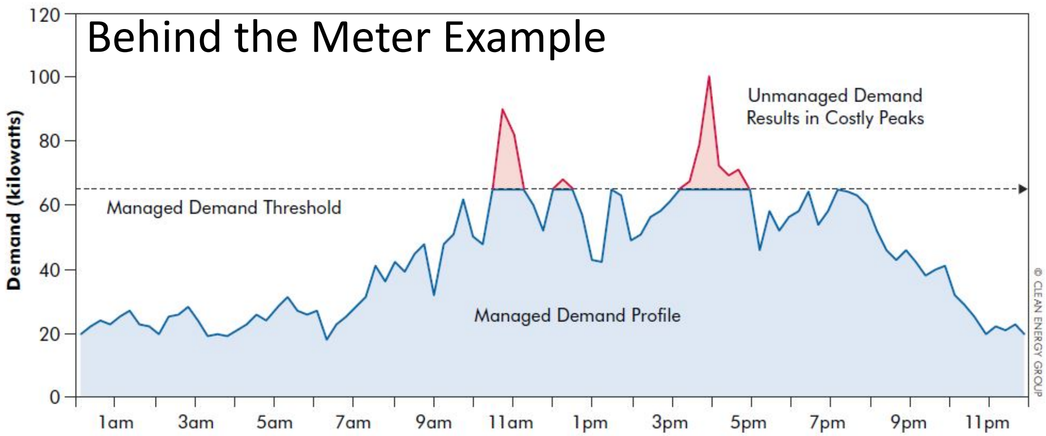
The value of storage is partly due to the high costs of our oversized grid

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



From Massachusetts *State of Charge* report

Energy storage reduces costs by shaving peak loads (on either side of the meter)



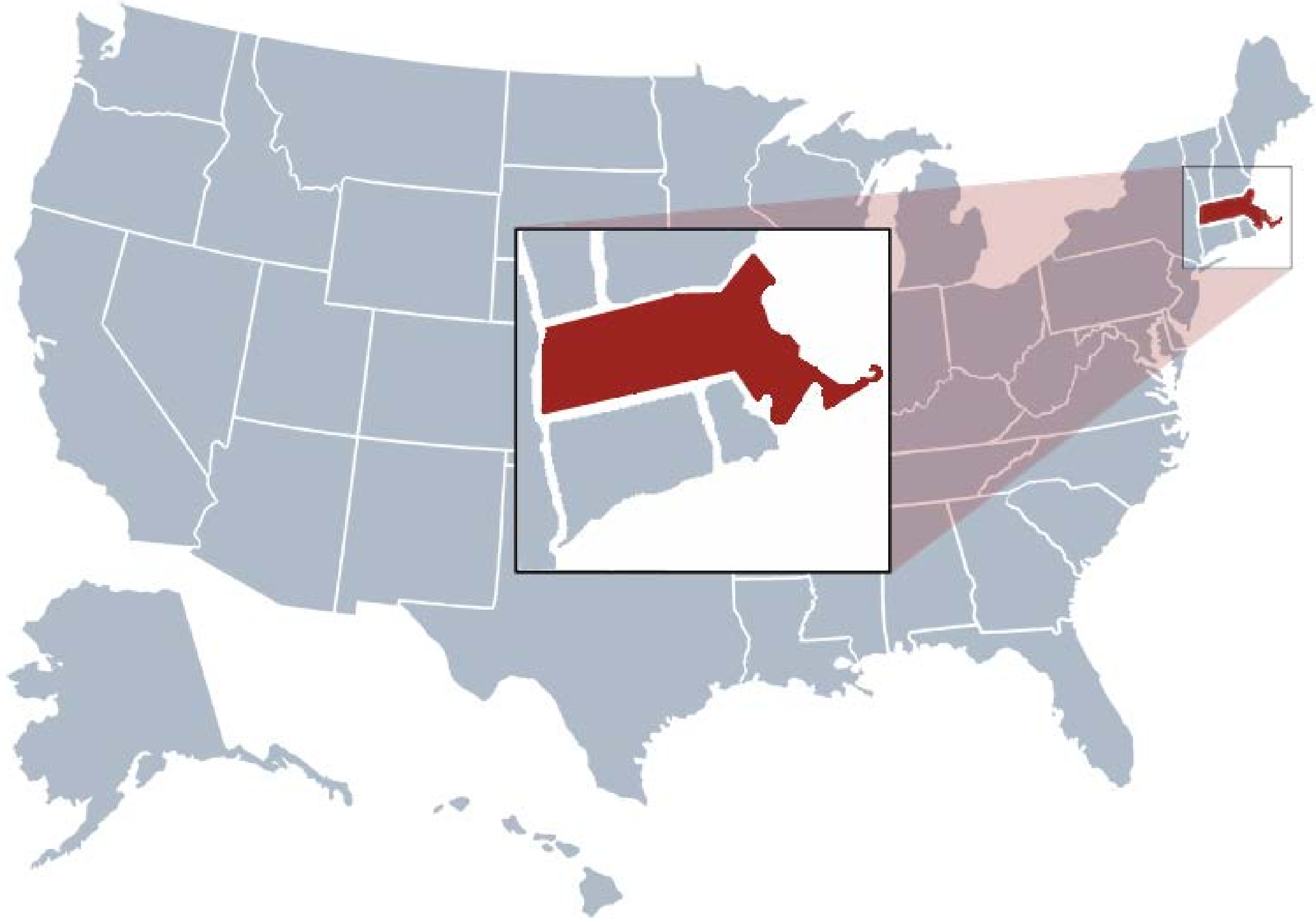
Peak reduced from 100 kW to 65kW = **35 kW reduction**

Savings depend on **cost of demand**

Demand charges @ $10/kW = **$4,200 annual savings**
Demand charges @ $20/kW = **$8,400 annual savings**

Generally, commercial customers paying **$15/kW or more** in demand charges may be able to install batteries economically for demand charge management (without subsidies).

Energy Storage for Demand Charge Management (BTM) in Massachusetts



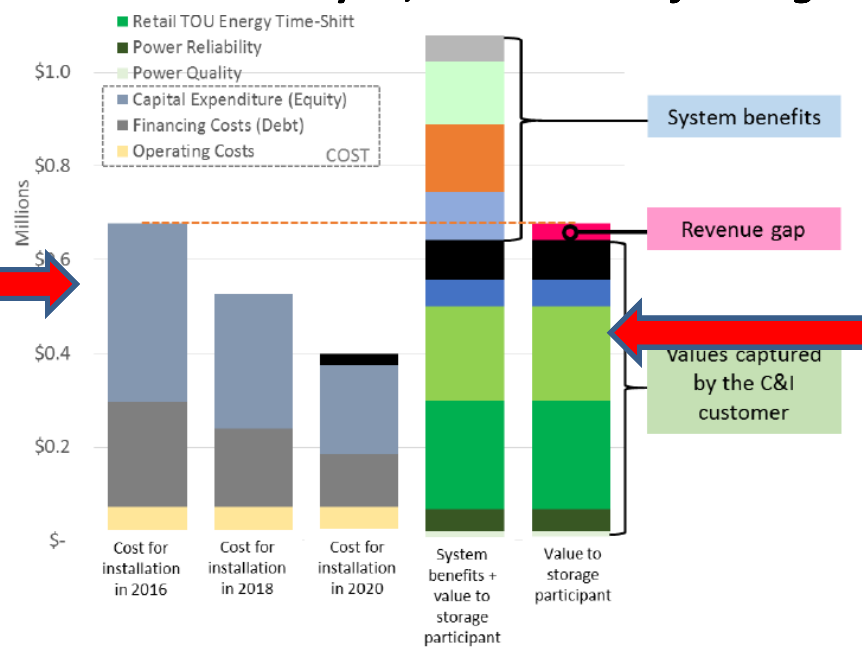
Demand charge rates in Massachusetts

MA demand charges as of July, 2016 (pre-Eversource rate case)

Utility / Demand $/KW	Commercial (non-summer / summer)	Industrial (non-summer / summer)
National Grid	$6.00	$3.92
Eversource NStar	$17.37 / $41.25	$19.15 / $25.12
Eversource WMECO	$13.36	$10.74
Unitil	$9.58	$7.88

BTM economic analysis, from *State of Charge* report

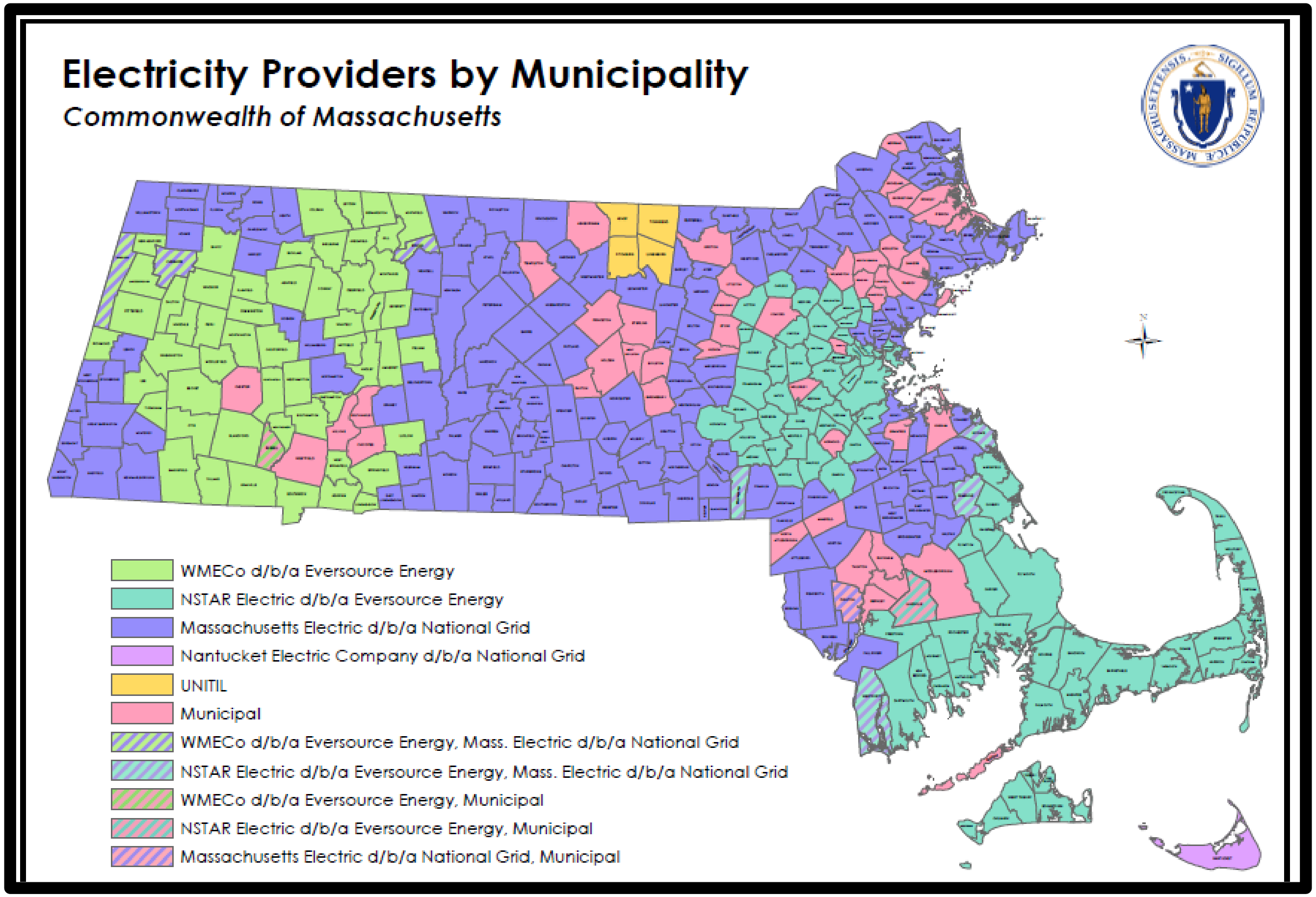
Note declining cost of storage



In this analysis, the value the customer realizes from demand charge management (light green bar) is based on a demand charge rate of $7.84/kW.

Scale of opportunity in MA

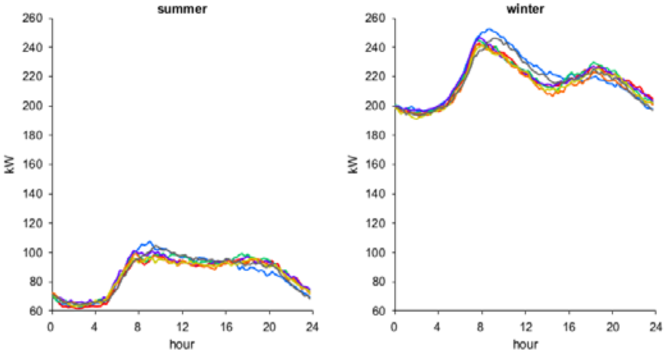
More than **70,000** commercial customers in Massachusetts *currently* pay demand charges that would make energy storage economical (>$15/kW).



(Light blue areas are highest demand charges)

Edwards D. Hassan Apartments

- Boston Housing Authority affordable senior housing facility in Hyde Park, MA
- 100 apartments
- **Electric heating**
- Common areas include kitchen, four laundry facilities, common room, 2 elevators
- System modeled:
  - Solar: 150 kW DC (cost: $375,000)
  - Storage: 30 kW/45 kWh Li-Ion battery (cost: $88,604)
- Total capital cost: $463,604



Seasonal load profile

Electric heat = high winter peak loads

Analysis by Geli

Hassan Apartments Baseline Utility Bill

Analysis is on common loads only – not individual apartment loads

Baseline utility bill

ENERGY				baseline (T2)
		Usage, kWh	Cost, $/kWh	Total Cost, $
Peak	Summer	72,196	$0.0925	$6,678
	Winter	489,413	$0.0925	$45,271
Part-peak	Summer	-	$0.0000	$0
	Winter	-	$0.0000	$0
Off-peak	Summer	176,967	$0.0925	$16,369
	Winter	773,548	$0.0925	$71,553
TOTAL, /yr		1,512,124		**$139,871**

Energy

DEMAND				
		Avg Peak, kW	Cost, $/kW	Total Cost, $
Max	Summer	153	$29.80	$18,221
	Winter	352	$21.35	$60,096
Peak	Summer	0	$0.00	$0
	Winter	0	$0.00	$0
Part-Peak	Summer	0	$0.00	$0
	Winter	0	$0.00	$0
TOTAL, /yr				**$78,317**
Meter Charge, $/yr				**$2,000**
TOTAL, $/yr				**$220,188**

Demand

Hassan Apartments payback comparison

	Size	Capital cost	Federal ITC	Depreciation	Net cost	Year 1 savings Energy charge	Year 1 savings Demand charge	Estimated payback
Solar system	150 kW PV	$375,000	$112,500	$144,713	$117,787	$18,204	$5,374	5.7 years
Energy Storage system	30 kW/45 kWh battery	$88,604	$26,581	$34,192	$27,831	$0	$7,645	4.4 years
Combined system	150 kW PV + 30 kW/45 kWh battery	$463,604	$139,081	$178,905	$145,618	$18,204	$13,019	5.3 years

Solar+Storage payback = 5.3 years

What the analysis includes:

- Federal ITC
- Federal accelerated depreciation

What it doesn't include:

- SMART solar incentives (with storage adder)
- Income from Alternative Energy Certificates
- Other market programs (demand response)

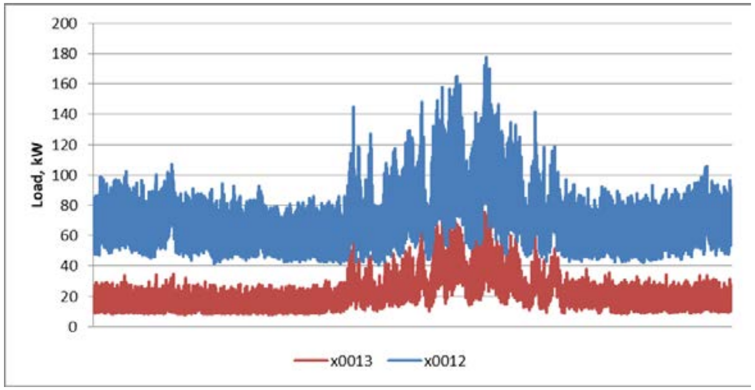
Jewish Community Housing for the Elderly

Coleman House:
146-unit affordable senior housing facility
Newton, MA

System modeled:
116 kW solar
55 kW/226 kWh Li-Ion Battery

Demand charge:
$28.92 / kW June – September
$20.47 / kW October – May

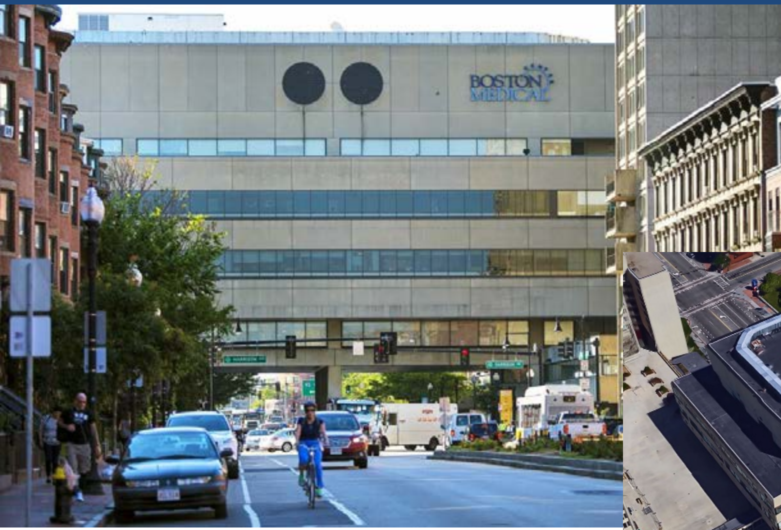
Modeling:
System modeled over 25 years, with battery replacement at 10 years
IRR > 18%
Assumes SMART incentive and ITC



Annual load profile (two meters)

Payback reached in year 5

Boston Medical Center



1,060 kW / 2,120 kWh battery to be located on the roof of the Yawkey Ambulatory Care Center, next to existing CHP

Project Installed Cost: $1,500,000

MassCEC Grant: $402,500

Baseline Capacity Charges

Eversource T&D charge:
Summer = $24.82/kW
Winter = $18.86/kW

ISO-NE Capacity Cost (icap) charge:
$9.96/kW-month

Result: Hospital is currently paying **annual demand costs of $1,247,000**

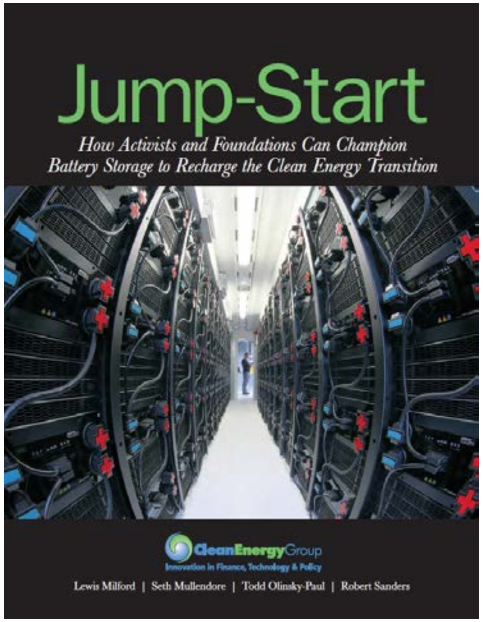
Project Economics:

Annual Savings: $200,000

Simple Payback: 7.5 years (without grant)
5.5 years (with grant)*

Note: This installation is costly due to rooftop location, and high hospital load factor. Ground installation, or a lower load factor, would result in lower installed cost and lower simple payback.

Thank You



Please check out our new report –*Jump-Start: How Activists and Foundations Can Champion Battery Storage to Recharge the Clean Energy Transition*

bit.ly/CEG-JumpStart

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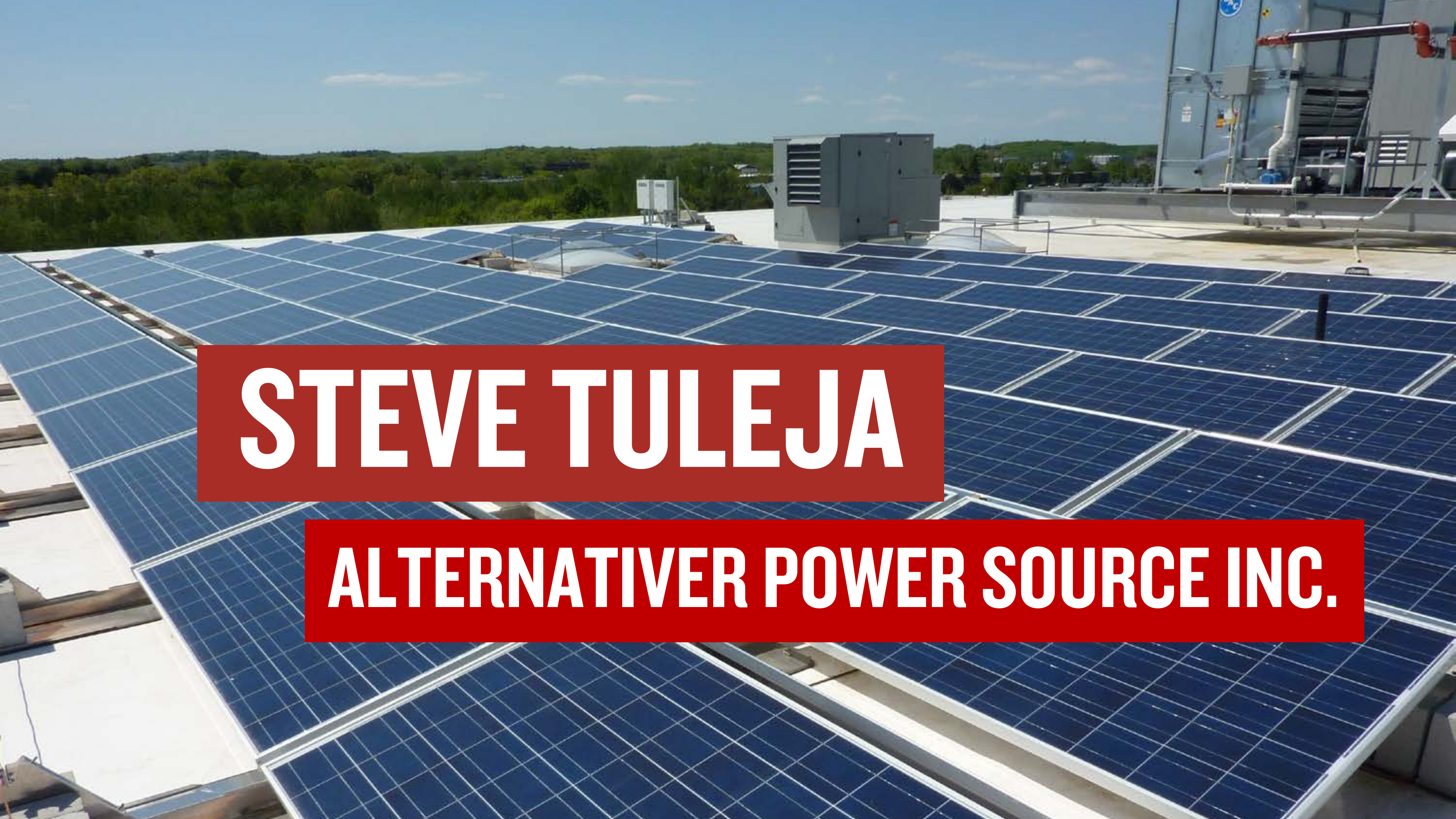
www.resilient-power.org

CleanEnergyGroup Innovation in Finance, Technology & Policy

CleanEnergy States Alliance

PANEL 2:

TECHNOLOGY AND COMMERCIAL/INDUSTRIAL BUSINESS CASES


STEVE TULEJA
ALTERNATIVER POWER SOURCE INC.

APS

Alternate Power Source Inc.

Energy Storage Solution

For

Boston Medical Center

April 17, 2018

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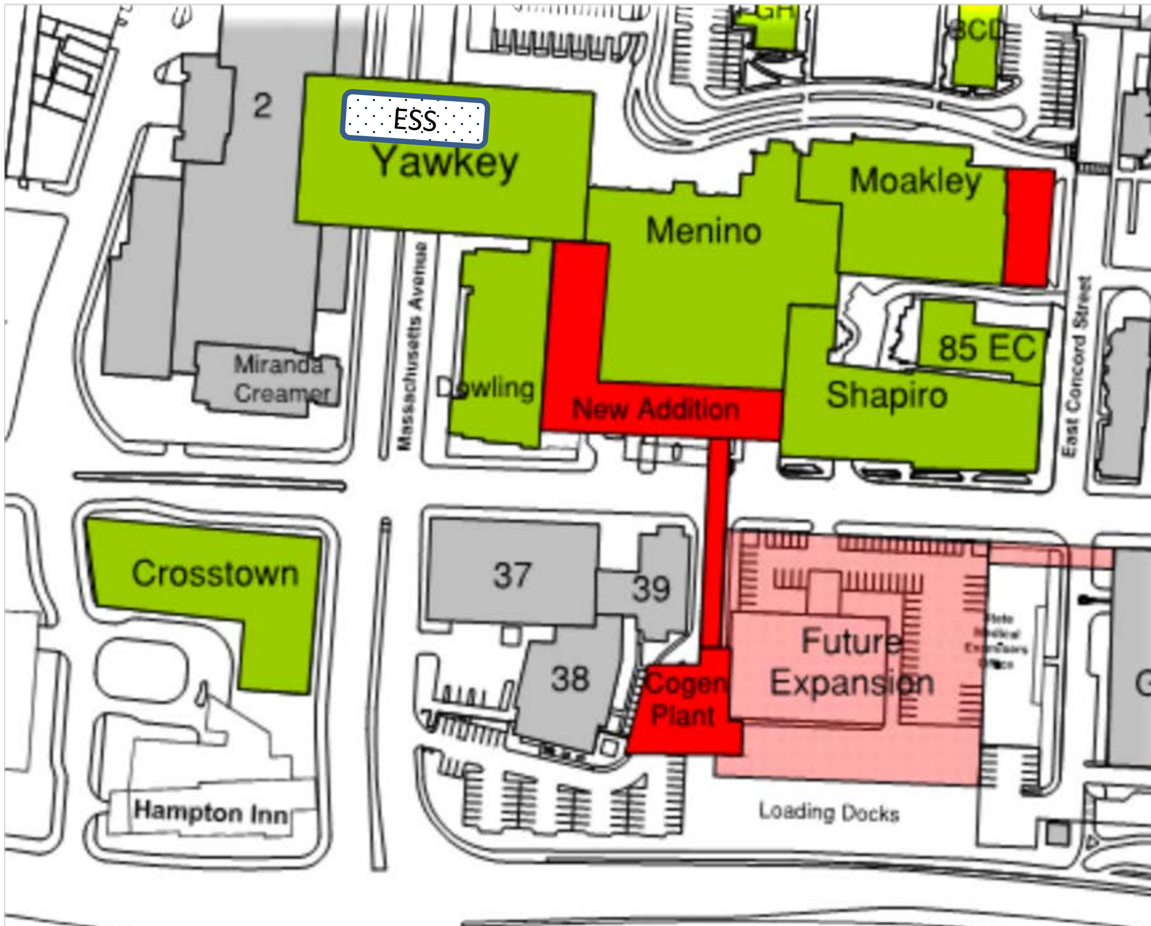
APS

BMC Project



Proposed:

- 1060 kW/2120 kWh
- Connected directly to modern switch gear
- Location Yawkey Roof

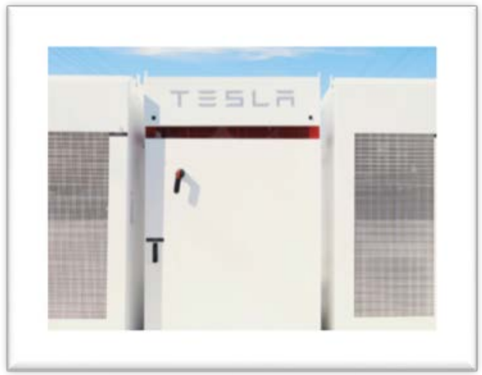
APS

What It Is

Proven Li-Ion technology sourced from industry leaders

LOCKHEED MARTIN

Johnson Controls



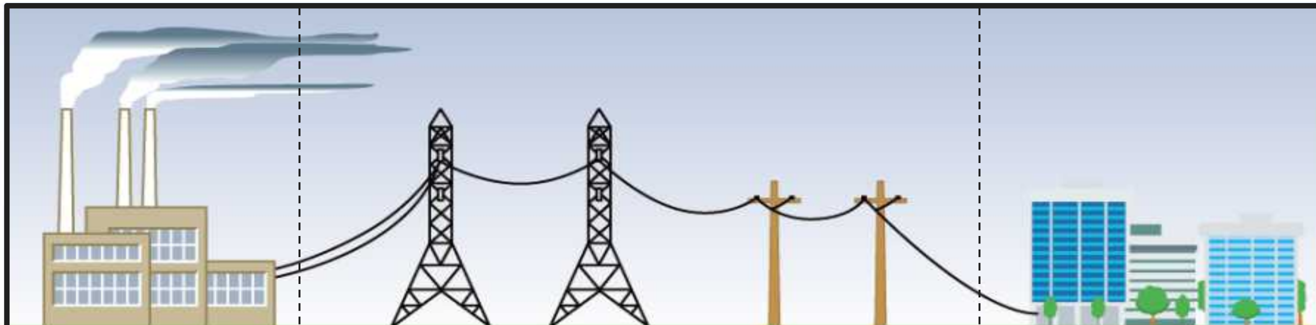
TESLA

GreenCharge

NEC

APS

Your Electricity Supply



	Generation	Transmission and Distribution	End User
Energy (¢/kWh)	6.0	1.5	7.5
Demand (¢/kW)	3.6	6.3	9.9
Total	9.6	7.8	17.4

You are charged for both Energy and Demand

Batteries cut the peak off your Demand to save you money

APS

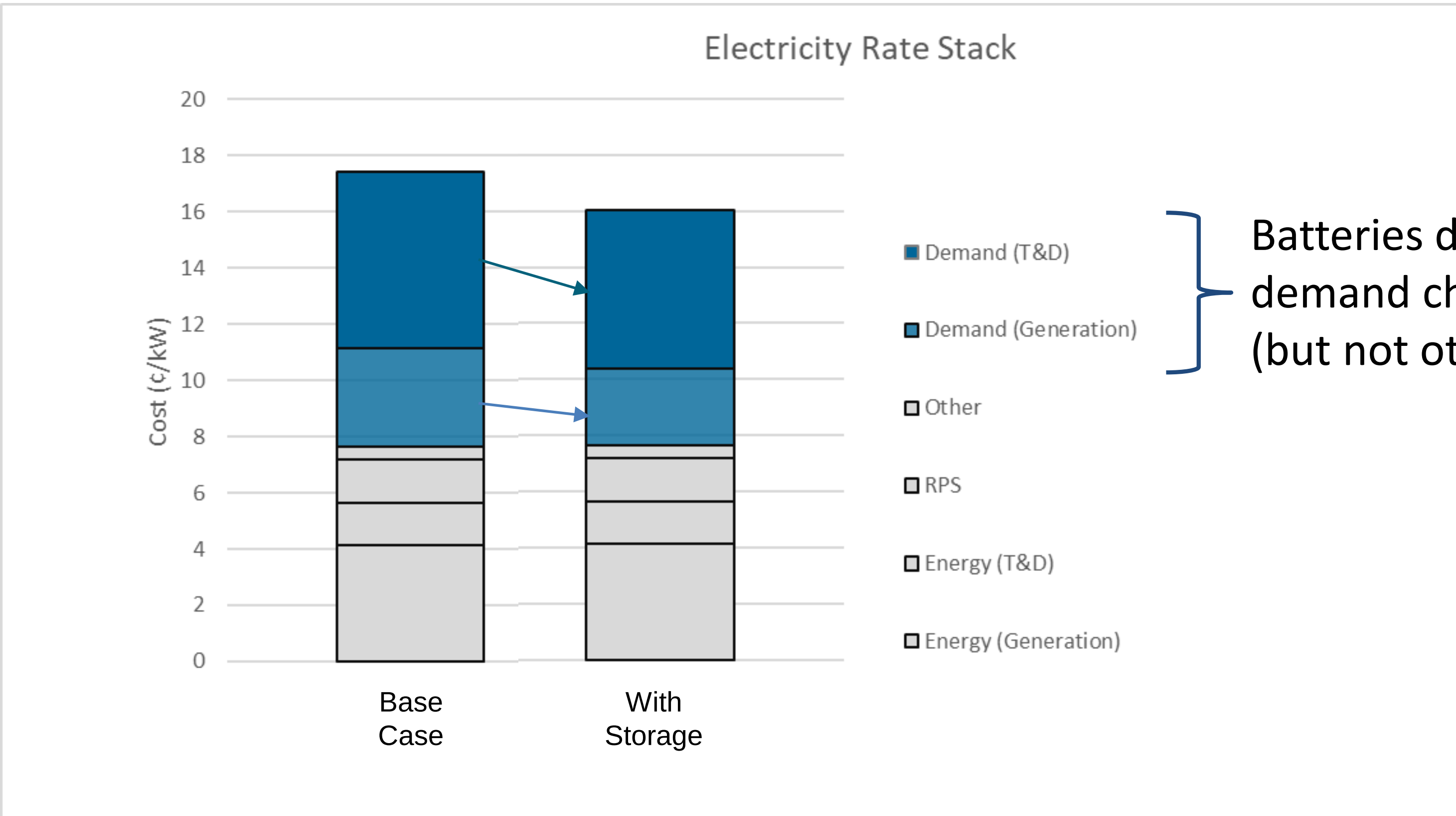
Typical Utility Bill

CURRENT BILL CALCULATION

DELIVERY SERVICES								
CUSTOMER CHARGE							237.07	
DEMAND CHARGES:								
DISTRIBUTION CHARGE								
	14.56	X	1974.2	KVA	=	28,744.35		
TRANSMISSION CHARGE								
	9.64	X	1974.2	KVA	=	19,031.29		
TOTAL DEMAND			1974.2	KVA	TOTAL DEMAND CHARGE		47,775.64	Demand
PEAK CHARGES:								
DISTRIBUTION	0.005040	X	282389	KWH	=	1,423.24		
TRANSITION	-0.001350	X	282389	KWH	=	-381.23		
RENEWABLE ENERGY	0.000500	X	282389	KWH	=	141.19		
ENERGY CONSERVATION	0.010410	X	282389	KWH	=	2,939.67		
OFF PEAK CHARGES:								
DISTRIBUTION	0.005040	X	477931	KWH	=	2,408.77		
TRANSITION	-0.001350	X	477931	KWH	=	-645.21		
RENEWABLE ENERGY	0.000500	X	477931	KWH	=	238.97		
ENERGY CONSERVATION	0.010410	X	477931	KWH	=	4,975.26		
TOTAL KWH			760320		TOTAL KWH CHARGE		11,100.66	Energy
CURRENT DELIVERY CHARGES							**59,113.37**	
GENERATION CHARGES	0.059800	X	760320	KWH	=		45,507	Energy
	14.00	X	1974.2	KVA	=		27,636	Demand
TOTAL CHARGES							**132,254**	

APS

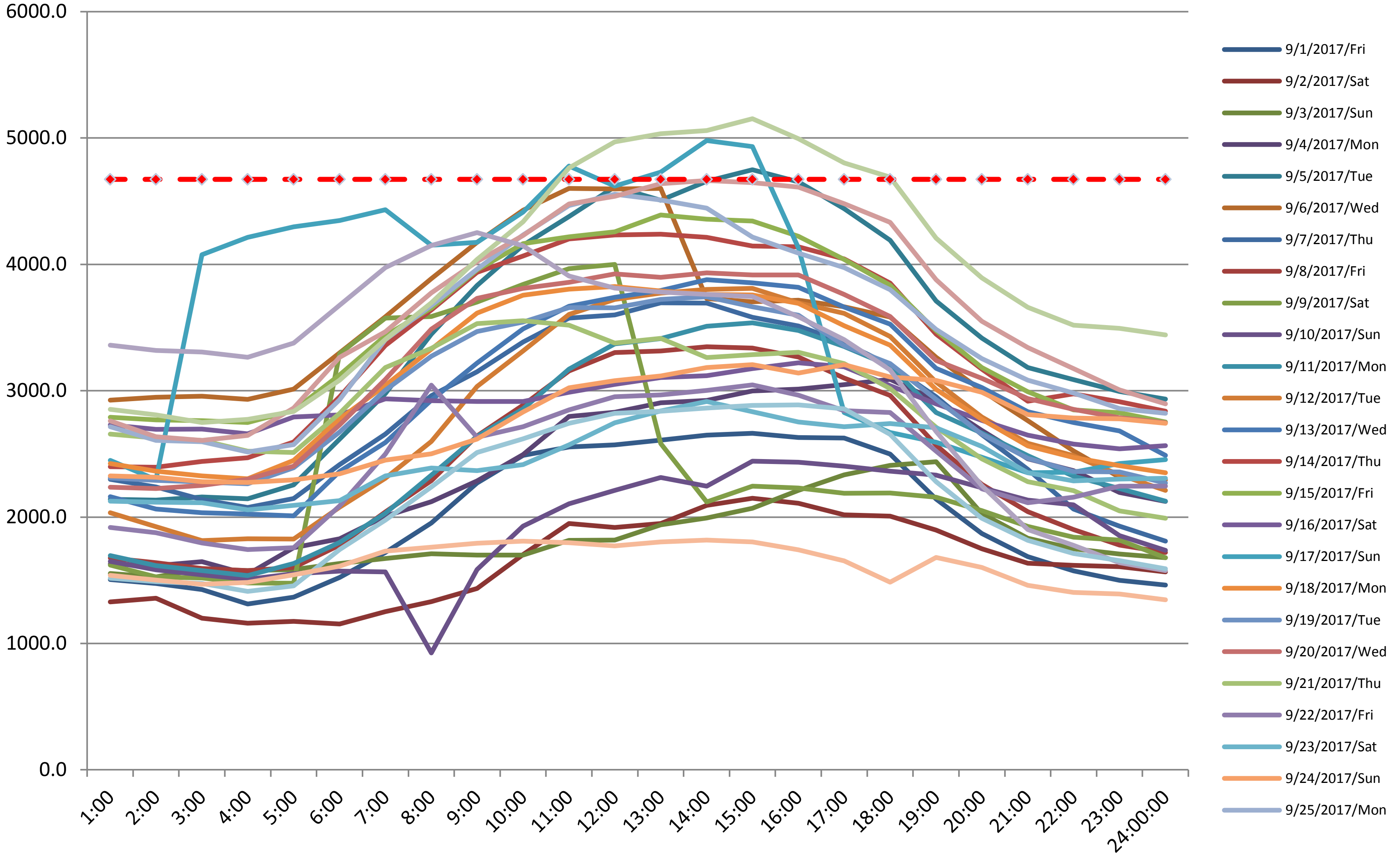
Your Electricity Pricing



Batteries decrease demand charges (but not others)

APS

T&D Reduction



APS

BMC Load Reductions

Summer Peak: 5000kw

Winter Peak: 3000kw

T&D Reduction: 310 - 1060kw/month

Generation Capacity Reduction: 1060kw

APS

Capacity Costs

Eversource T&D

Summer = $24.82
Winter = $18.86

ISO-NE Capacity Cost

ICAP Cost - NEMA			
FCA	Cap Year	ISO Price	Retail Price-kw/mth
10	19/20	$ 7.03	$ 9.96
11	20/21	$ 5.30	$ 7.57
12	21/22	$ 4.63	$ 6.43

APS

BMC Savings

T&D Demand reduction 310-1060kw/month.

Annual savings = $110,000

Capacity reduction 1060kw

Annual savings $90,000

Total Annual Savings: $200,000

Annual Demand Costs: $1,247,000

Annual Demand Savings = 16%

APS

BMC Resiliency

Backup power available to critical communications, and helipad

Able to condition power from CHP when islanded to support high load hospital equipment

System is able to interface with CHP to improve black start

System will now cover demand spike during CHP trip/restart

APS

BMC Economics

Project Cost: $1,500,000

Annual Savings: $200,000

Simple Payback: 7.5 years (w/o grant)

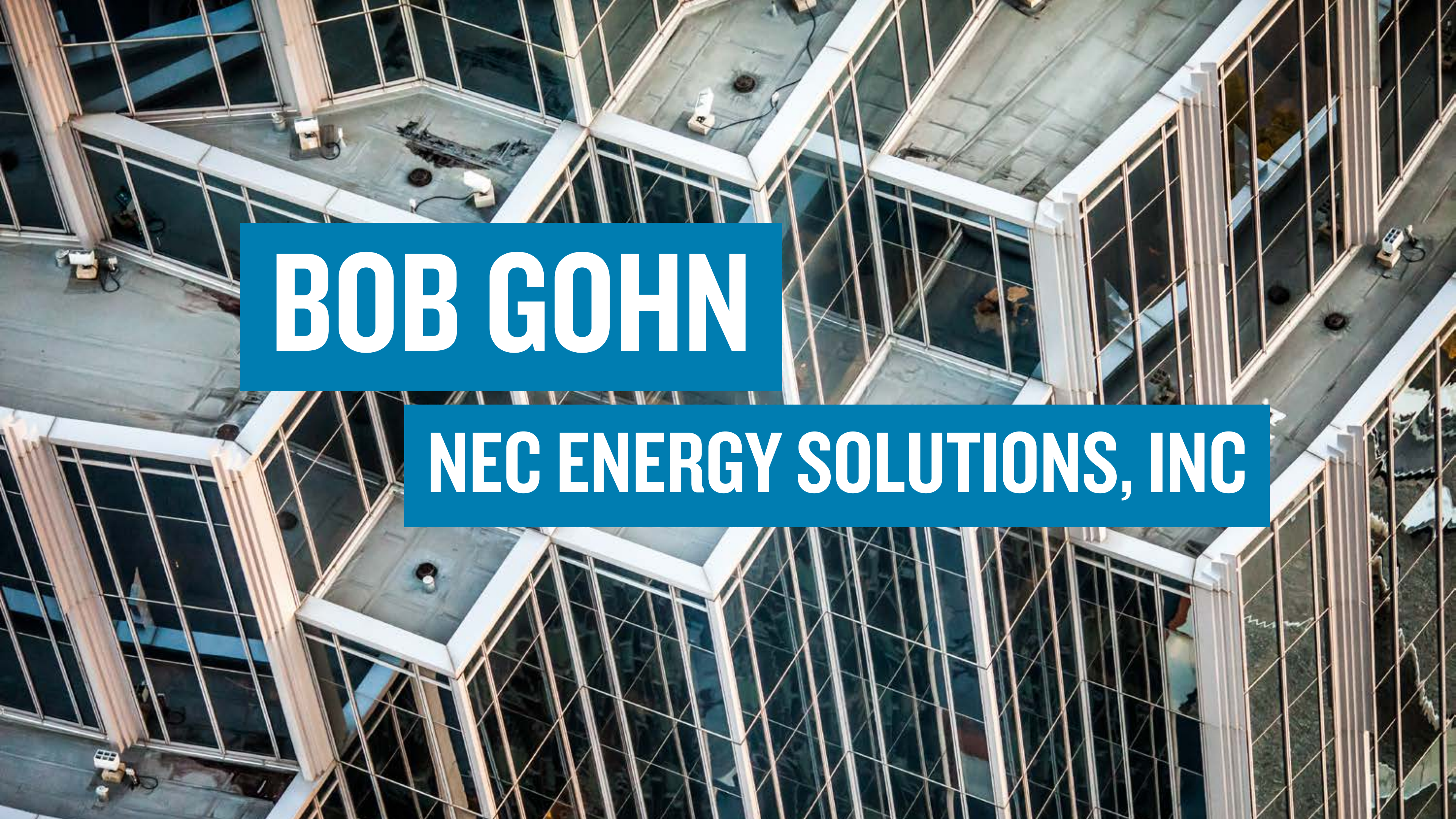
Mass CEC Grant: $402,500

Simple Payback: 5.5 years (w / grant)*

*Ground installations will have a lower simple payback.

*Lower load factor accounts will have lower simple payback


DAVE HEBERT
ENRNOC, INC., AN ENEL GROUP COMPANY


BOB GOHN
NEC ENERGY SOLUTIONS, INC

NEC ENERGY SOLUTIONS

Harnessing the Power of Energy Storage in Boston's Commercial Buildings

Technology and Commercial / Industrial Business Cases

April 17, 2018

Bob Gohn, NEC Energy Solutions

NEC Energy Solutions: A Massachusetts Leader

NEC ENERGY SOLUTIONS

- Pioneering Energy Storage leader since 2008
- Headquartered in Westborough MA
- In NEC Corporation family
  - $23.9B Revenue; established 1899
- >250MW of energy storage globally
  - Massachusetts projects ranging from <100kWh to >100MWh

Sterling, MA
Grid Resiliency & Peak Management

Charlton, MA
Solar PV + Storage

BAY STATE WIND PARTNERS WITH NEC ENERGY SOLUTIONS

Massachusetts-based Collaboration Will Support Efforts to Create Industry-Leading Battery Storage and Offshore Wind Pairing Using Local Workforce

March 16, 2018 11:00 AM Eastern Daylight Time

BOSTON--(BUSINESS WIRE)--Bay State Wind, the 50-50 partnership between Ørsted, the global leader in offshore wind, and Eversource, New England's premier transmission builder, today announced that it has entered into a Letter of Intent to work collaboratively with Massachusetts-based NEC Energy Solutions to develop an energy storage solution for its 800MW wind / 55 MW – 110 MWh energy storage combined project. The Bay State Wind project will represent the world's largest wind-paired energy storage system for comm
South Coast region of Massachusetts.

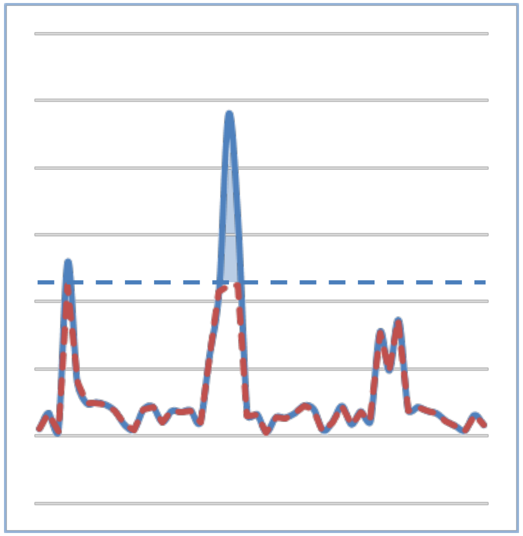
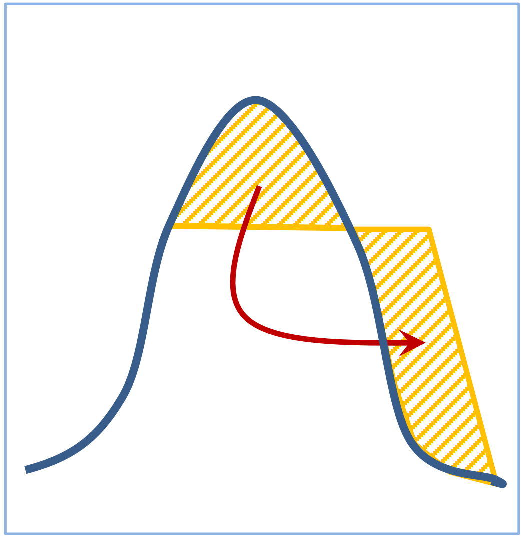
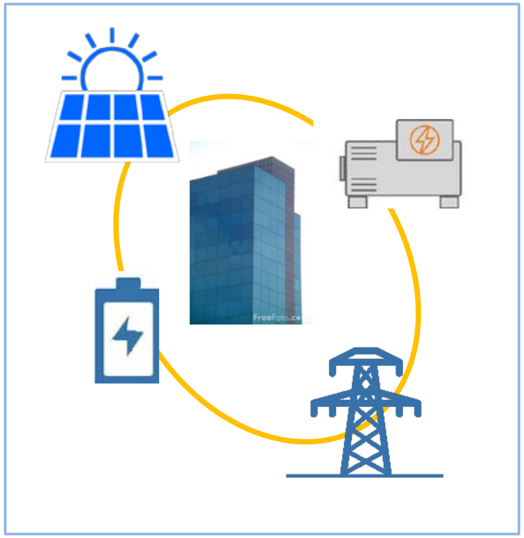
This collaborative effort furthers Bay State Wind's co
storage in Massachusetts. Dedicated to growing Ma
and working to strengthen the supply chain through
jobs in the quickly growing, high demand fields of re

"We could not be more thrilled to work with a Massachusetts company that is a global leader in battery storage technology and products," said Thomas Brostrøm, President of Ørsted North America. "NEC Energy Solutions is widely recognized as a pioneer and leader in the market for utility scale energy storage, and their ability to recruit talent from the local workforce will help not only Bay State Wind, but it will help solidify Massachusetts as a global leader in the green energy revolution."

Bay State Wind
Offshore Wind + Storage

Storage-Based Services for Commercial Buildings

NEC
NEC ENERGY SOLUTIONS

Peak / Demand Charge Management	Solar Generation Maximization	Resiliency / Microgrid
		

Boston-Area Hospital Resiliency Project

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NEC ENERGY SOLUTIONS

JFK Airport Hotel Microgrid

Colombia Office Complex

UK Recycling Plant

- Goal: Energy resiliency microgrid
  - Backup power during grid outages
  - Economic dispatch (peak shaving)
- Energy storage:
  - Supports CHP plant when grid-connected (i.e. smooths paralleled CHP/grid vs. load against utility import maximums)
  - Provides microgrid frequency regulation and transient load control when islanded
- ~700kW / 500kWh energy storage system
- Mid-2018 installation, with expected extension to multiple sites
- MA DOER Resiliency Grant program support
- Similar to NYC project underway; other projects around the world

NEC

NEC ENERGY SOLUTIONS


CALL-TO-ACTION
JOHN CLEVELAND
BOSTON GREEN RIBBON COMMISSION

A BETTER CITY

BOSTON
Green Ribbon
COMMISSION

HARNESSING THE POWER OF ENERGY STORAGE IN BOSTON'S COMMERCIAL BUILDINGS

A BETTER CITY

www.abettercity.org