Eversource Active Demand Program Update

Association of Energy Engineers

Connecticut Chapter Meeting

May 7th, 2019

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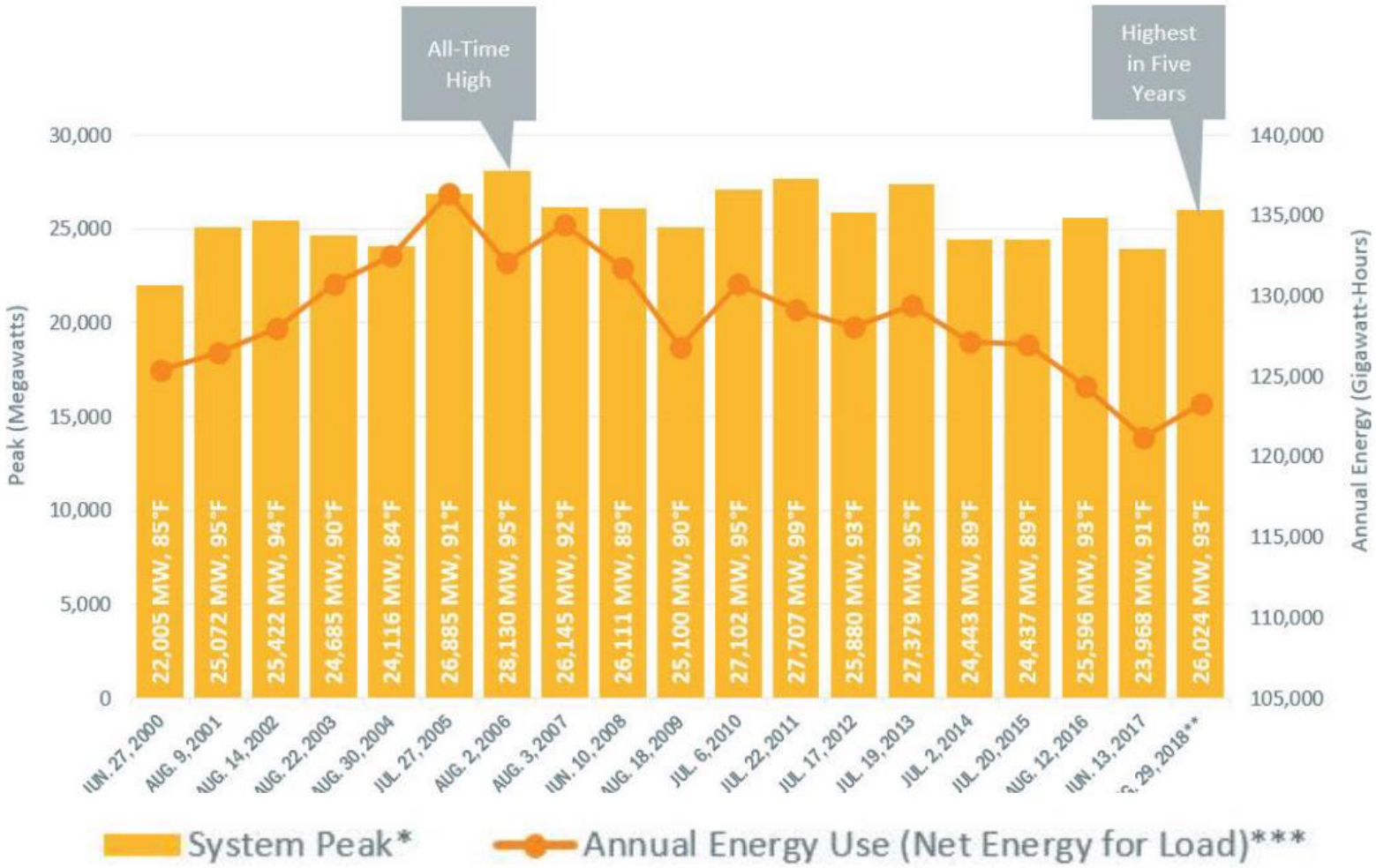
Eversource

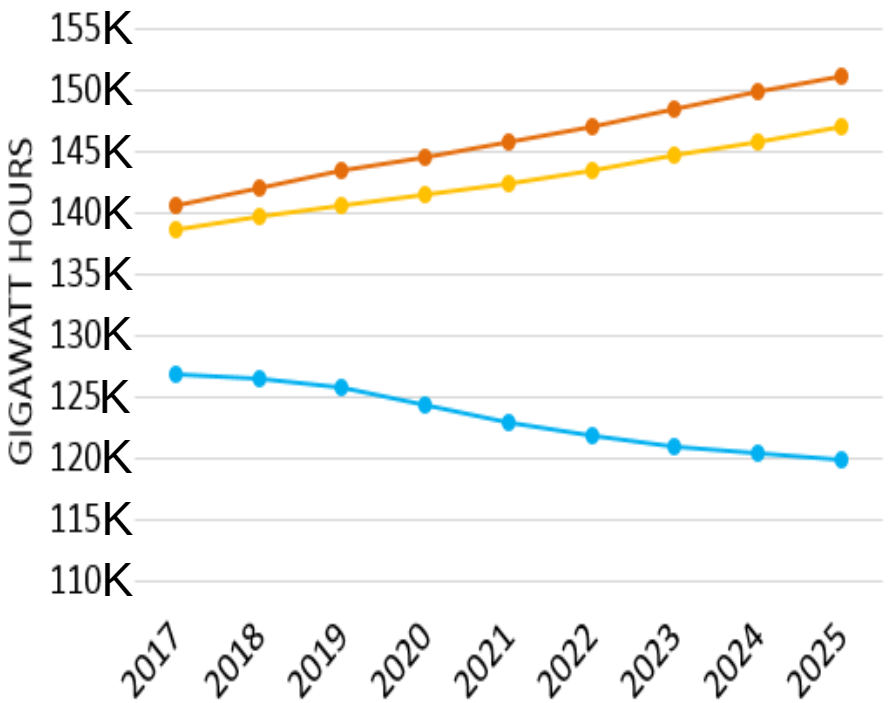
Regional Context – ISO NE



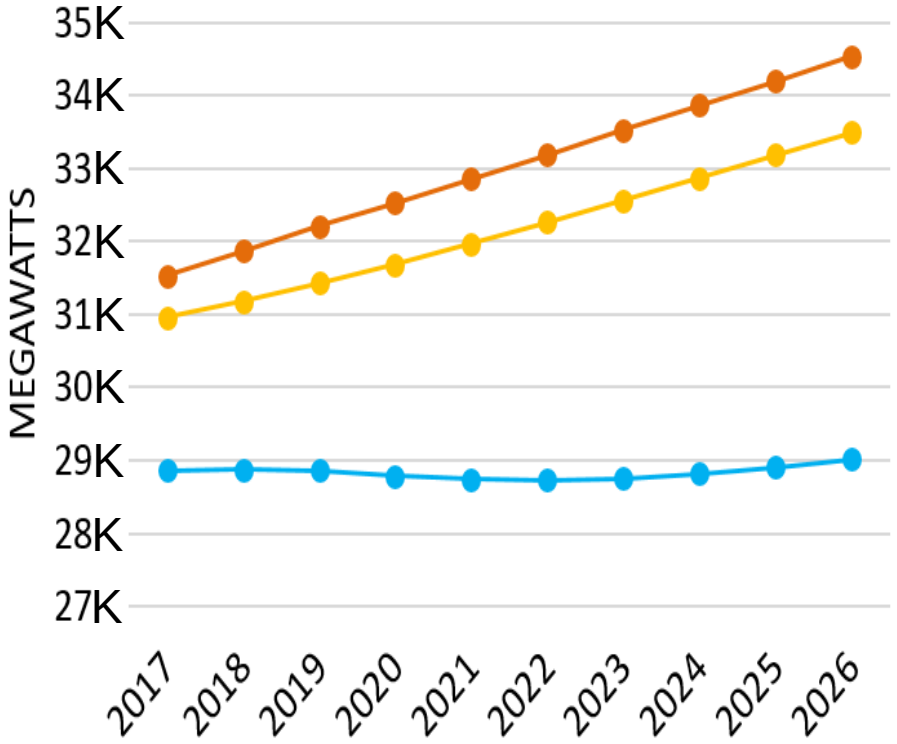
Source: ISO NE

Regional Context – ISO NE Forecast

ANNUAL ENERGY USE (GWh)
With and without EE and PV Savings



SUMMER PEAK DEMAND (MW)
With and without EE and PV Savings

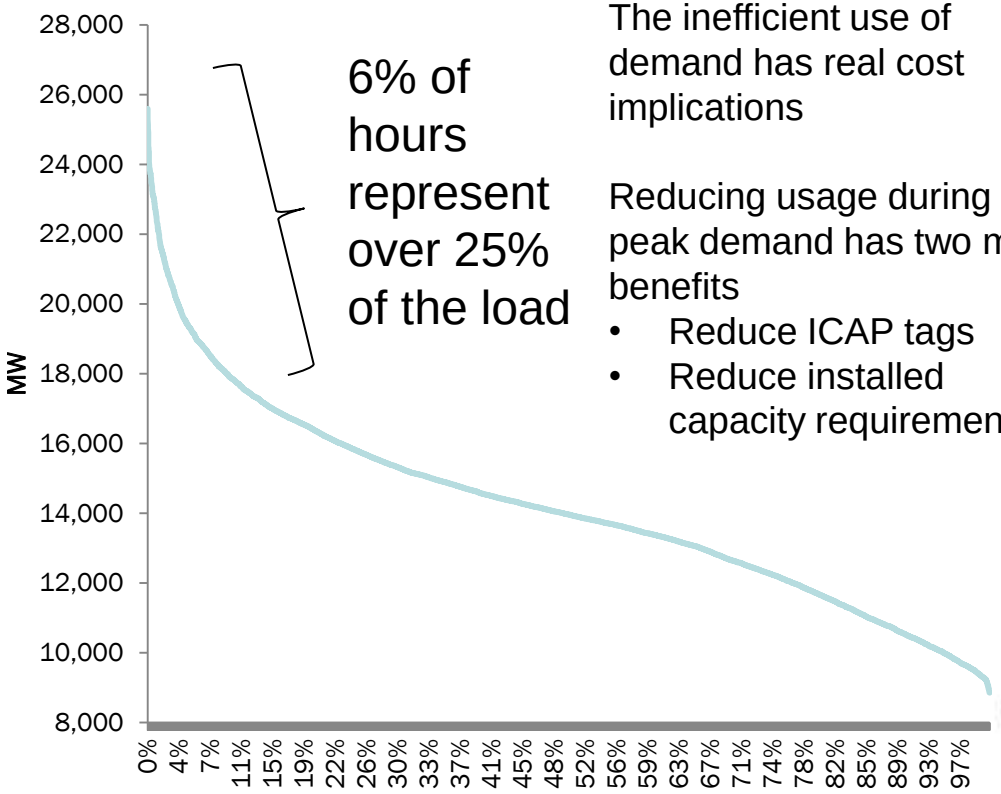


- The gross load forecast (projected regional energy use)
- The gross load forecast minus forecasted solar PV resources
- The gross load forecast minus forecasted PV, minus EE resources in the Forward Capacity Market 2015–2018 and forecasted EE 2019–2024

Regional Context – ISO NE

- More than 4,200 megawatts (MW) will have shut down between 2012 and 2020
  - an amount equal to almost 15% of the region's current generating capacity
- Over 5,500 MW of additional oil and coal capacity are at risk for retirement in coming years

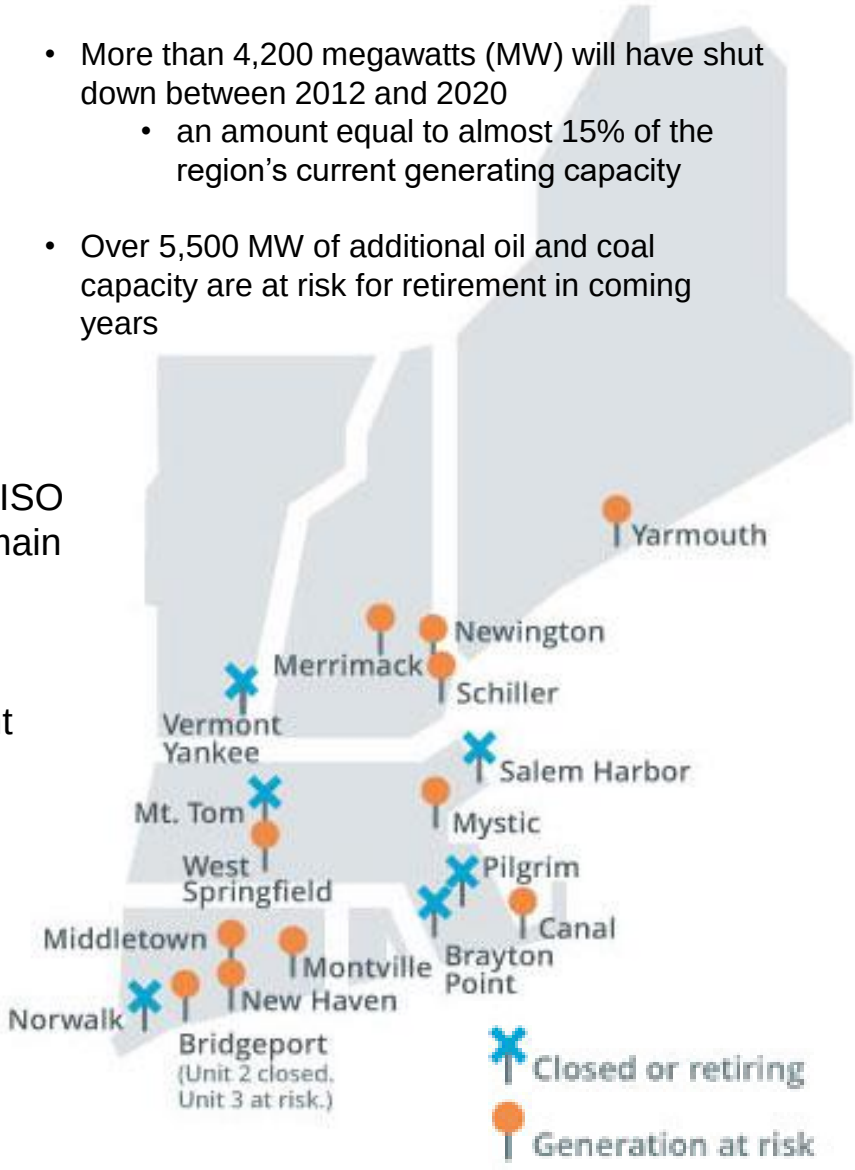
2016 ISO NE Load Duration Curve



The inefficient use of demand has real cost implications

Reducing usage during ISO peak demand has two main benefits

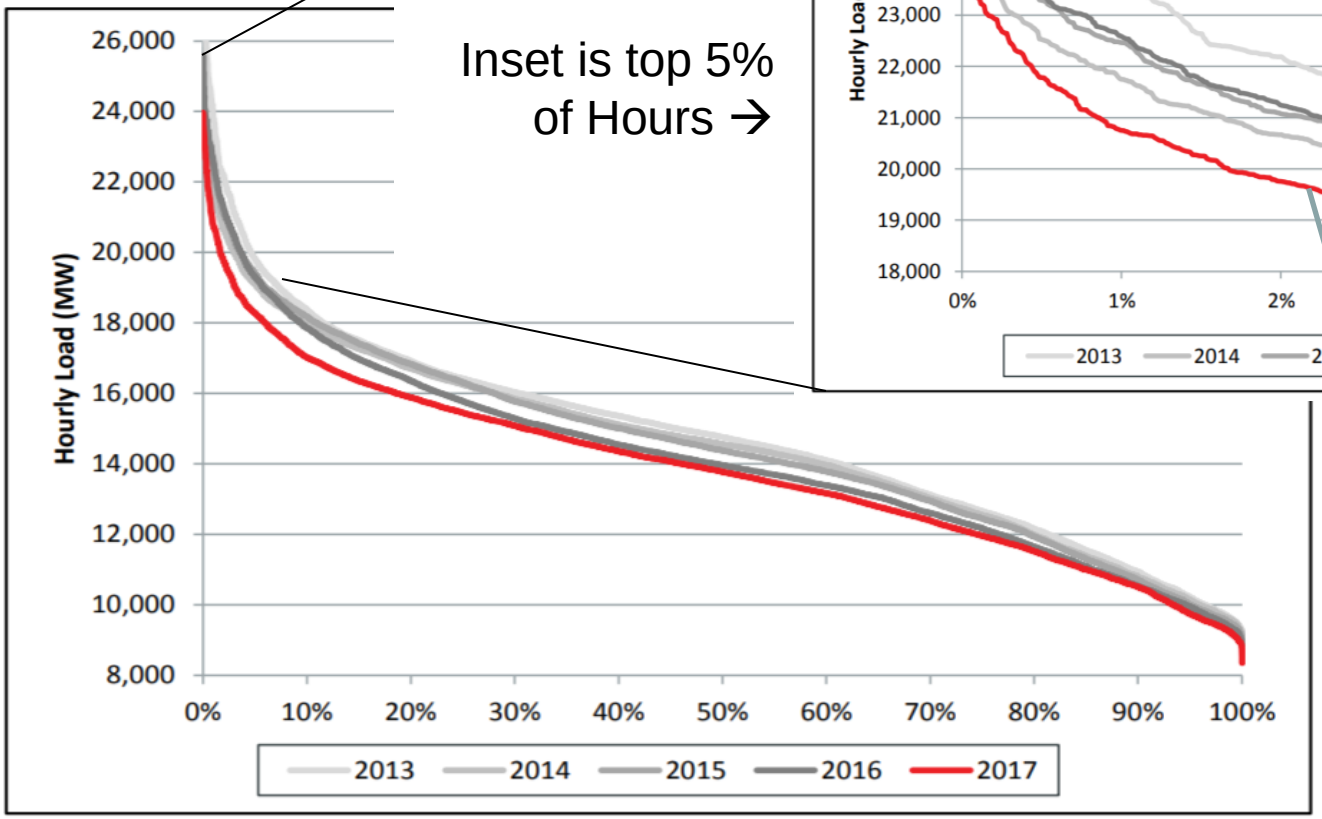
- Reduce ICAP tags
- Reduce installed capacity requirement

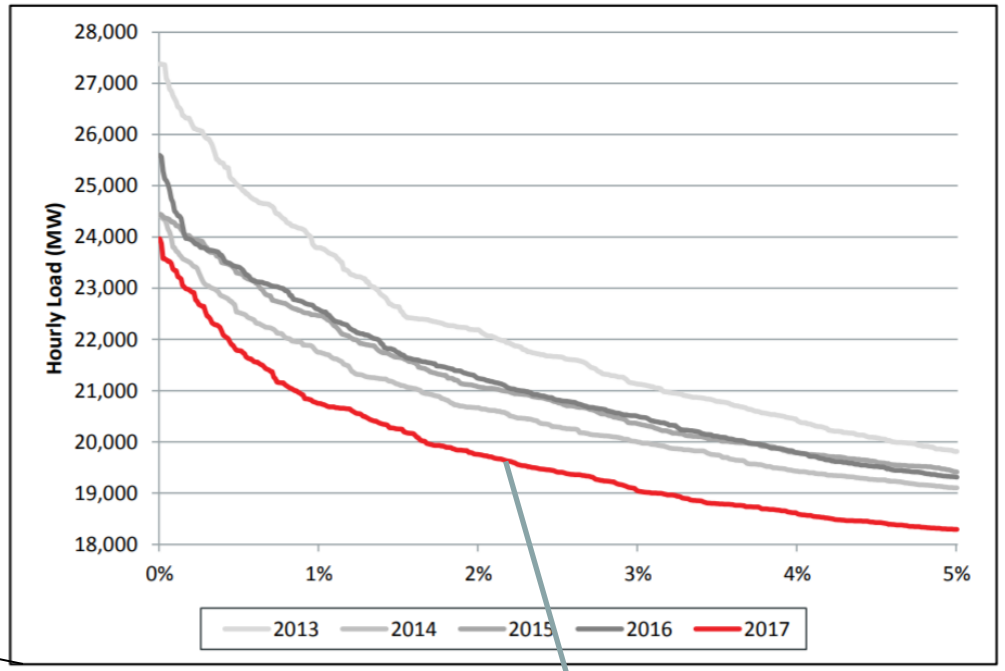


ISO NE Load Duration Curve

Top 5% of hours account for ~25% of the total load

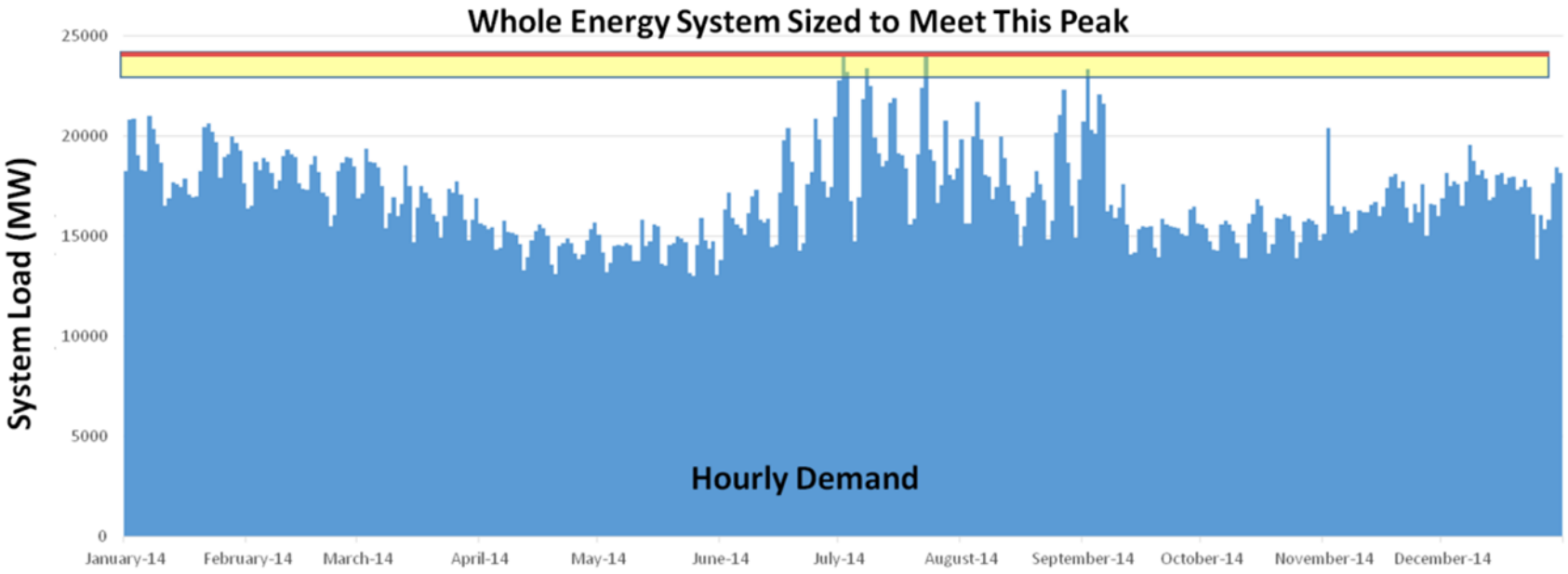
Inset is top 5% of Hours →





Peak loads have declined slightly in recent years due to milder summers, energy efficiency, and behind-the-meter solar.

Source: 2017 Annual Markets Report, ISO New England Inc. Internal Market Monitor, May 17, 2018


Whole Energy System Sized to Meet This Peak
System Load (MW)
25000
20000
15000
10000
5000
0
Hourly Demand
January-14
February-14
March-14
April-14
May-14
June-14
July-14
August-14
September-14
October-14
November-14
December-14

Focus on Winter

During prolonged cold stretches, the ISO is forced to dispatch oil fired generation, which impacts costs and emissions

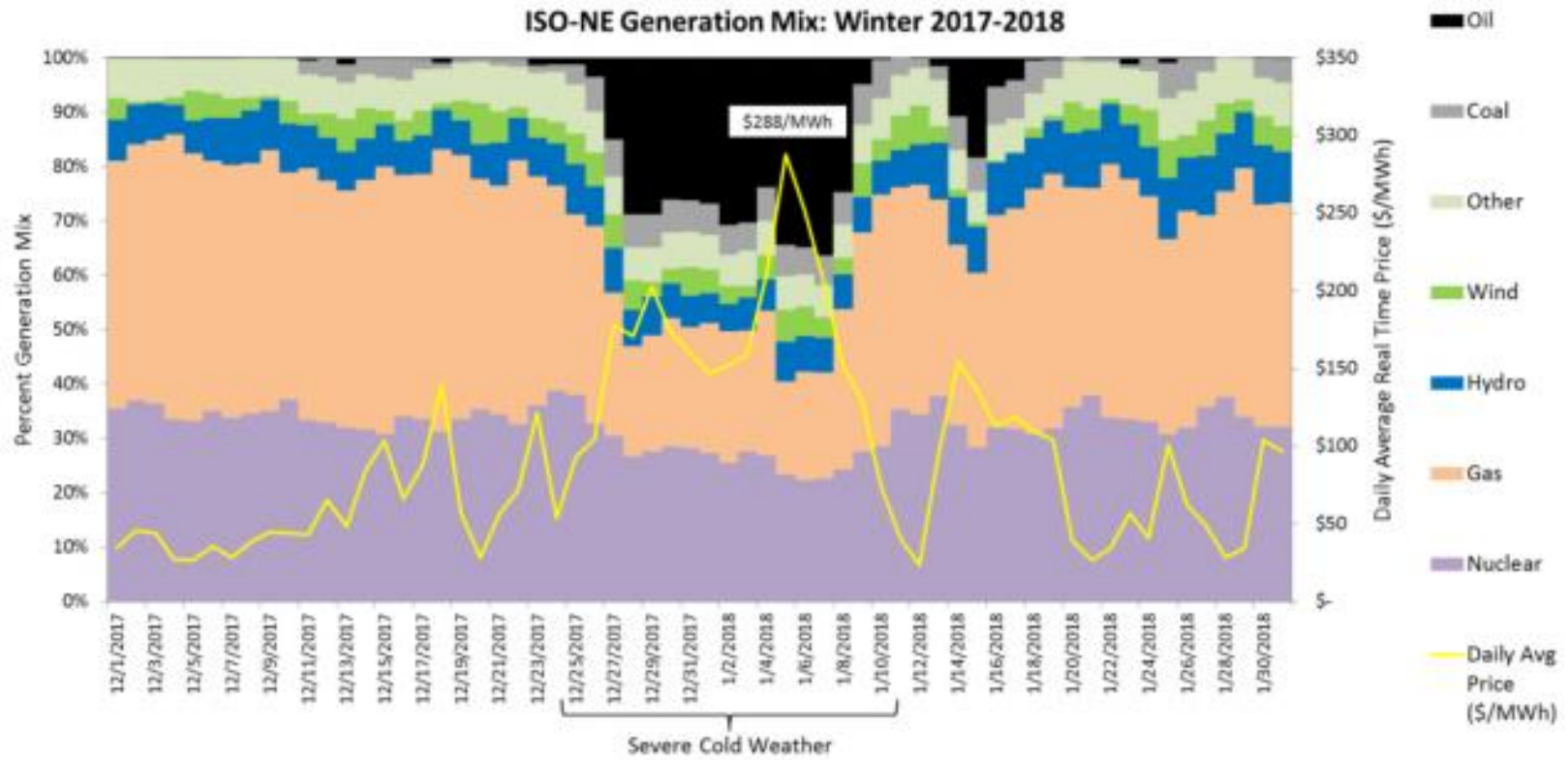
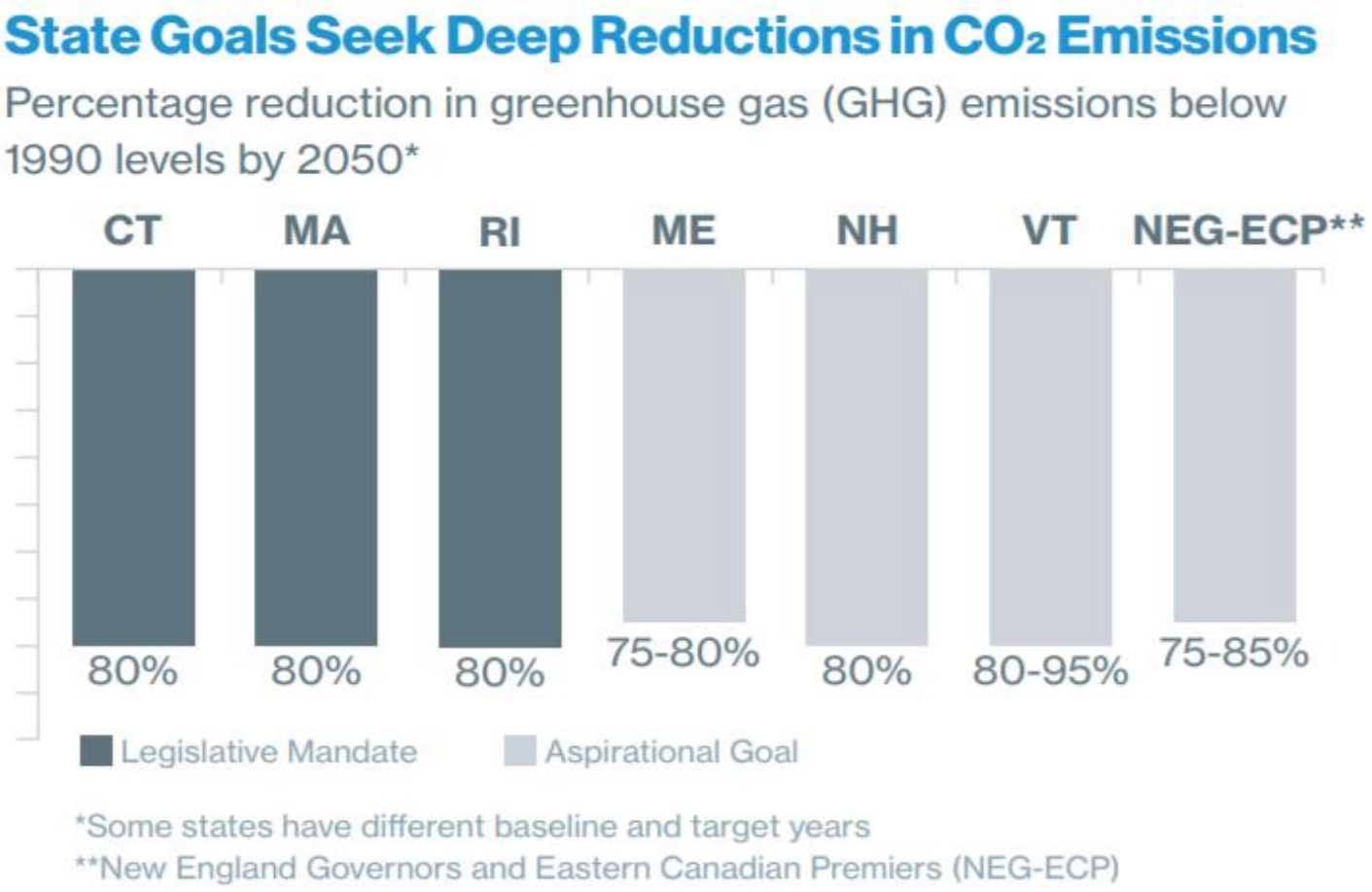


Figure 4: ISO-NE Generation Mix During Winter 2017-2018

Regional Priorities – Reducing GHG

All states in which Eversource operates are seeking to substantially reduce GHG emissions, which leads to a wide range of state energy policies

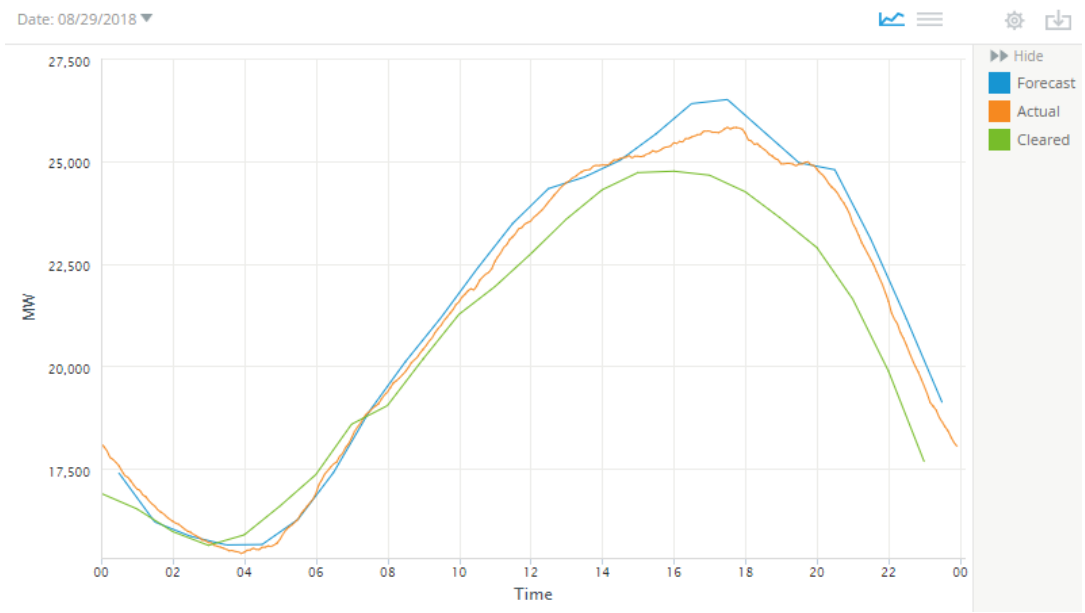


ISO-NE System Peaks = ICap Hours

ISO new england

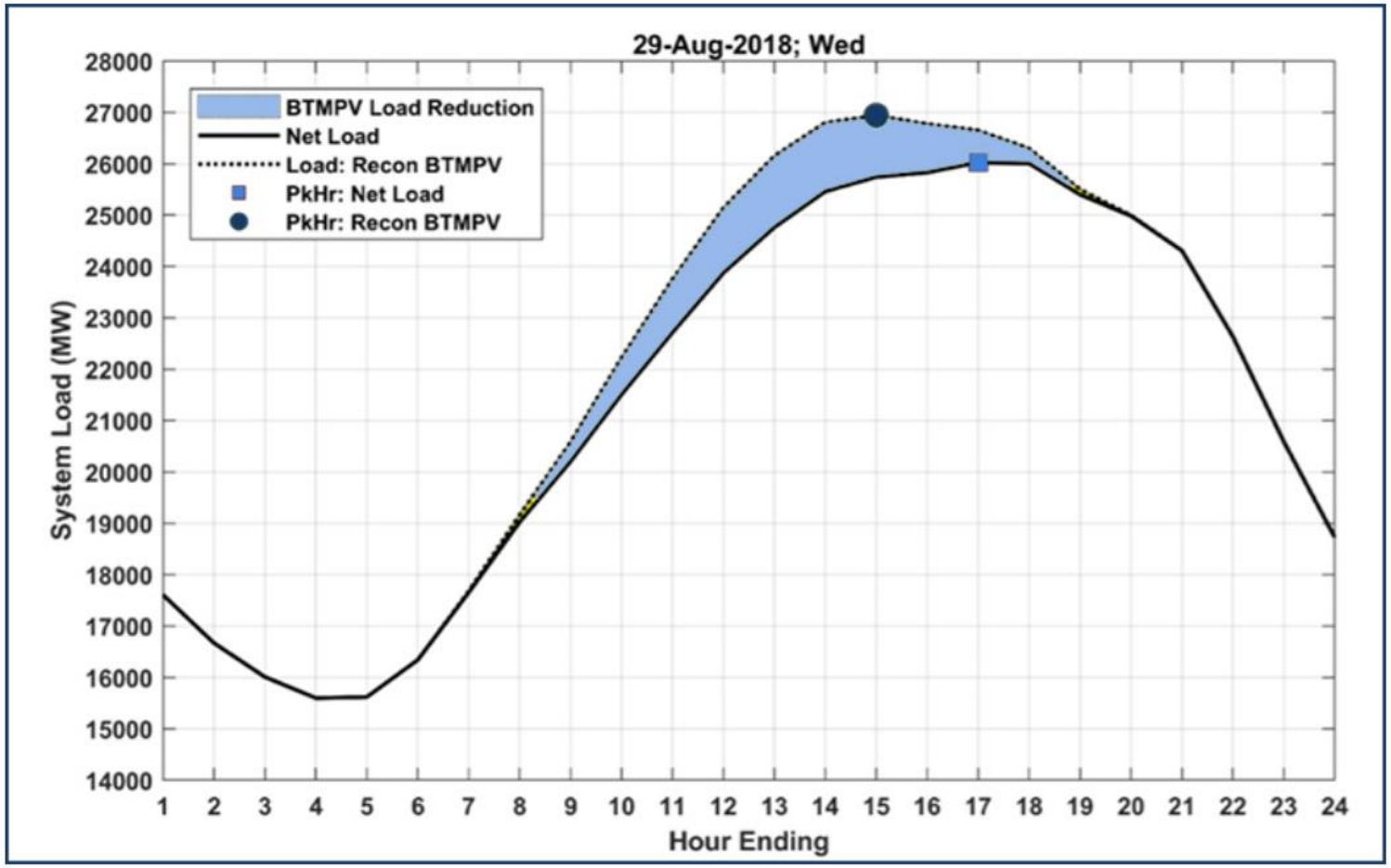
Annual System Peak Day, Hour, and Load

Peak Date		System Peak Load
Date	Hour End	MW
8/09/2001	15:00	-24,723.332
8/14/2002	15:00	-25,103.369
8/22/2003	15:00	-24,310.552
8/30/2004	16:00	-23,718.721
7/27/2005	15:00	-26,617.688
8/02/2006	15:00	-28,038.238
8/03/2007	15:00	-25,773.240
6/10/2008	15:00	-25,691.470
8/18/2009	15:00	-24,707.827
7/06/2010	15:00	-26,701.350
7/22/2011	15:00	-27,312.342
7/17/2012	17:00	-25,543.347
7/19/2013	17:00	-26,910.954
7/02/2014	15:00	-24,067.772
7/29/2015	17:00	-24,052.353
08/12/2016	15:00	-25,111.431
06/13/2017	17:00	-23,507.885
08/29/2018	**17:00**	**-25,528.391**



- Any weekday June – August
- Later in the day trend

ISO-NE System Peaks = ICap Hours



Graph of last summer's peak day shows BTM PV peak reduction is the difference between the peak after BTM PV is reconstituted and the peak net of BTM PV. | *ISO-NE*

- Later in the day trend

Installed Capacity Charge

- Capacity Auction = Previous Peak Load + Reserve Margin (~25%)
- Result is a fixed amount that must be paid by NE consumers
- Based on *YOUR* consumption at ICap hour….

- Paid through charges on SUPPLY bill
  - Pass-Through
  - Fixed Price

- Zero Sum in year 1…. Regional benefits during reconstitution

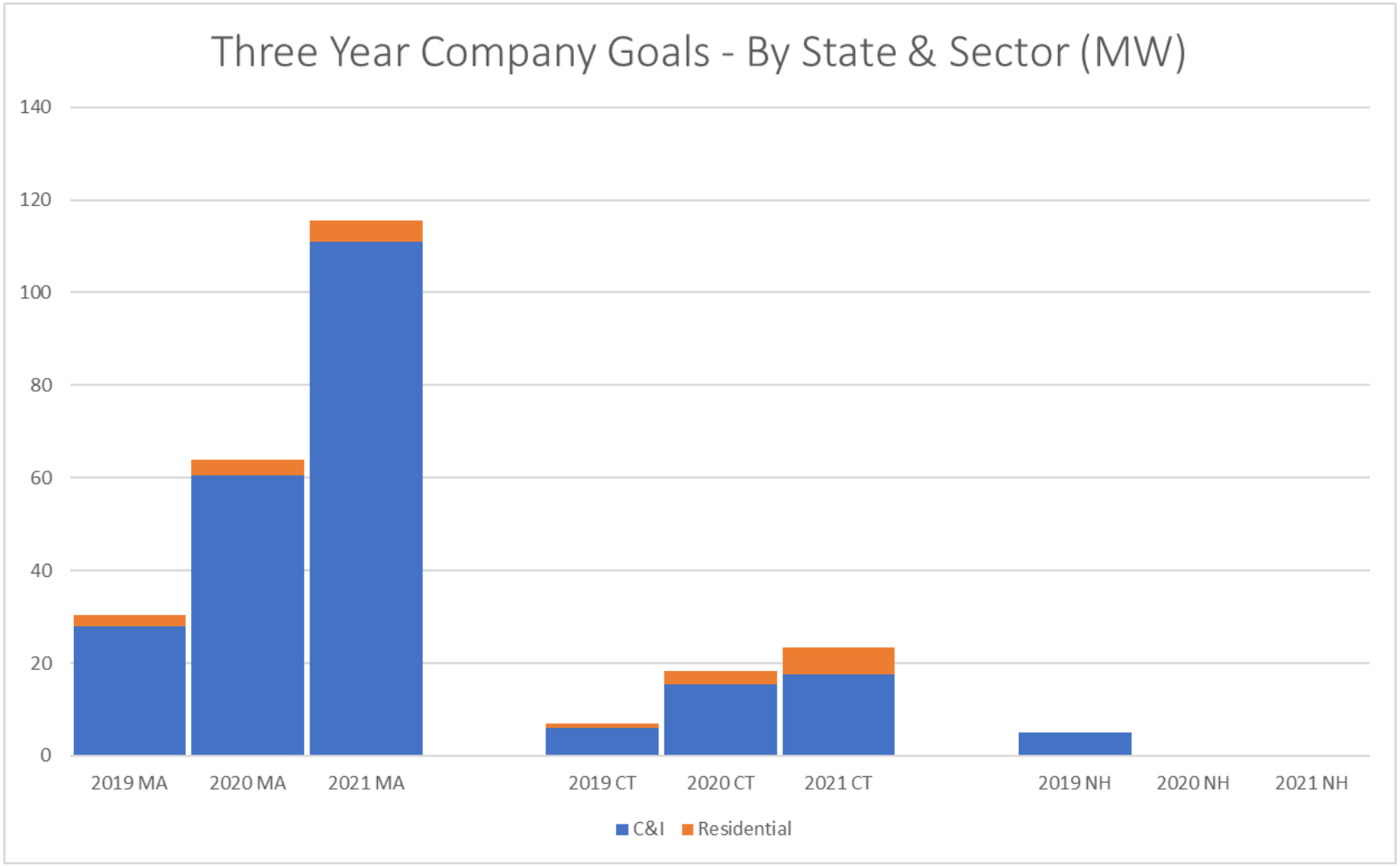
- Different than T&D site demand charges

Problems to Solve – Active Demand

1. Regional System Peak Load
2. Winter Price/Fuel Mix

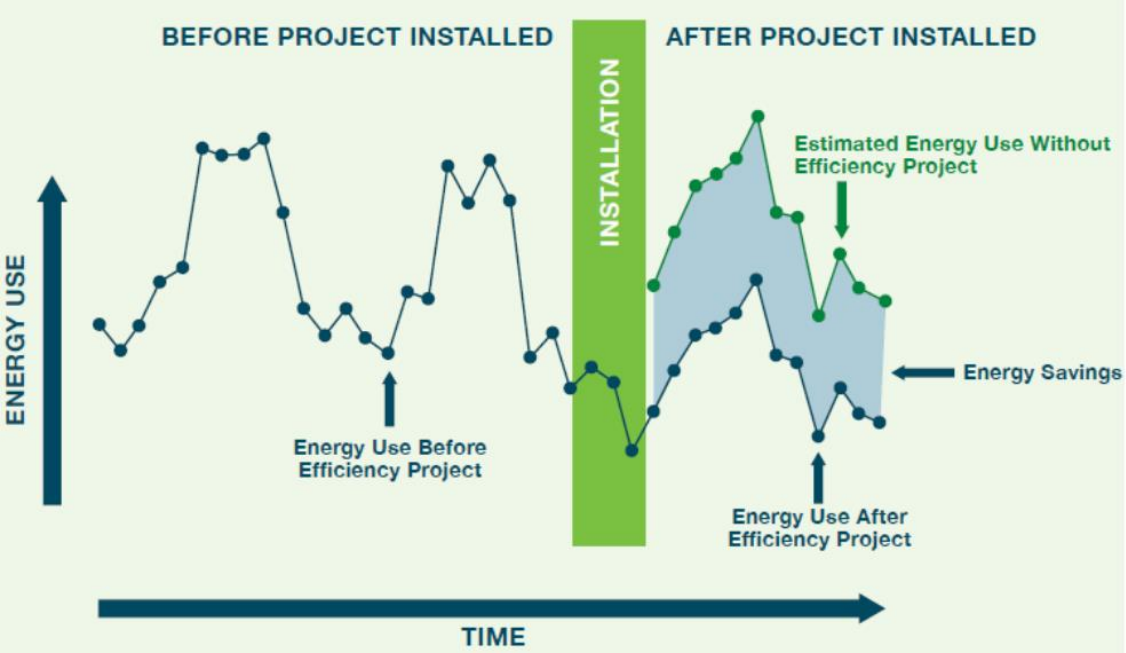
- CT, MA, NH, RI have all begun utility sponsored programs
- Goals for capacity reductions at correct times

Eversource 3-Year Summer Goals



Active Demand v. Energy Efficiency

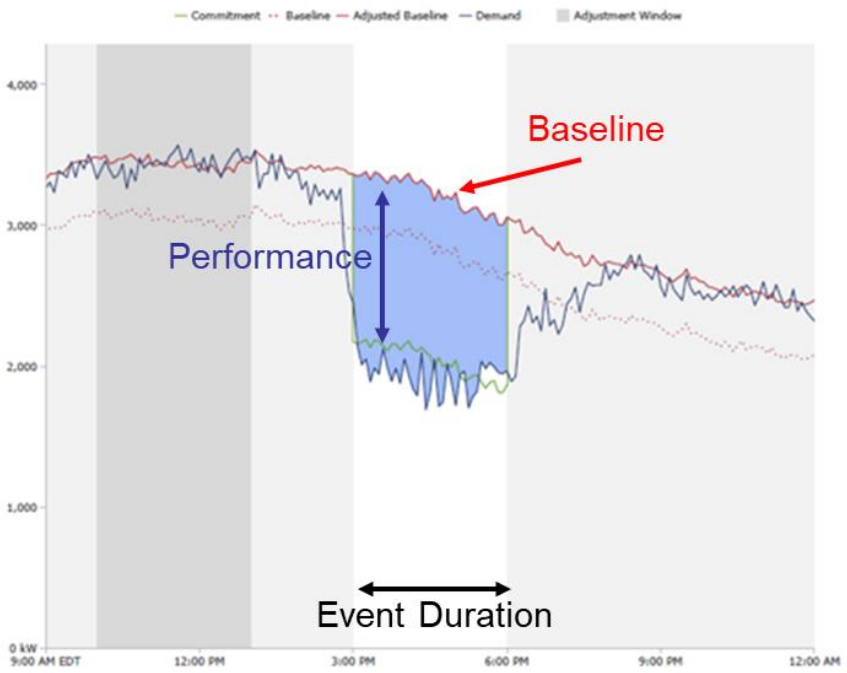
- Energy Efficiency
  - Continuous savings
    - Claimed for lifetime
  - Upfront incentives
  - kW & kWh Benefits
    - Cost Effective test
  - Performance for completed projects



Graph from NRDC; Jan 2017

Active Demand v. Energy Efficiency

- Active Demand
  - Control & Dispatch
  - Pay for Performance
    - Single Year
    - Vs Baseline
  - Year-to-Year incentives for capacity
  - Peformance for dispatching correctly
    - Unknown until end of season



Program Dispatch Designs

Targeted Summer

- June – September
- 8 Events Maximum
- 24 Total Hours Max
- 3 Hour Event Duration
- Weekday / Non-Holiday
- Day Ahead Notifications

Daily Summer

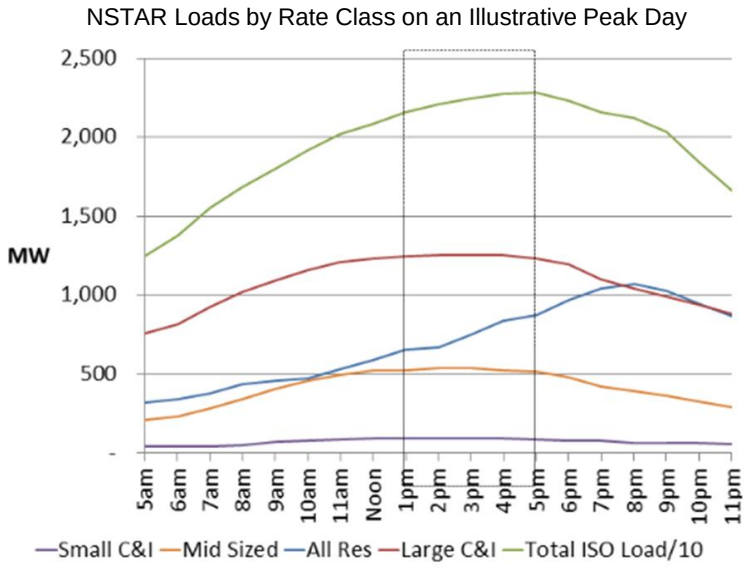
- June - September
- 3 Hour Event Duration
- Dispatch window 2–7p
- Weekday / Non-Holiday
- Day Ahead Notifications

Targeted Winter

- December – March
- 5 Events Maximum
- 15 Total Hours Max
- 3 Hour Event Duration
- Weekday / Non-Holiday
- Day Ahead Notifications

Types of Programs – Sector Based

- Medium and Large C&I
  - Targeted Load Curtailment
  - Targeted Battery Dispatch
  - Daily Battery Dispatch
- Small B & Residential
  - Wi-Fi Thermostat Control
  - Daily Battery Dispatch
  - BYOD – Direct Load Control



Summary of C&I Incentives

Initiative	Program	Season	Incentive	Dispatch Strategy	Key Partners
Curtailment	Targeted Load Curtailment	Summer	$35 / kW-Season	Targeted Summer	Limited to contracted Curtailment Service Providers (CSP): Cpower, Enel X, & Voltus
	Targeted Load Curtailment	Winter	$25 / kW-Season	Targeted Winter	
	Metering	Both	$1,500 One-Time		
Storage	Targeted Dispatch	Summer	$100 / kW-Season	Targeted Summer	Open to all developers/manufacturers who meet qualifications. Examples: AMS, Stem, Tesla, NEC, Ameresco ect.
	Daily Dispatch	Summer	$200 / kW-Season	Daily Summer	
	Targeted Dispatch	Winter	$50 / kW-Season	Targeted Winter	

- Curtailment Incentive are split between CSP & Customer

C&I – CURTAILMENT

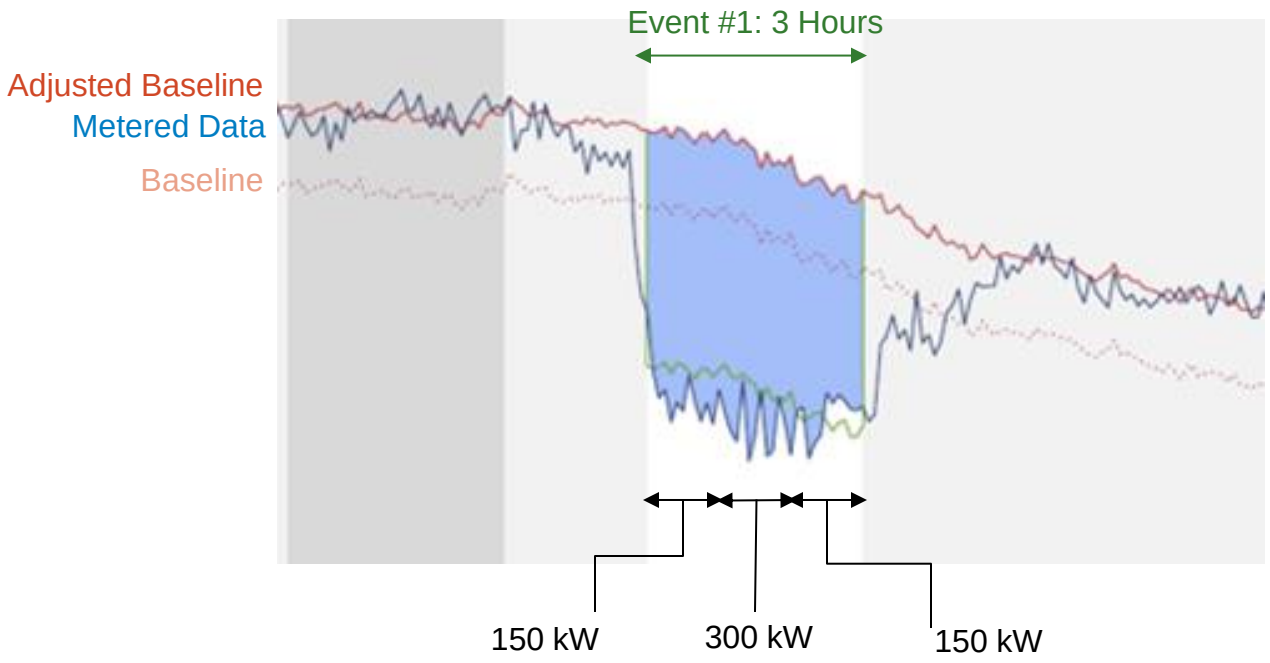
Curtailment Service Providers (CSP)

- Engage with customers to explain basics of demand response
- Complete an audit to estimate the customer's curtailment potential
- Give customer estimate of DR revenues
  - ISO Program + Eversource Program + ICap Reduction
- Enable customer site for curtailment
  - Metering, controls sequences, ect
- Dispatch customers during events
- Provide post-event feedback on performance
- Initial calculations on incentives

CSP Introductions

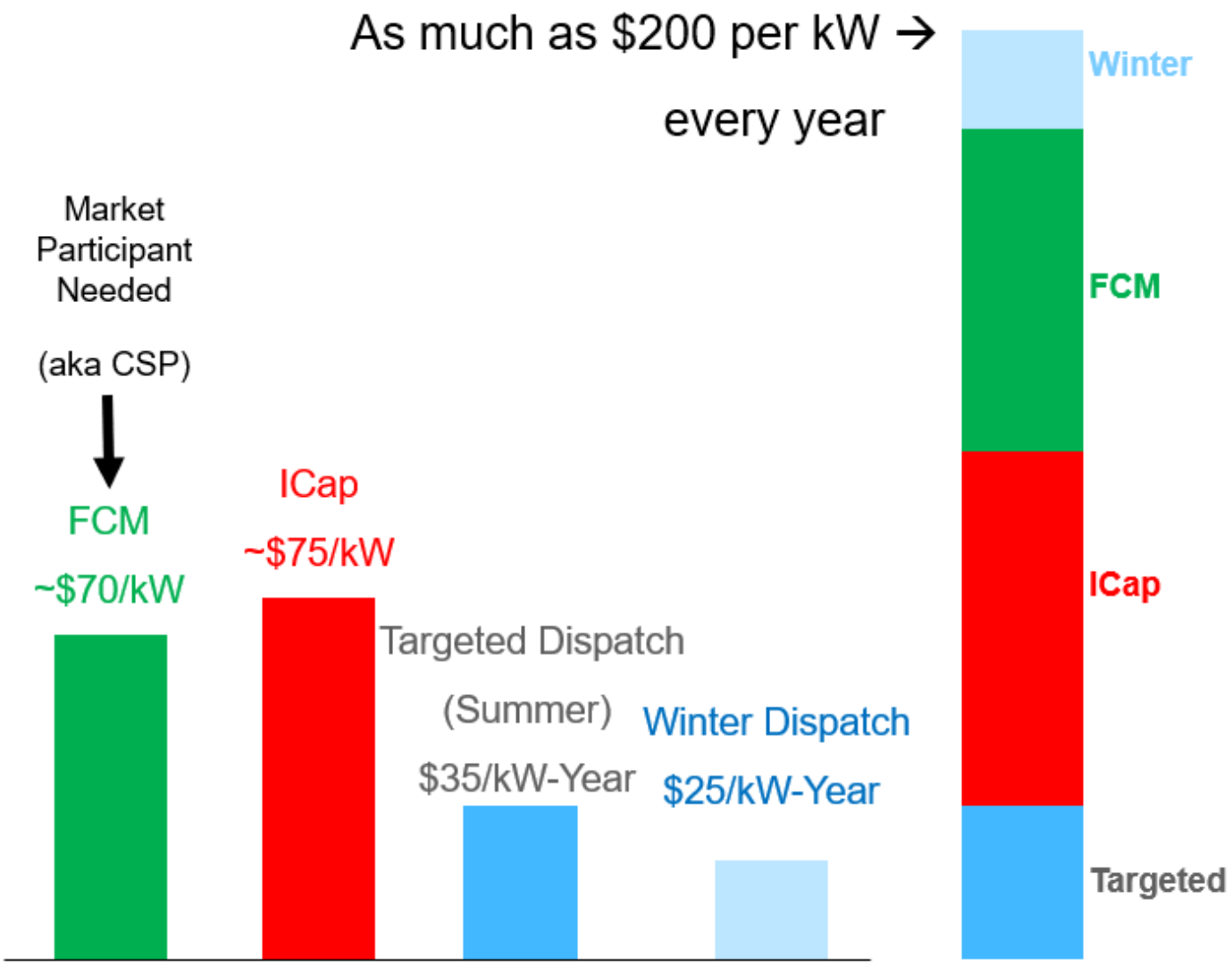
- Cpower
  - Email: Eversource@CPowerEnergyManagement.com
- Enel X
  - Email: EversourceNE@enel.com
- Voltus
  - EversourceNE@voltus.com

Example



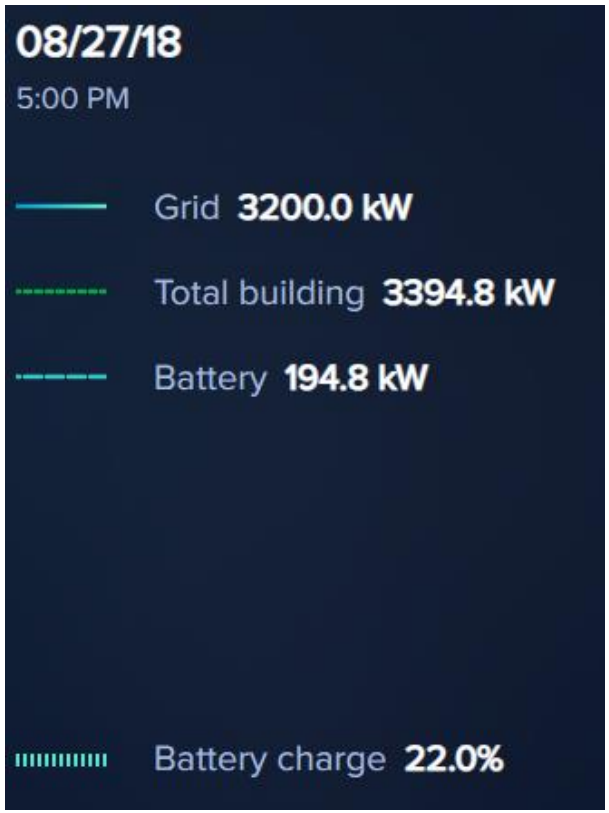
	#1	#2	#3	Event Average
Duration	1 Hrs	1 Hrs	1 Hrs	3 Hrs
Performance	150 kW	300 kW	150 kW	200 kW

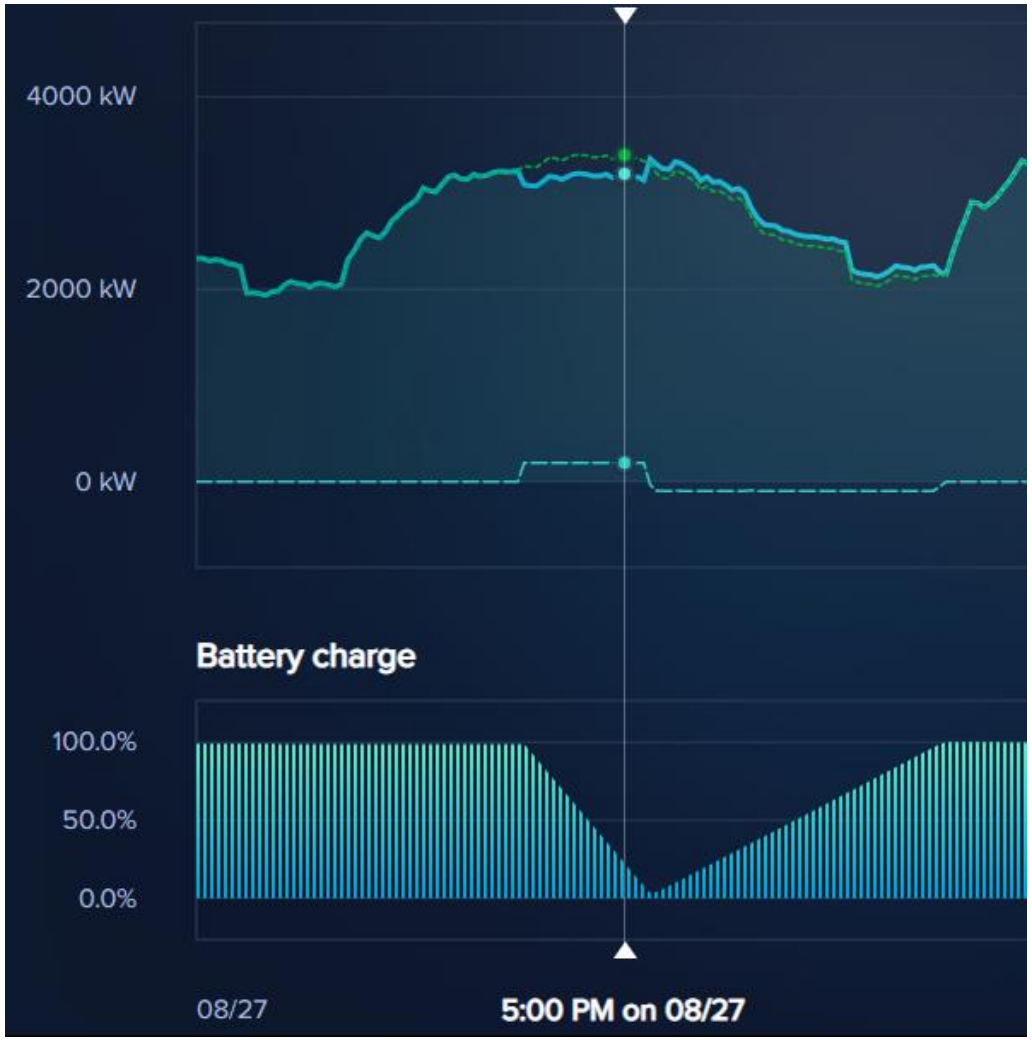
Benefit Stack of Demand Response



C&I – STORAGE

Pay For Performance





Example

- Assume 4 Events this summer

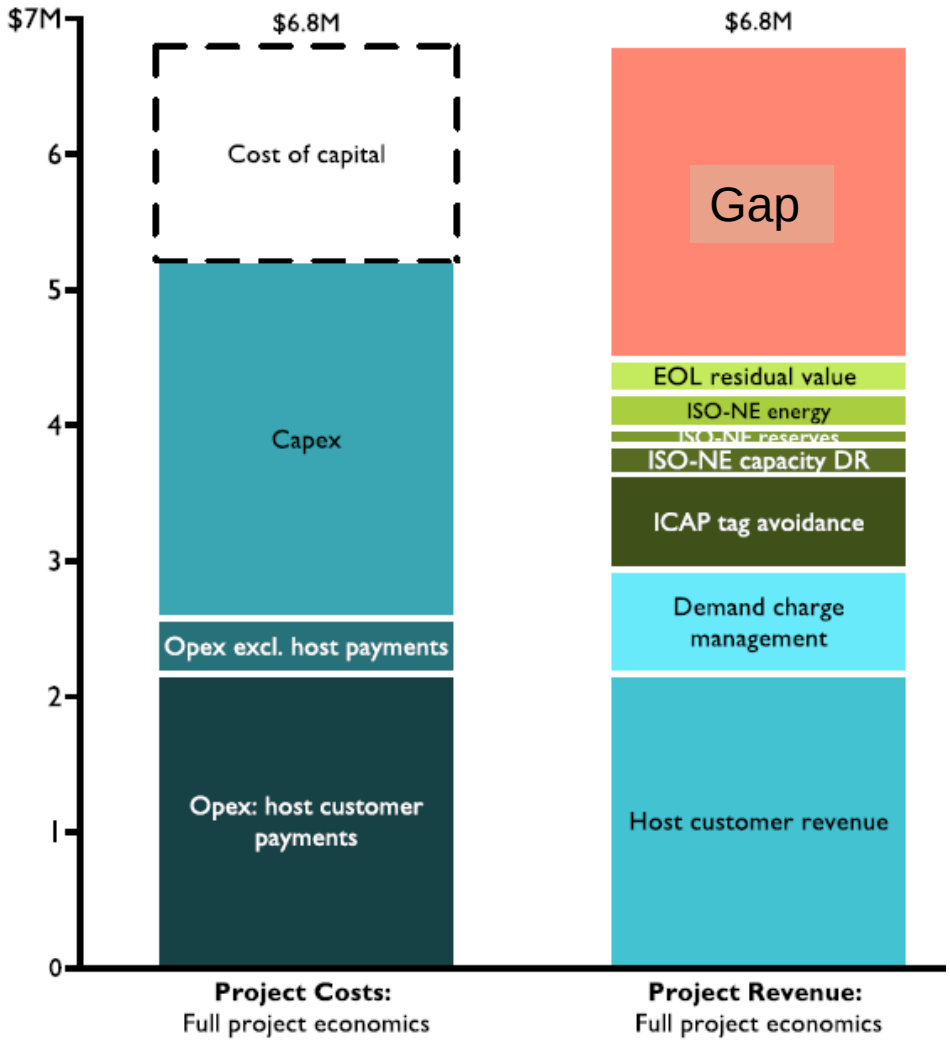
	#1	#2	#3	#4
Duration	3 Hrs	3 Hrs	3 Hrs	3 Hrs
Performance	195 kW	195 kW	195 kW	195 kW

- Average Summer Performance: 195 kW
- Incentive: 195 kW x $100/kW-season = $19,500
- Potential to earn another $50/kw-season in winter as well
  - 195 kW x $50/kW-season = $9,750

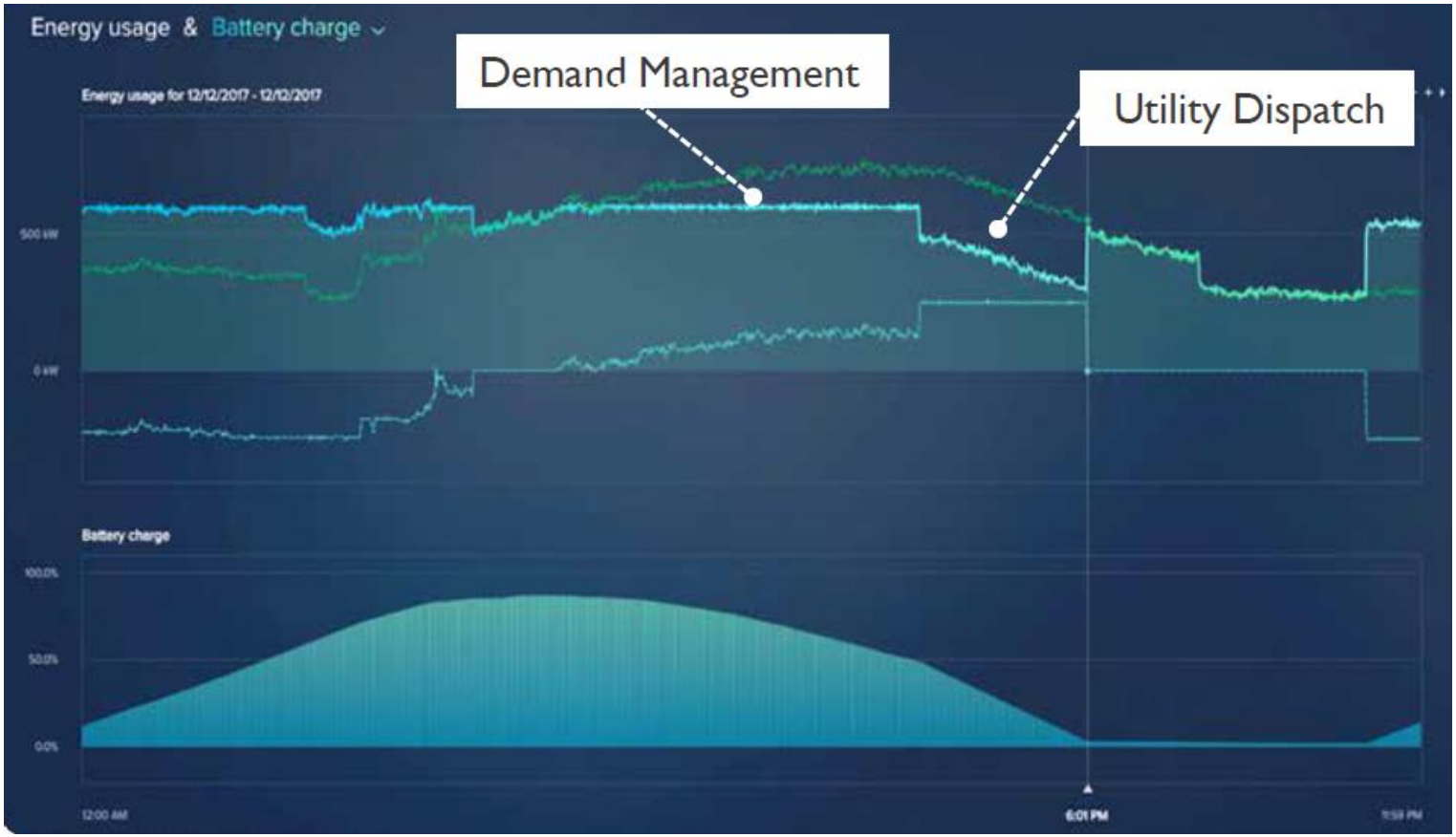
Value Stack

- Customers can use the same capability to gain multiple benefits
  - Eversource Program
  - ISO-NE Capacity Market: Assume
  - Reduced ICAP Charge (Supply Bill)
  - Customer peak management
  - Other Markets
- Not suitable for daily dispatch scenarios
  - Dispatching daily may take away asset's ability to perform in other markets
- Battery developers will sell value stack

Value Stack Example



Operational Example

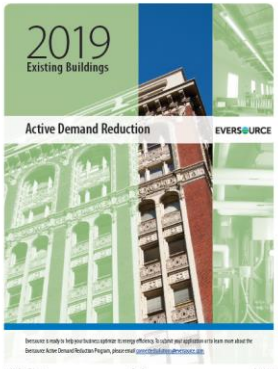


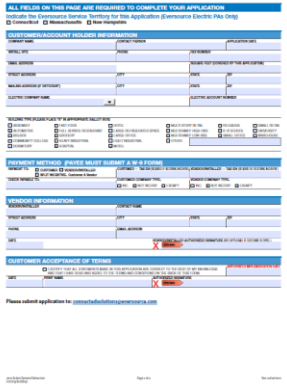
How to Participate

- Go to eversource.com and find “Demand Response” in the “Save Money and Energy” for more information
  - https://www.eversource.com/content/ct-c/business/save-money-energy/manage-energy-costs-usage/demand-response

- Email: connectedsolutions@eversource.com

- Apply:





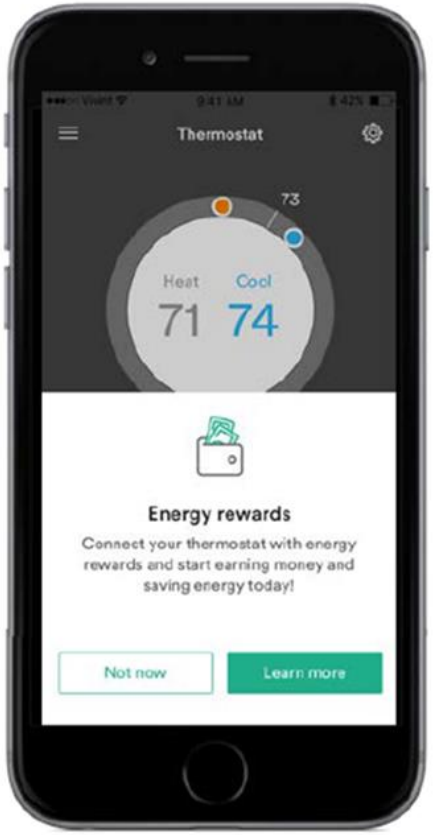
RESIDENTIAL & SMALL B

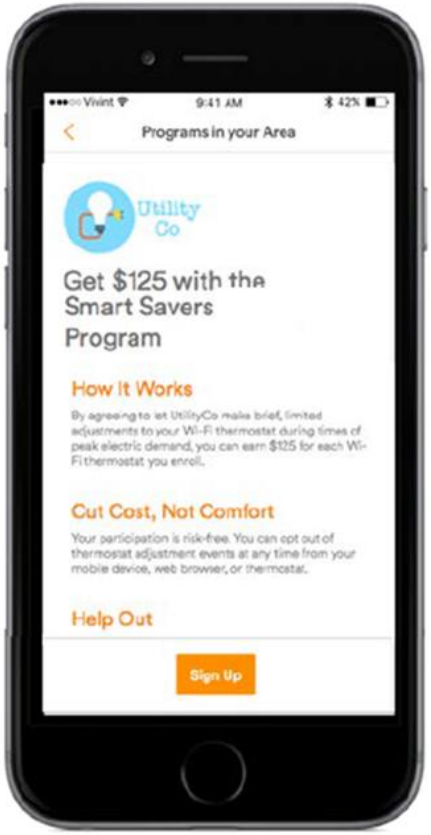
Bring Your Own Device

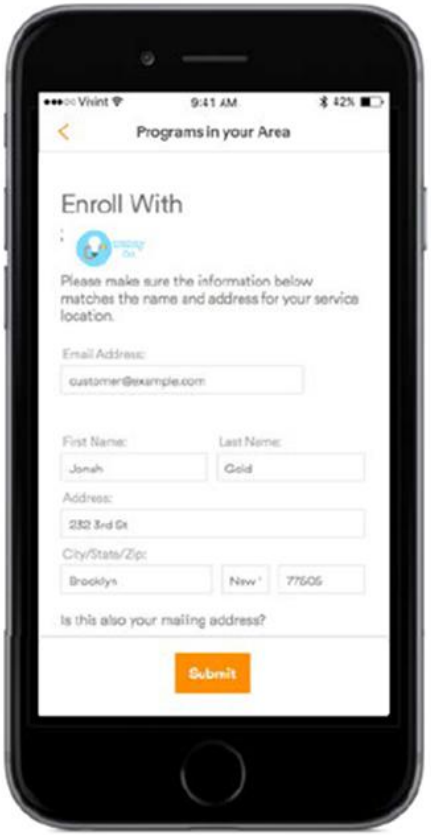
	Program Parameters	Devices
Thermostat	• Targeted Summer Dispatch • All major OEM's available • **$25 for signing up** • **$20 per year for participation**	
Battery *MA Only	• Daily Summer & Targeted Winter Dispatch • Limited to participating OEM's • **$225/kW-summer** • **$50/kW-winter**	

Electric Vehicle Charging
*MA Only
	• Targeted Summer & Targeted Winter Dispatch
	• ChargePoint Level 2 WiFi Devices
	• **Up to $300 / Charger**
	  • **Existing Chargers**
	  • **New Purchases**
		

Wi-Fi Thermostats

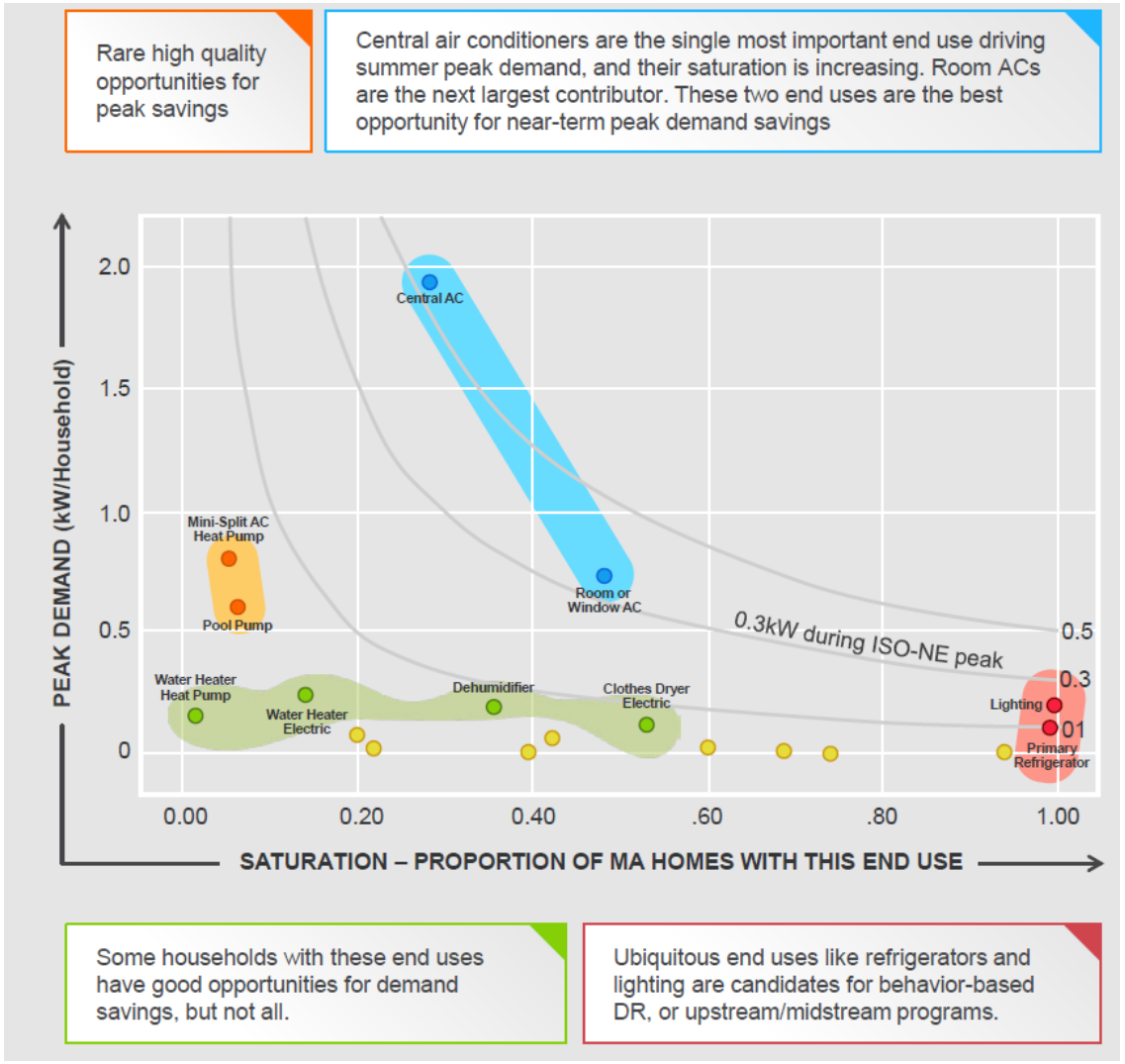






Device Potential

- AC is a growing load that provides the greatest opportunity to manage residential summer peak demand



Source: Massachusetts Residential Baseline Load Shape Study, Navigant, July 27, 2018

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