Managing Peak Demand & Capacity Costs

May 13, 2020

PEAK DEMAND management

MAPC
METROPOLITAN AREA PLANNING COUNCIL

Agenda

- Introductions & housekeeping
- Peak demand background
- MAPC's peak demand notification program
- Mass Save demand offerings
- Melrose experience

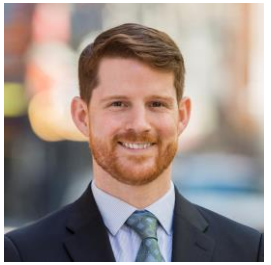
Introductions

Paul Wassink
Demand Response Program Manager
National Grid

Joana Abreu
Program Manager Demand Response
Eversource

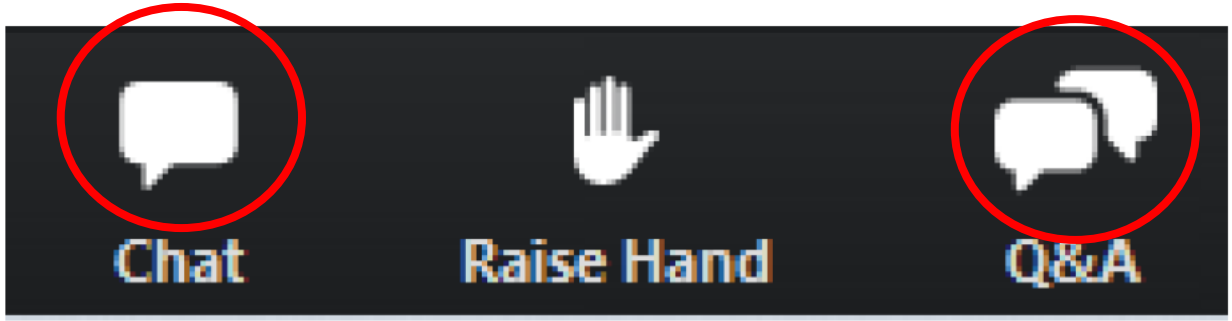
Martha Grover
Sustainability Manager
City of Melrose

Brooks Winner
Clean Energy Specialist
Metropolitan Area Planning Council



Housekeeping

- This meeting is being recorded
- Use the chat box to communicate with hosts
- Submit questions using Q&A



Poll

Stacking the Benefits

Avoided Capacity Costs

Payments from Utility Programs for Reducing Demand in Summer

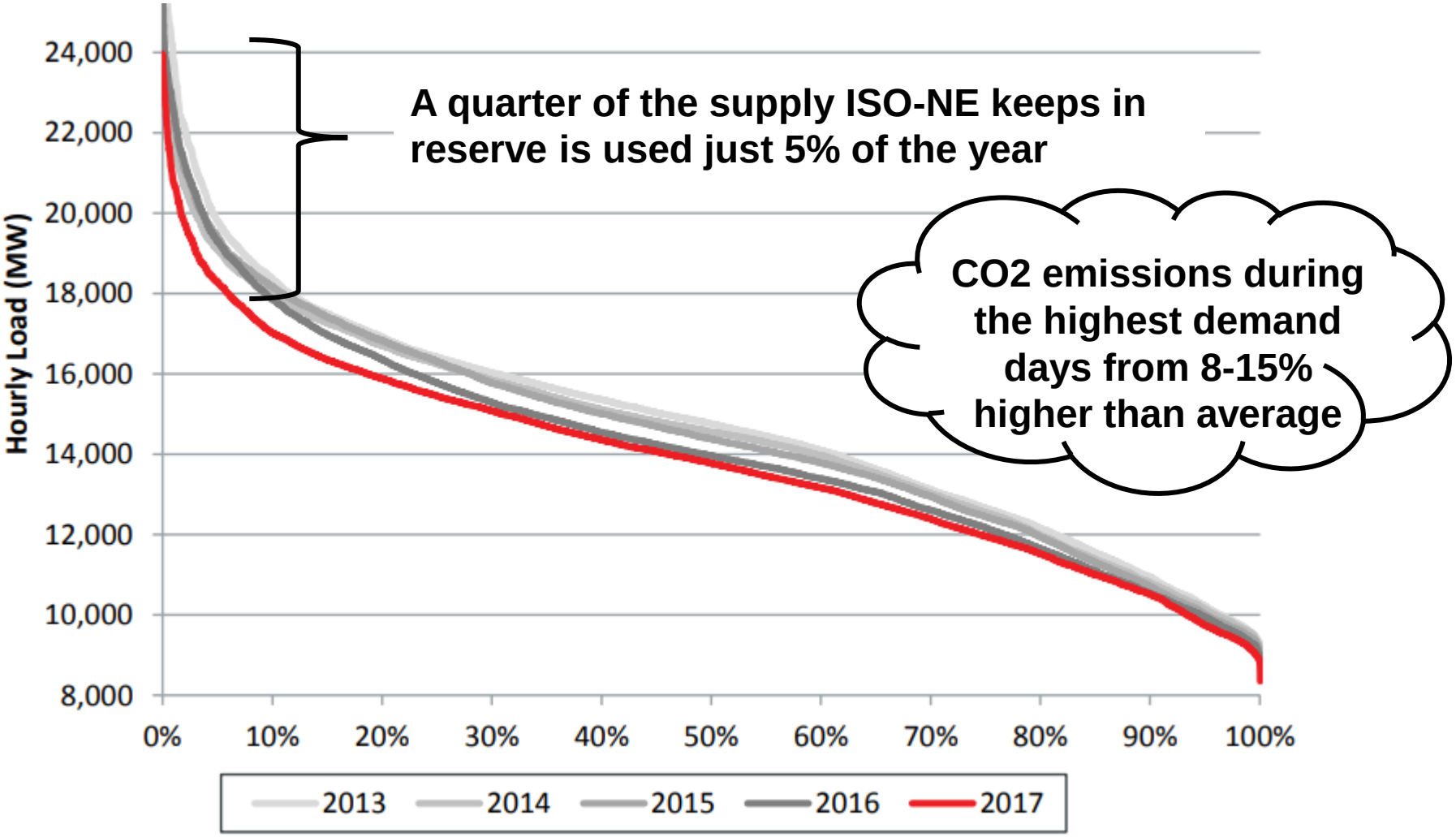
Payments from Utility Programs for Reducing Demand in Winter

Payments from ISO-NE - Forward Capacity Market for Demand Reduction (summer and winter)

Potential Revenue through Clean Peak Standard

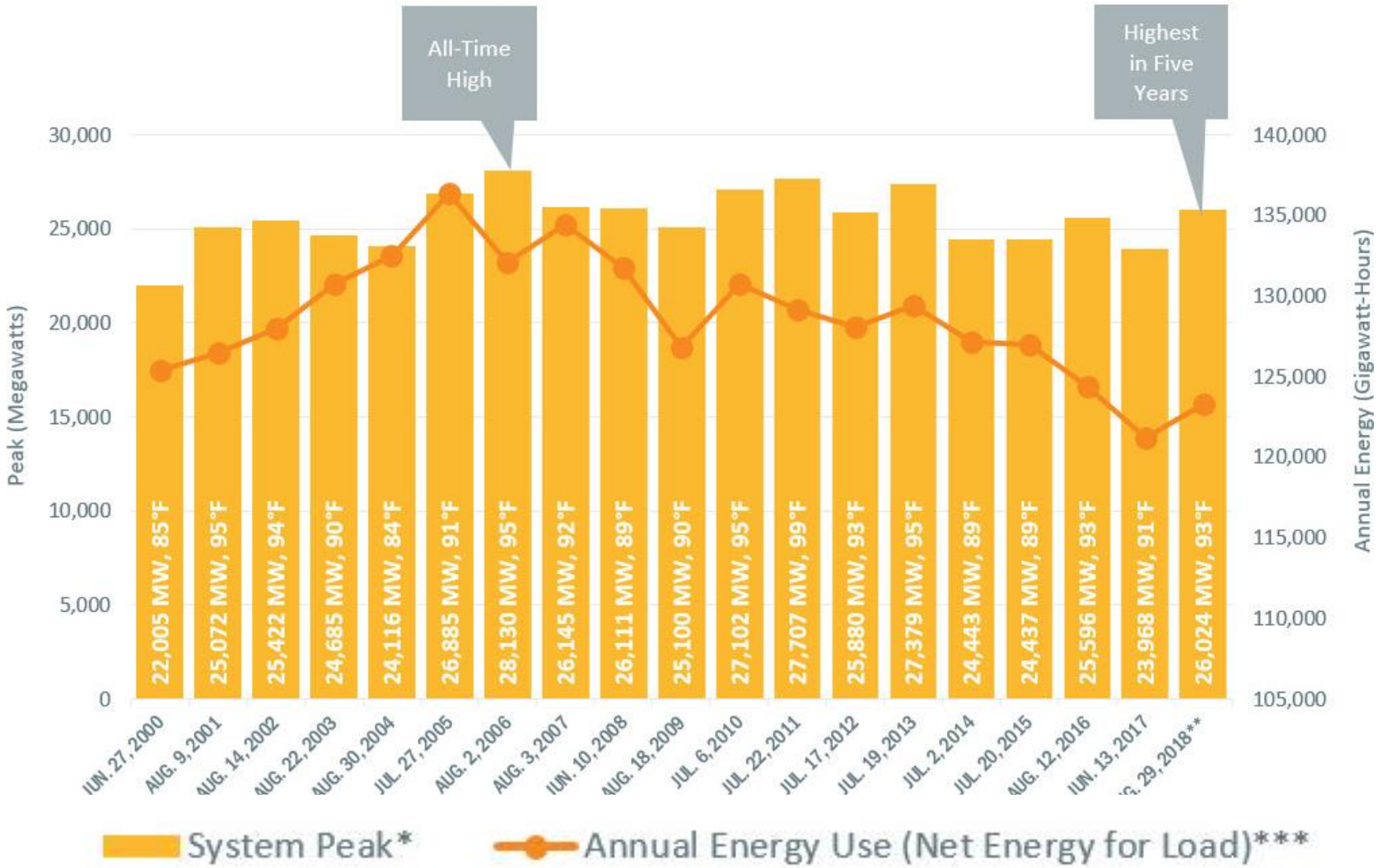
Background on Capacity Charges and Peak Demand

Load Duration Curve in ISO-NE



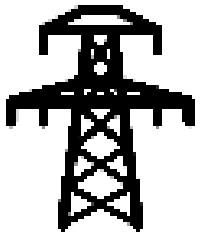
Source: ISO-NE 2017 Annual Market Report & 2016 Annual Emissions Report

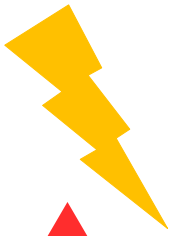
Peak Demand vs. Net Energy Use

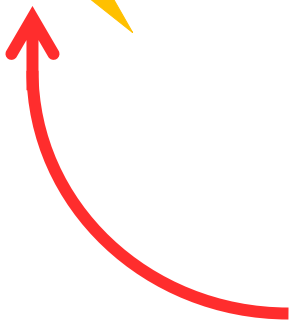


Source: ISO-NE Electricity Use Stats

Two charges on each electricity bill:

1.  **Delivery - Getting Electricity to You**

2.  **Supply - The Actual Electricity**



Capacity Charge

Capacity Charge = **Price** * **Quantity of Demand**

Set by

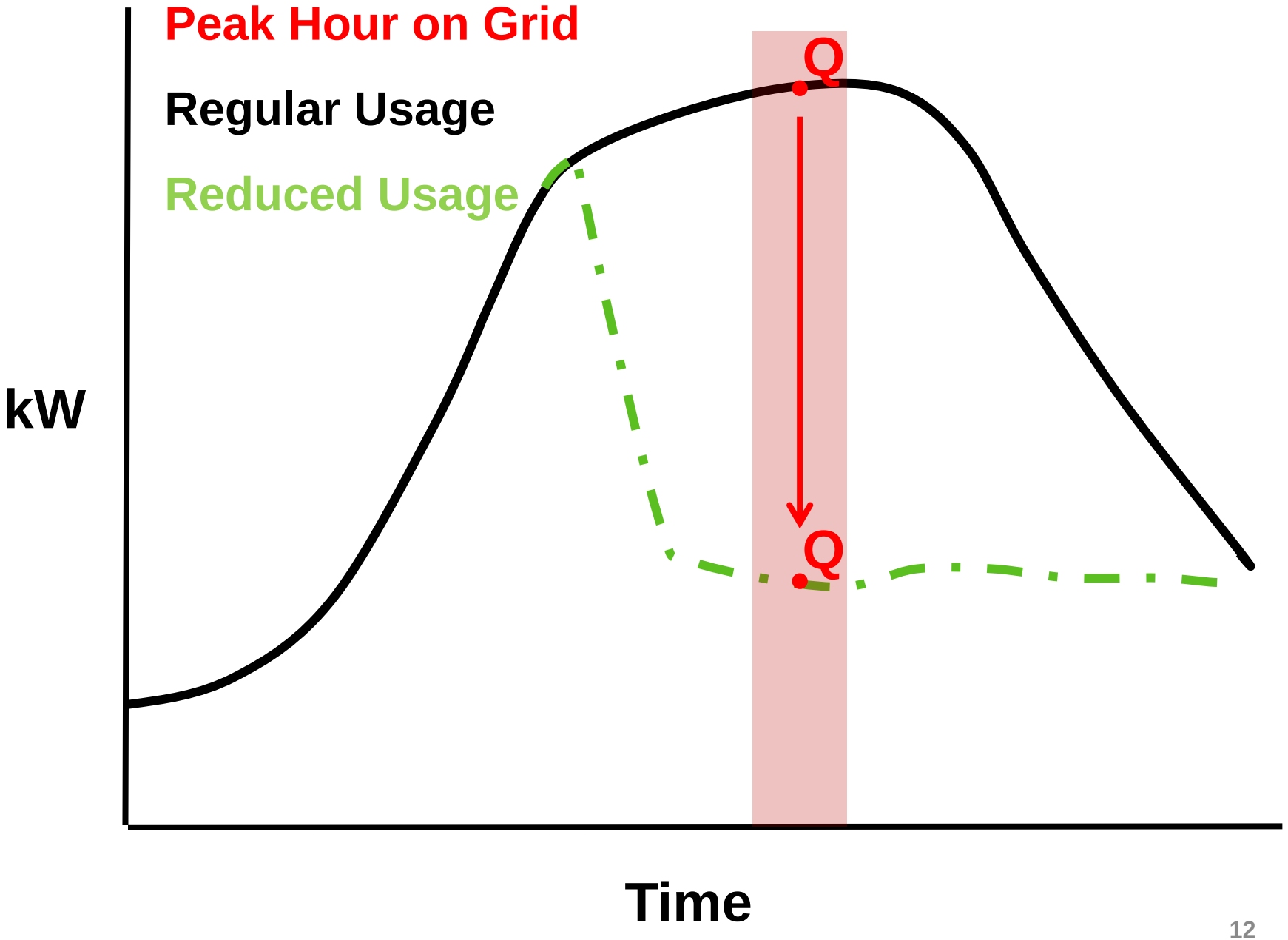
Under your control

Capacity Charge = **$5.30** * **1000kW**

per kW ICAP Tag

$5,300 per Month

~$63,000 per Year


Peak Hour on Grid
Regular Usage
Reduced Usage
Q
Q
kW
Time

Typical Buildings:

High School, Middle School, Library, Town or City Hall, Police, Fire Station, Waste Water Treatment

Applicable Accounts:

National Grid: G3

Eversource: B3, B5, B7, G6, G8

ISO-NE's Calendar

June 1st to May 31st

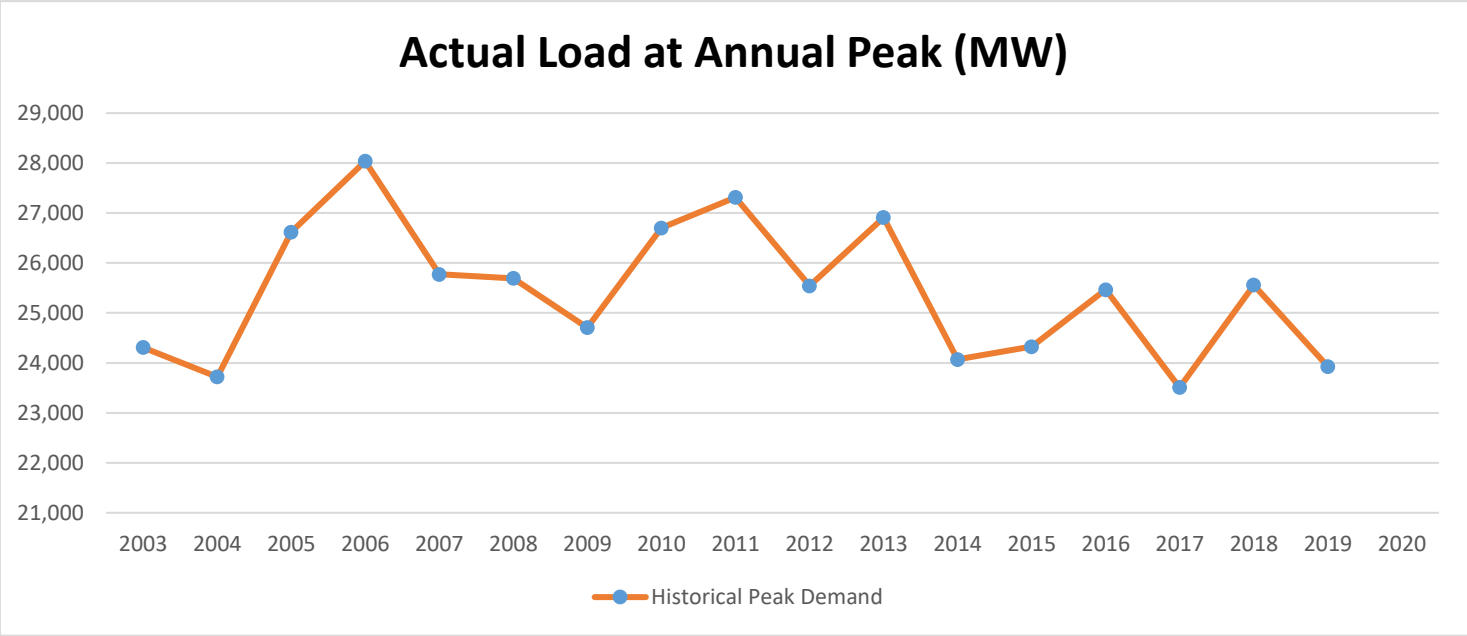
Usage THIS summer determines the ICAP tag (quantity of capacity) starting NEXT June 1st

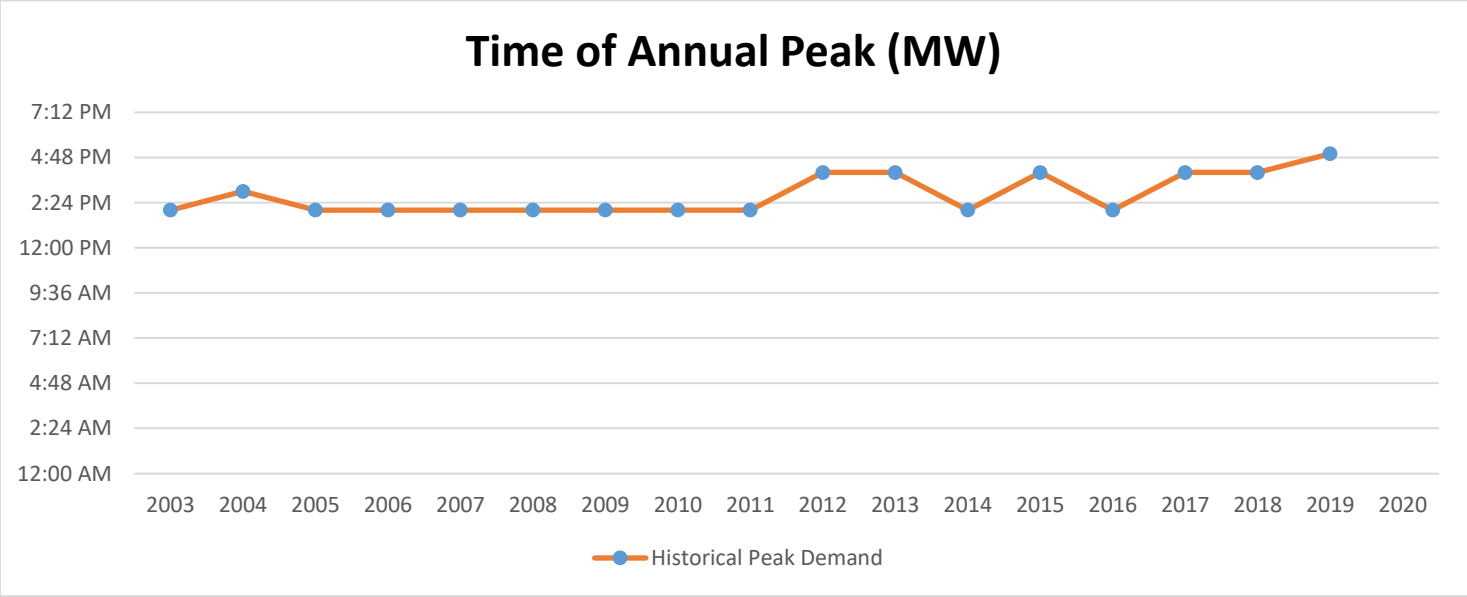
Example:

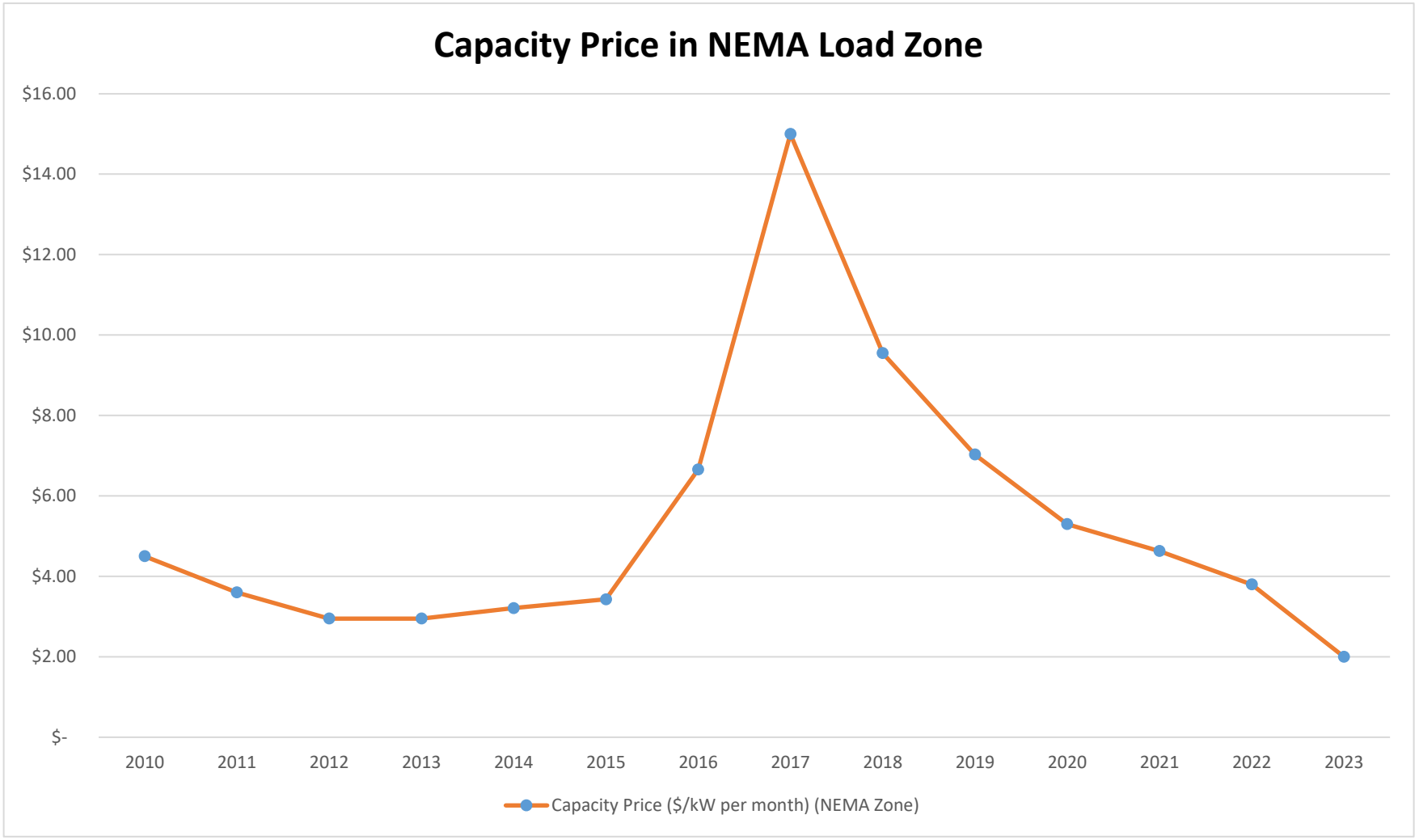
Usage during peak in summer of **2019** determined the ICAP Tag starting this June **2020**

Link to calendar and pricing for next three years at

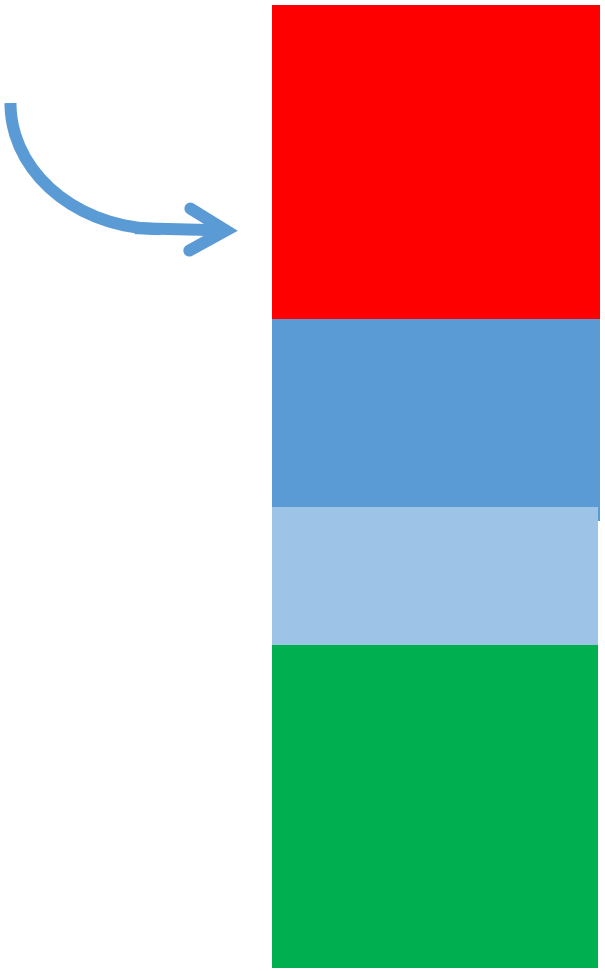
https://www.iso-ne.com/about/key-stats/markets#fcaresults


Actual Load at Annual Peak (MW)
29,000
28,000
27,000
26,000
25,000
24,000
23,000
22,000
21,000
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Historical Peak Demand


Time of Annual Peak (MW)
7:12 PM
4:48 PM
2:24 PM
12:00 PM
9:36 AM
7:12 AM
4:48 AM
2:24 AM
12:00 AM
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Historical Peak Demand


Capacity Price in NEMA Load Zone
$16.00
$14.00
$12.00
$10.00
$8.00
$6.00
$4.00
$2.00
$-
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Capacity Price ($/kW per month) (NEMA Zone)

MAPC's Peak Demand Notification Program



Avoided Capacity Costs:
~$75/kW

Our Process:

1) Notification email sent each day by 10:15 AM. Example below:

The annual peak is LIKELY today.

TODAY WED 27 JUL	THU 28 JUL	FRI 29 JUL	SAT 30 JUL	SUN 31 JUL	MON 01 AUG	TUE 02 AUG
High of 85 °F	89 °F	85 °F	81 °F	78 °F	79 °F	84 °F
Peak load 23.8 GW at 3 - 4 PM	23.9 GW	22.8 GW	18.9 GW	17.5 GW	19.7 GW	20.5 GW
LIKELY	LIKELY	POSSIBLE	UNLIKELY	UNLIKELY	UNLIKELY	UNLIKELY

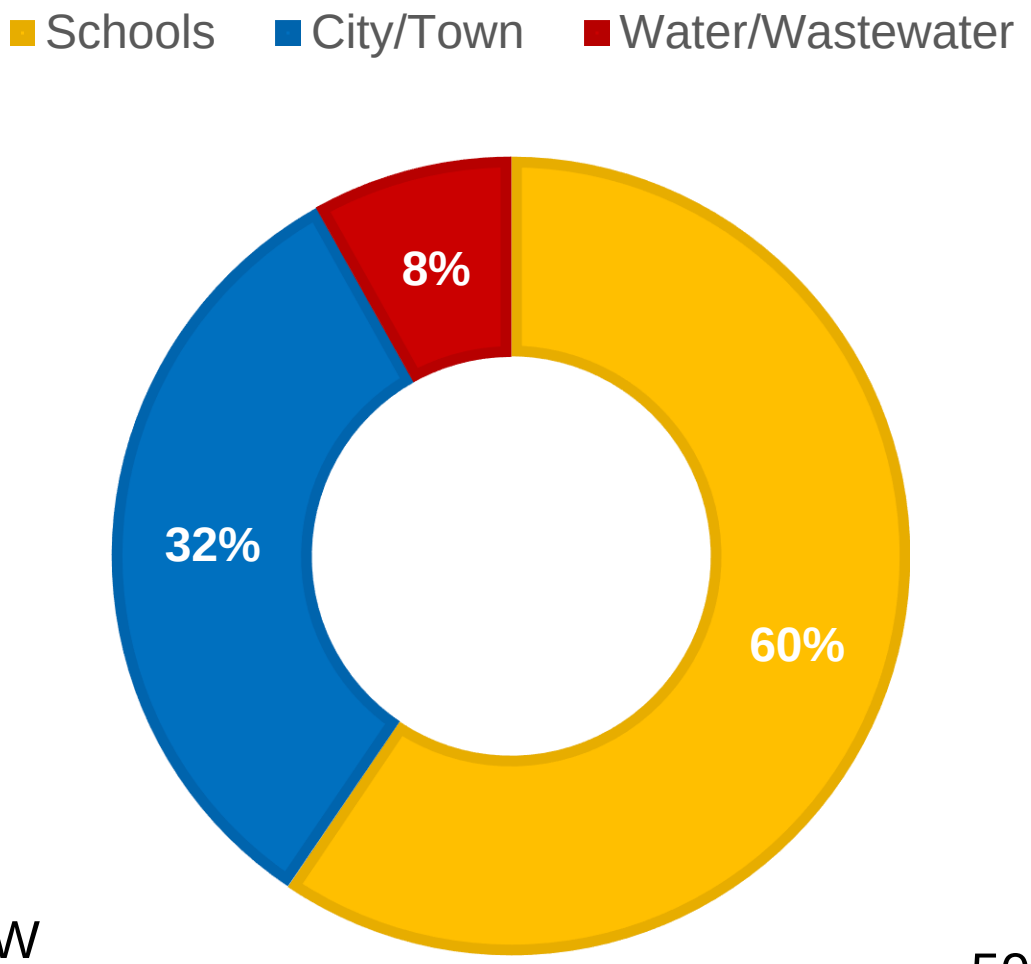
2) If **LIKELY,** we recommend you prepare to reduce load (i.e. load shed) around the estimated peak time

3) If forecast is **POSSIBLE** or **LIKELY** MAPC will track the demand and send any updates as appropriate

Participating Municipalities in 2019

- 87 communities receiving notifications;
- 17 colleges & universities
- At least 10 municipalities actively reduced demand in 2019
- $311,000+ estimated avoided costs
- 3.7 MW reduction per event
- 7+ MWh reduced across 3 events called in 2019

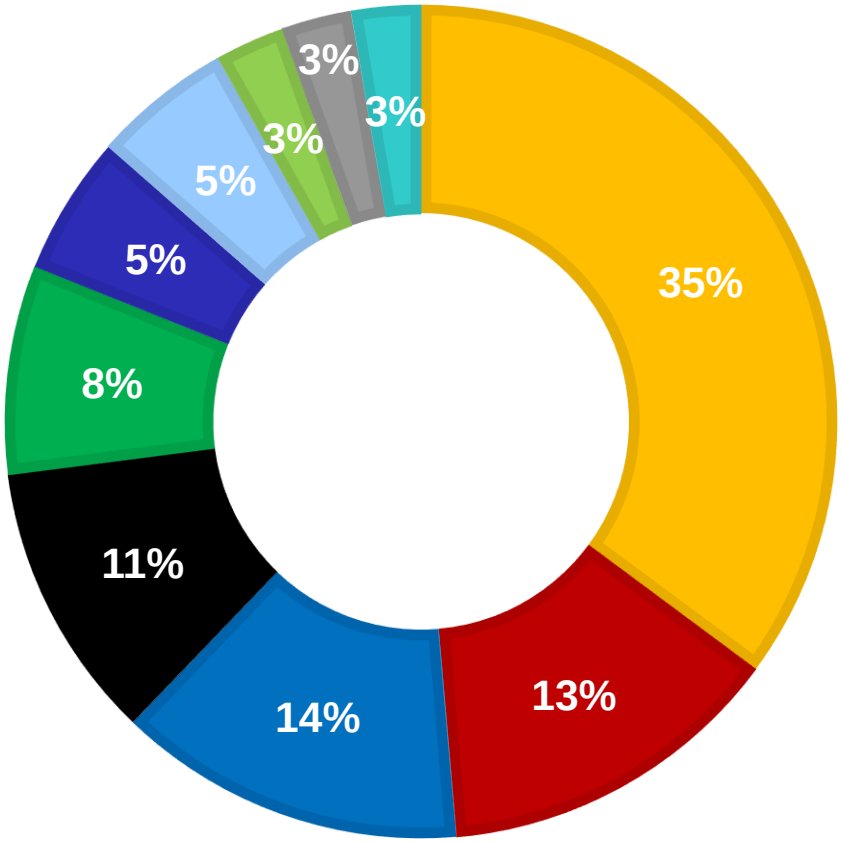
Participating Building Types in 2018



Average 300 kW of demand reduced per event

50-75% demand reduction common

Participating Building Types in 2018



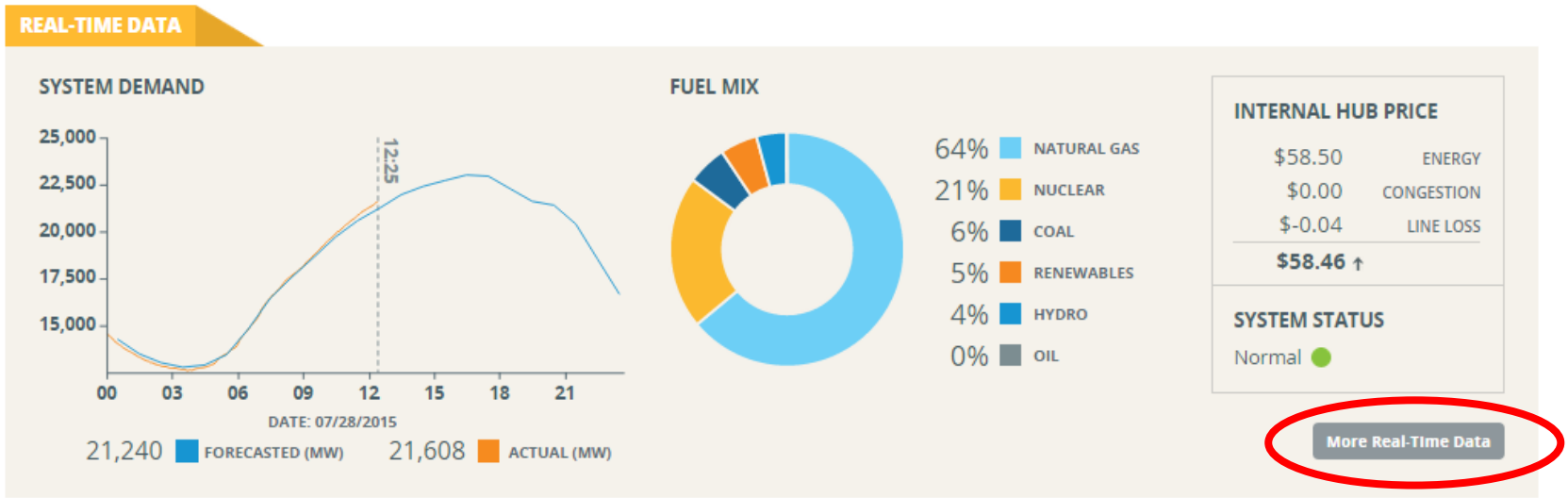
- High Schools
- Middle Schools
- Town/City Halls
- Libraries
- Wastewater Treatment Facilities
- Elementary Schools
- Vocational Tech Schools
- DPW Buildings
- Community Centers
- Public Service Buildings

How-To Example: Lynn Schools Load Shedding 2015

- **Choose a Champion**
  - Assign someone to own program
- **Educate Stakeholders early and often of intent**
  - Principals
  - School administrators
  - Mayor
- **Actions**
  - 1.HVAC
  - 2.Lights
  - 3.Anything that is not life safety
- **How Early did we start**
  - Began shed at 2pm- due to shift ending at 3PM
- **Theory vs Practice**
  - No exception
- **Feedback**
  - Face to Face
  - Opportunity cost for money saved
- **Changes**
  - Become more educated in program
  - Look for any other opportunities for saving

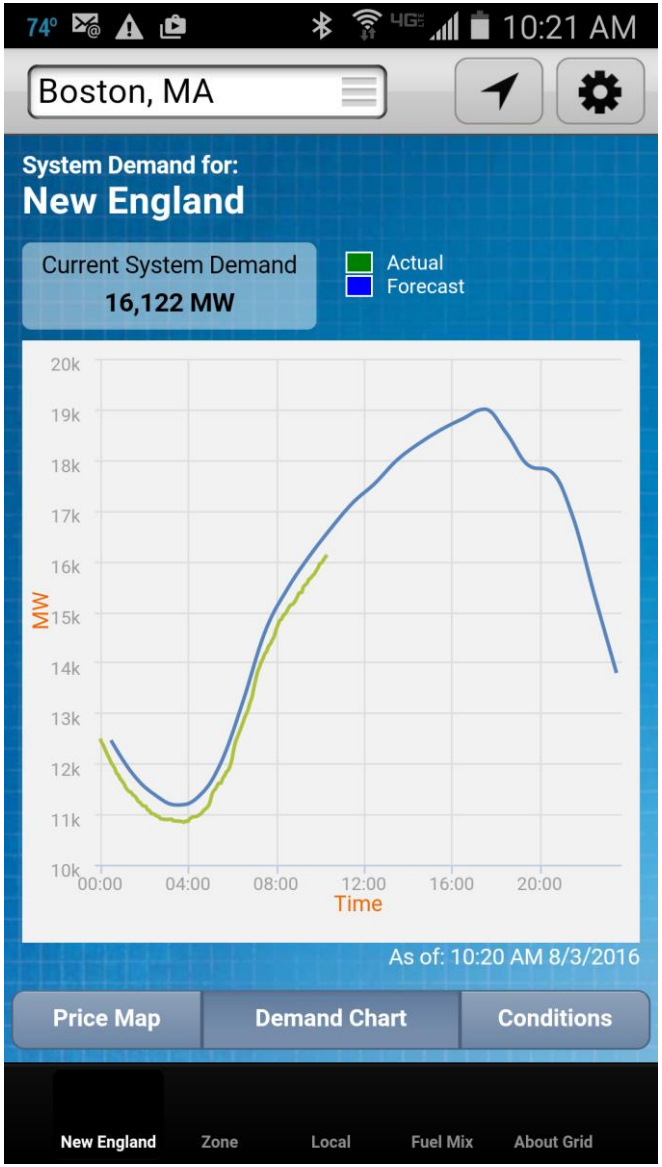
Real-Time Tracking Tools: ISO-NE Website

- Step 1 – www.iso-ne.com, click on "More Real Time Data"

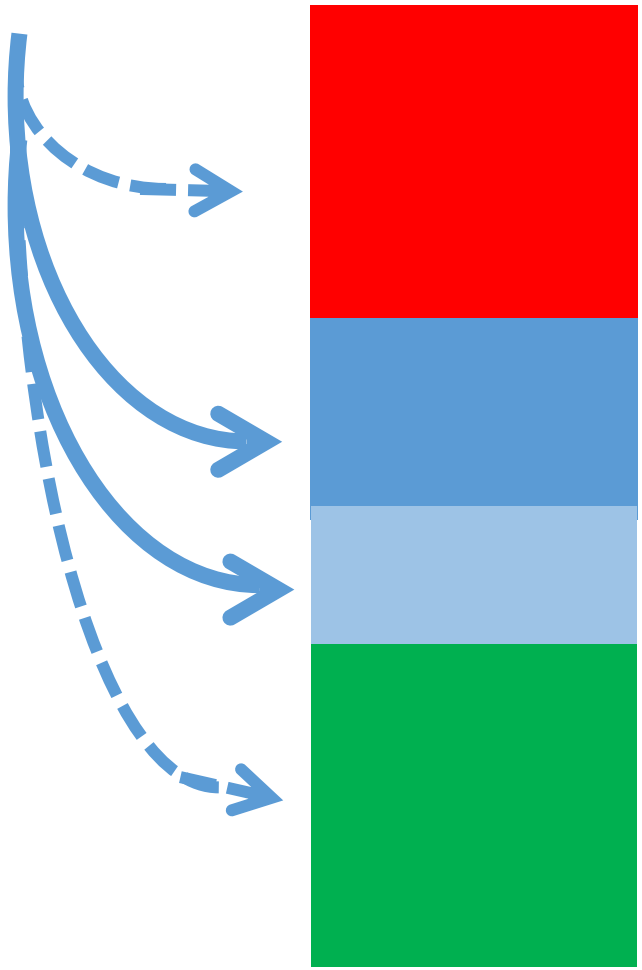


- Step 2 – look at "System Load" graph estimate and actual

Real-Time Tracking Tools: ISO to Go App (Free)



Demand Response through Mass Save



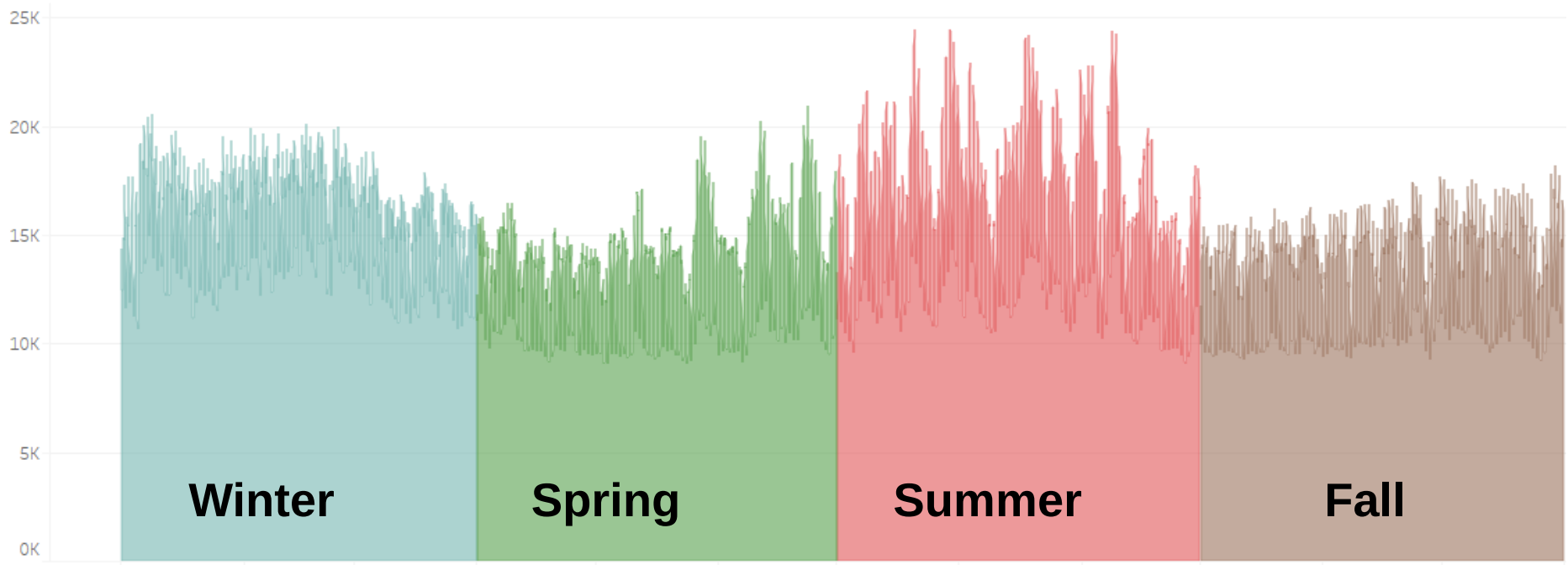
Avoided Capacity Costs: ~$75/kW

Payments from for Summer Demand: ~$35/kW-Year

Payments from for Winter Demand: ~$25/kW-Year

Payments from ISO-NE for Reducing Demand through Forward Capacity Market ~$70/kW

What is Demand Response and Why do We Do It?



The whole grid is sized to meet the peak.

"The top 10% of hours during these year, on average, accounted for 40% of the annual electricity spend…"

Source: State of Charge – MA Energy Storage Initiative

A Portfolio of Demand Response

Residential

Thermostat

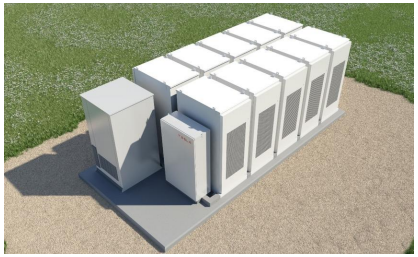
Battery

Electric Vehicle

Commercial

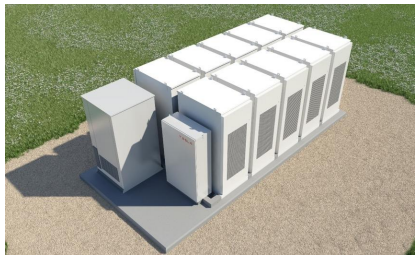
Targeted Dispatch

Daily Dispatch



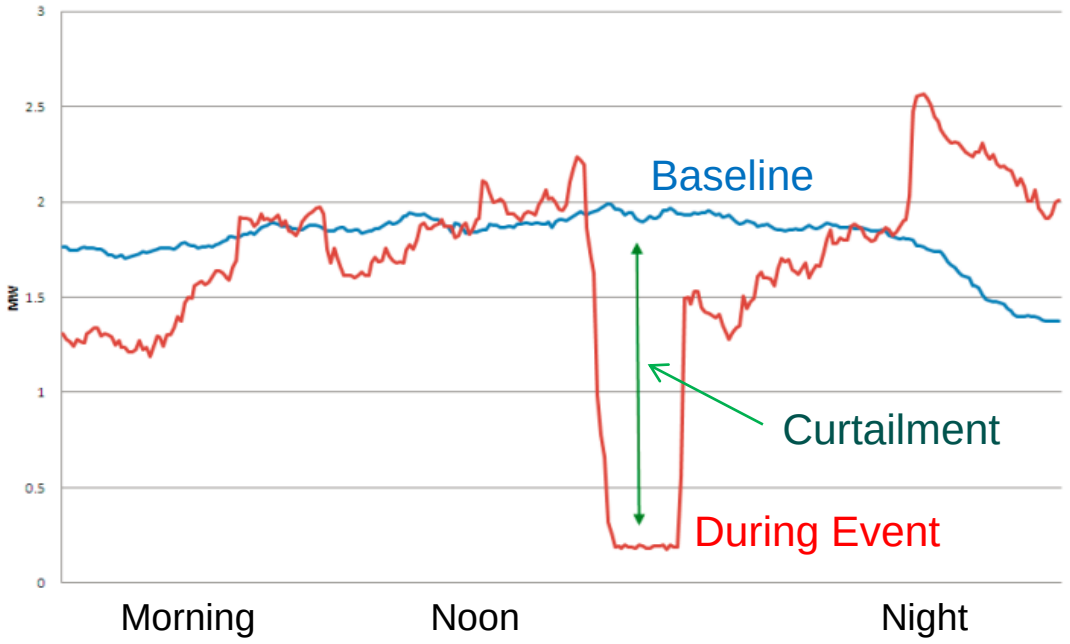
Winter Dispatch

3 Options to Curtail

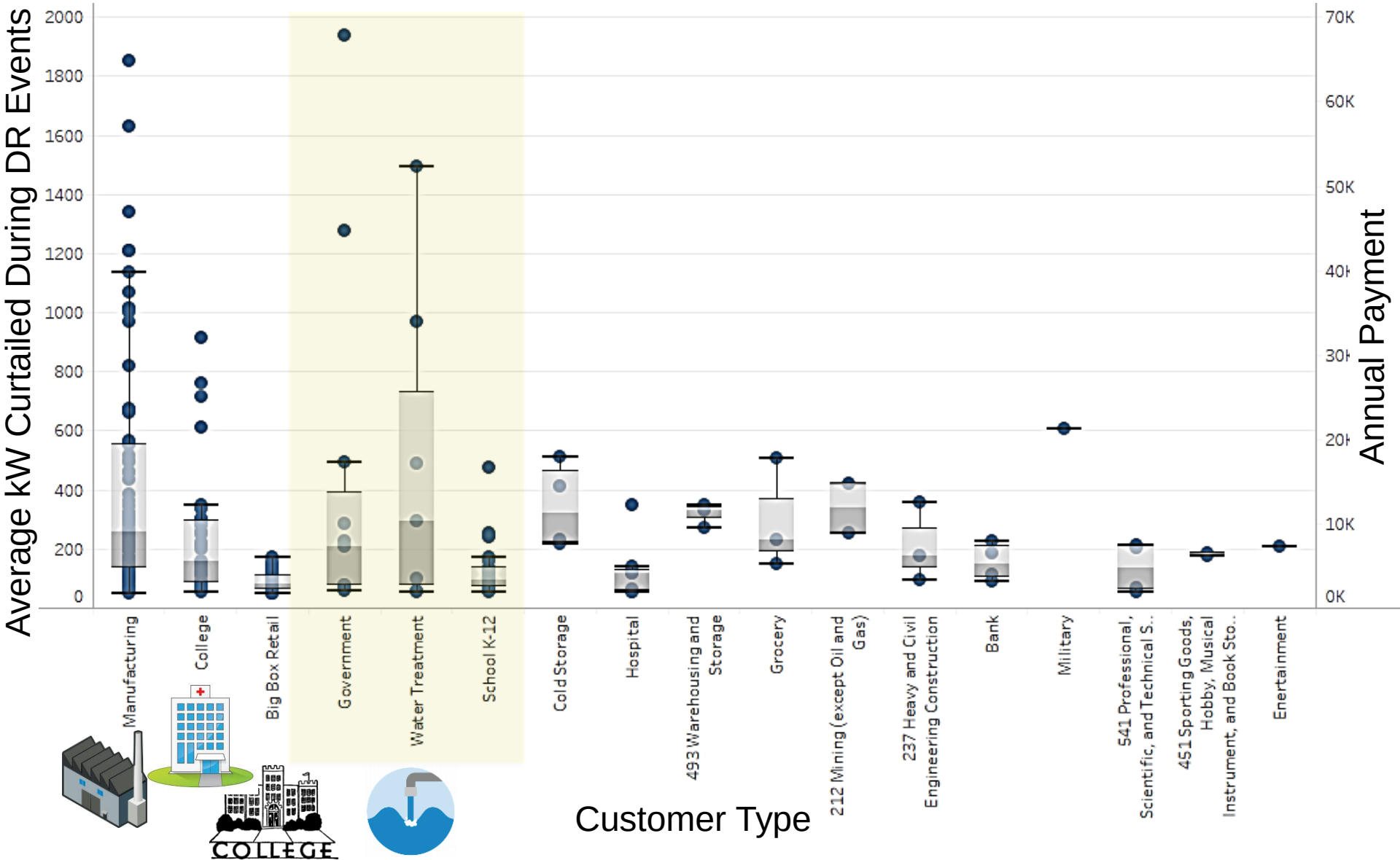
	Program Parameters	Typical Application
Targeted Dispatch	• 3 - 6 events per summer • 3 hours per event • **$35/kW-summer**	
Daily Dispatch	• 30 - 60 events per summer, 5 events per winter • 2 - 3 hours per event • **$200/kW-summer**	
Winter Dispatch	• 5 events per winter • 3 hours per event • **$25/kW-winter**	

What do DR Events Look Like

- Day ahead notification at ~1pm
- Called on:
  - During the Summer: June, July, August, and September
  - Weekdays
  - Not Holidays
- 3 hour events – From 2pm to 5pm
- 3 to 7 events per summer

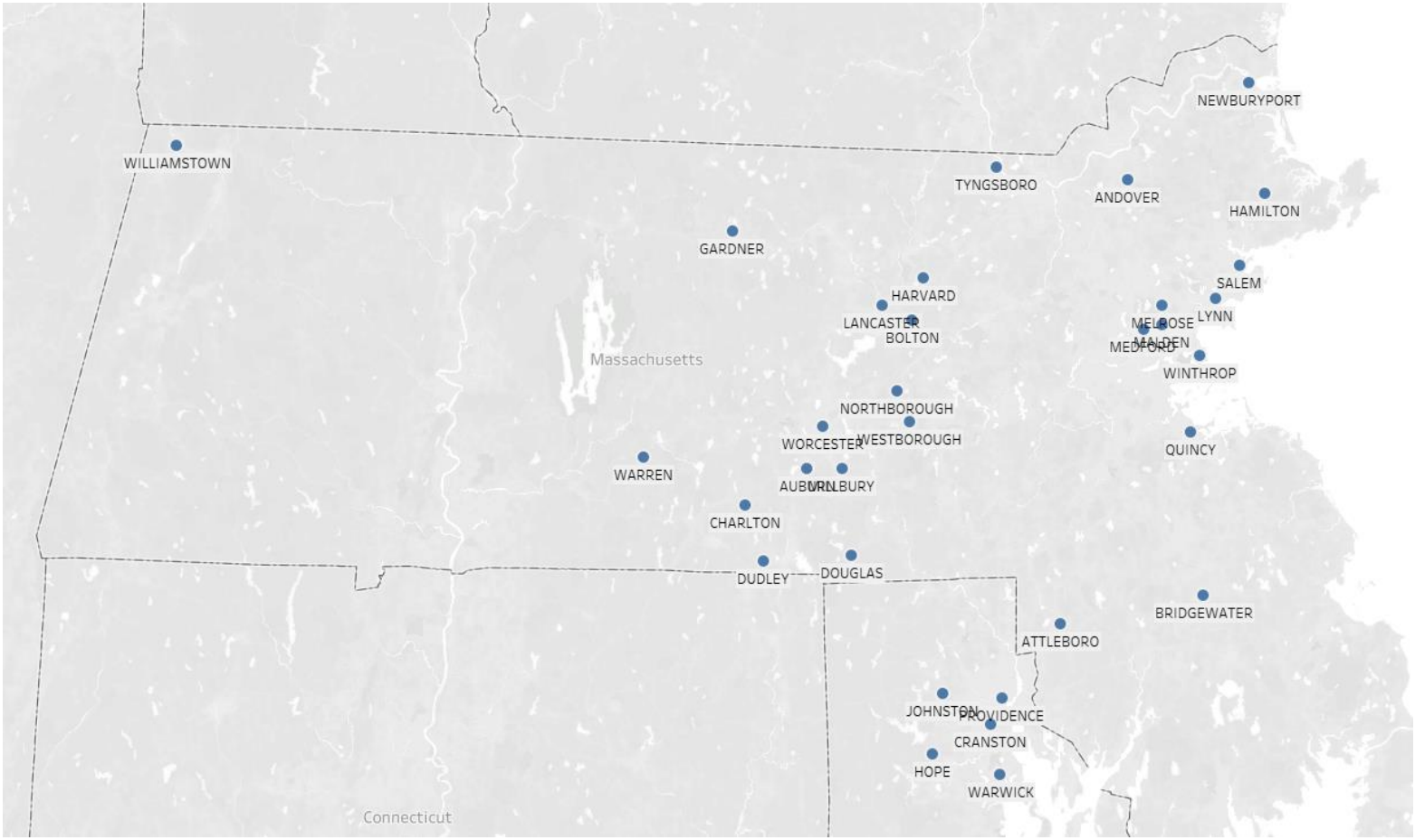


Current Customer Mix



Municipal Customers

- 81 municipal facilities participated in the National Grid program in 2019
- Average Performance per facility was 150kW (~$5,000 per year)



How Demand Response is Implemented

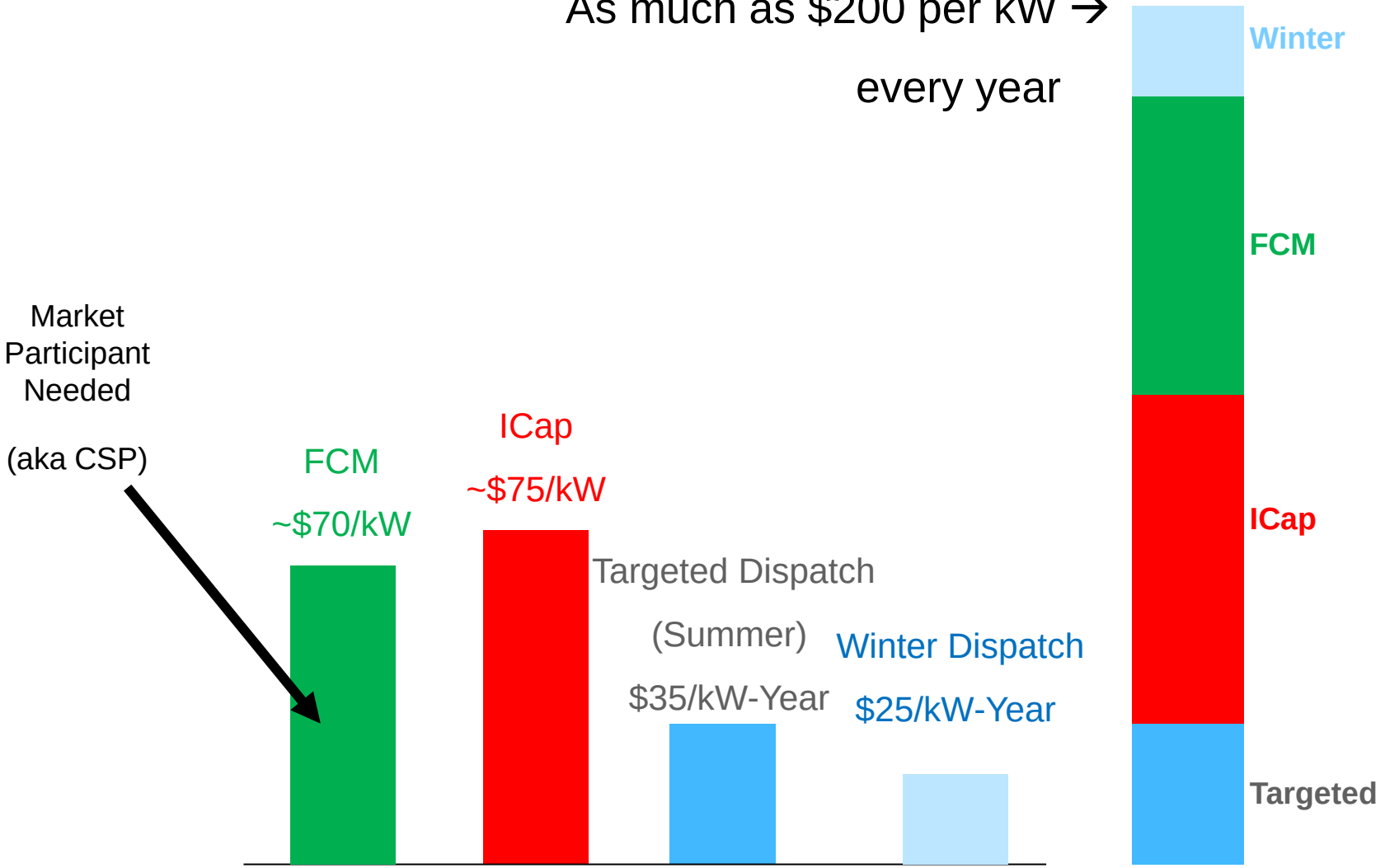
Targeted Dispatch	Daily Dispatch	Winter Dispatch
• Usually Manual • Temperature setback ~3F • VFD speed limiting • Early setback • Process Changes • Rarely Lighting • Generators • Combined Heat and Power	• Usually Automatic • Batteries • Flywheels • Thermal Storage • Industrial Freezers	• Usually Manual • Snowmaking • Industrial Processes • Generators

TECHNOLOGY AGNOSTIC

Having a central BMS helps, but is not required.

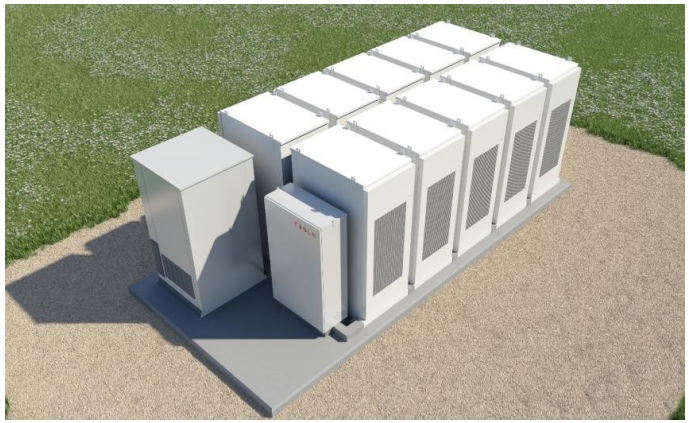
Other Benefits of Demand Response

As much as $200 per kW → every year



Basics of Daily Dispatch

- Typically 30–60 events per summer
- 2 - 3 hours per event
- Between 2 – 7pm
- Customers/Vendors are notified the day before.
- Not Holidays
- Paid by performance $200/kW-summer



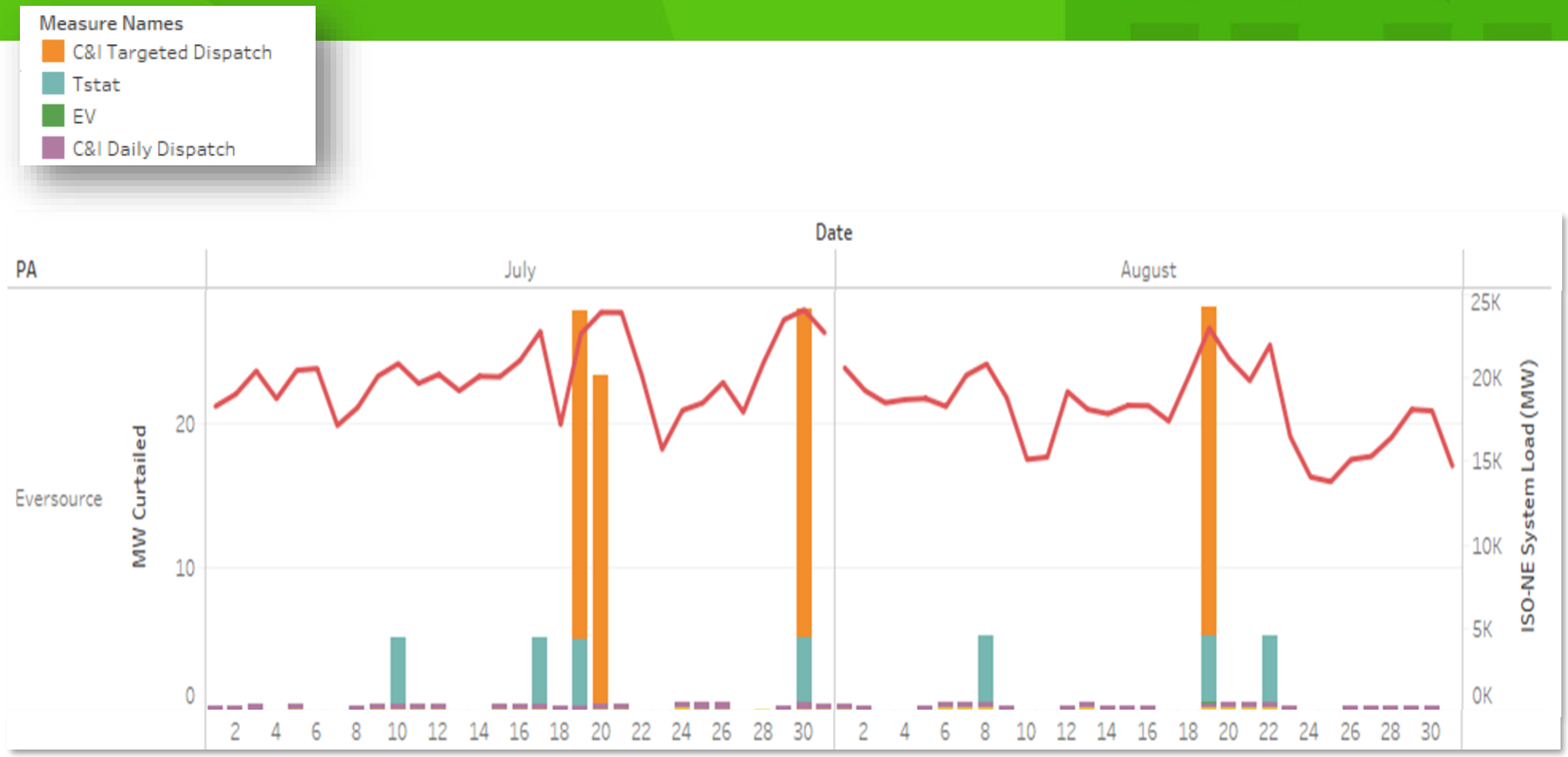
Registration Deadline

- Get you applications in by May 31st

Pre-Approved Vendors

Curtailment Service Provider	National Grid	Eversource	Unitil	Cape Light Compact
CPower **Phone:** 1-844-276-9371 **Email:** ConnectedSolutions@CPowerEnergyManagement.com	X	X	X	X
Enel-X **Phone:** 1-617-692-2514 **Email:** ConnectedSolutions@enel.com	X	X		X
IPKeys **Phone:** 1-855-475-3970 **Email:** NGSales@ipkeys.com	X			
Voltus **Phone:** 1-415-463-4236 **Email:** ConnectedSolutions@voltus.co	X	X		X

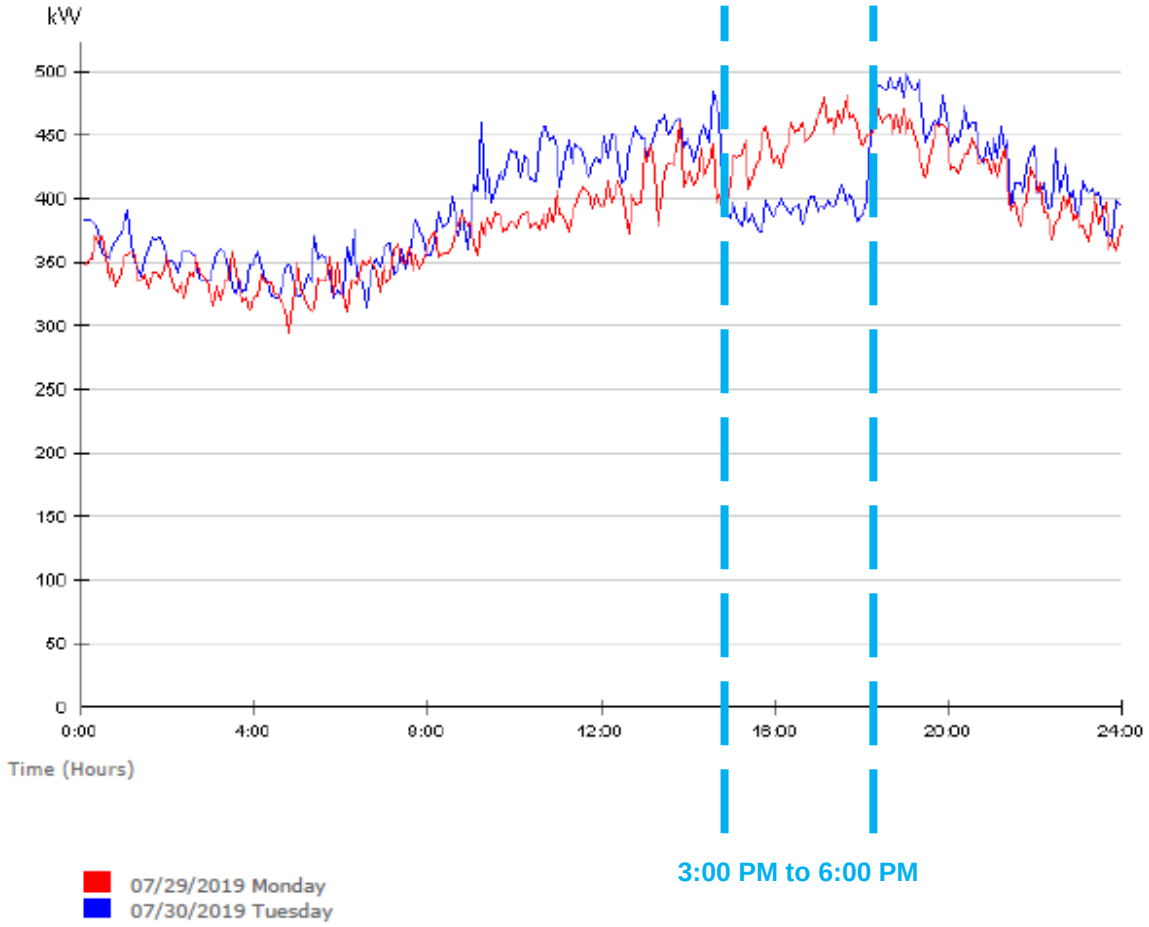
Summer Season Dispatch



How do customers participate?

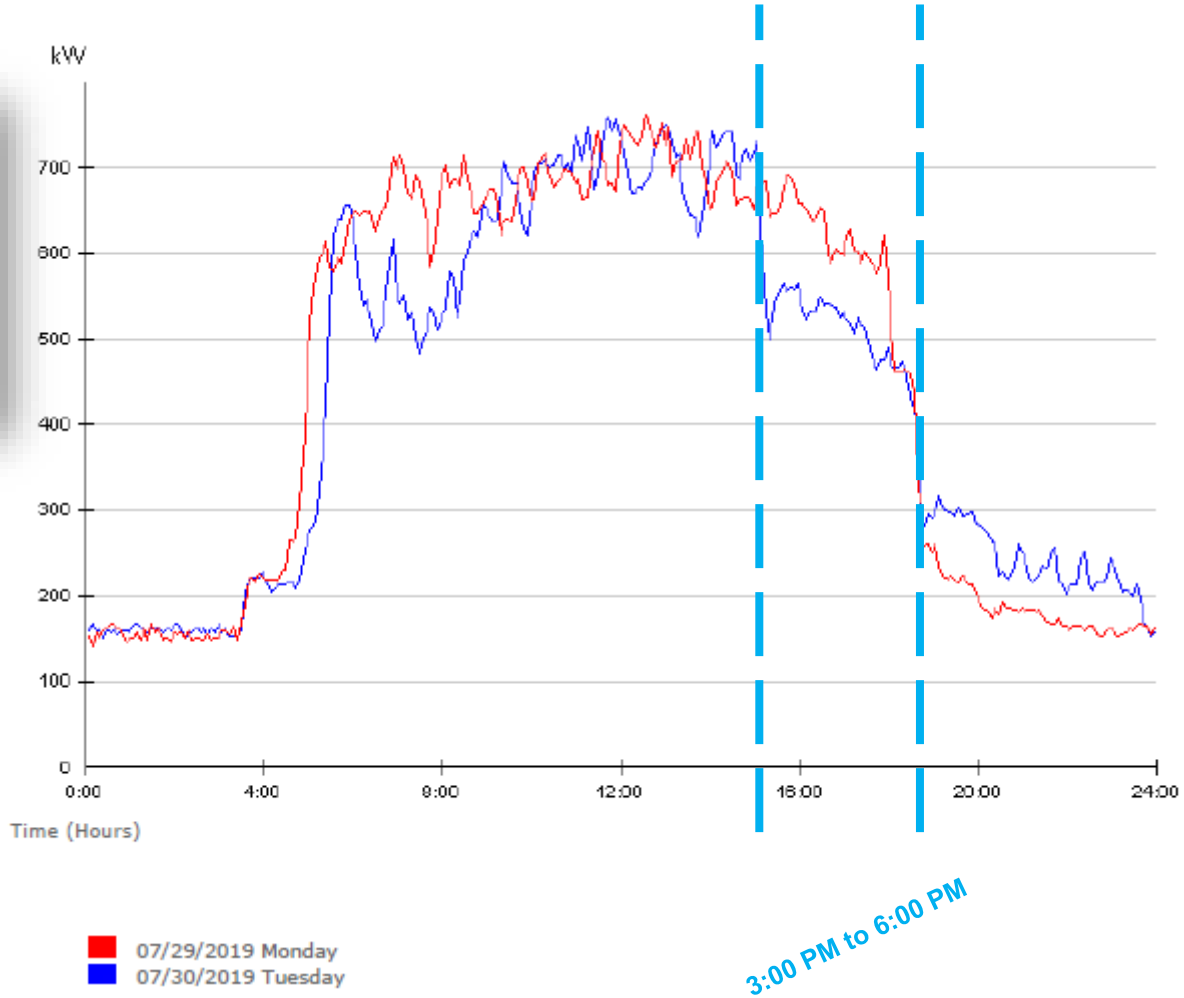
Municipal Buildings, City Courts, schools

Building automation system, HVAC, fans



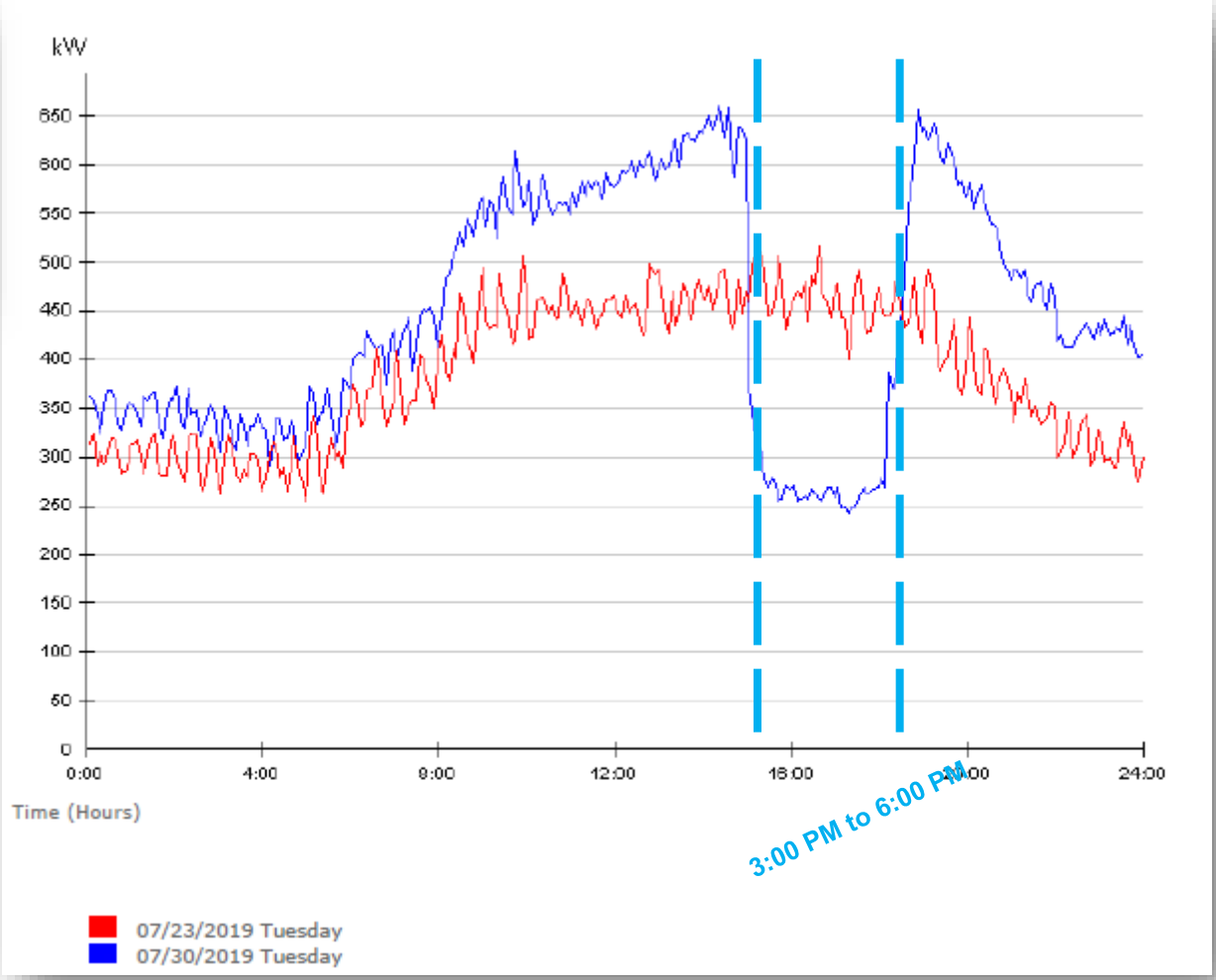
Office Building

HVAC: raise set points & chiller curtailment; dimming lights



Colleges

BMS, battery



Contact Info

Joana Abreu
Demand Response Program Manager

EVERSOURCE

781-441-3943
joana.abreu@eversource.com

Austin Brandt
Senior Power Supply Planner
Cape Light Compact

(508) 375-6623
austin.brandt@capelightcompact.org

Thomas (Tom) Palma
Manager, Distributed Energy Resources

Unitil

palma@unitil.com
T 603.294.5172

Paul Wassink

Senior Engineer

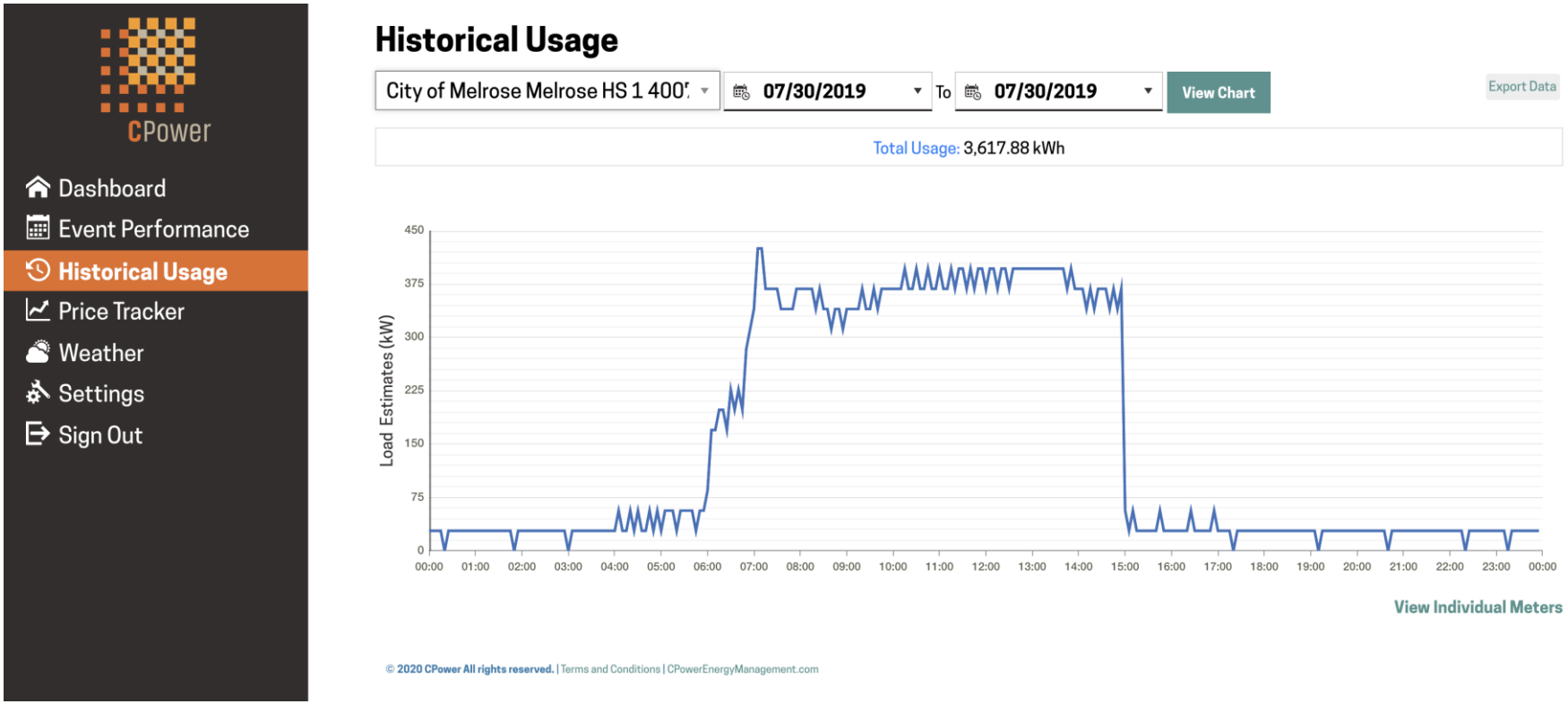
Demand Response Program Manager

nationalgrid

1-781-907-2681 (office)

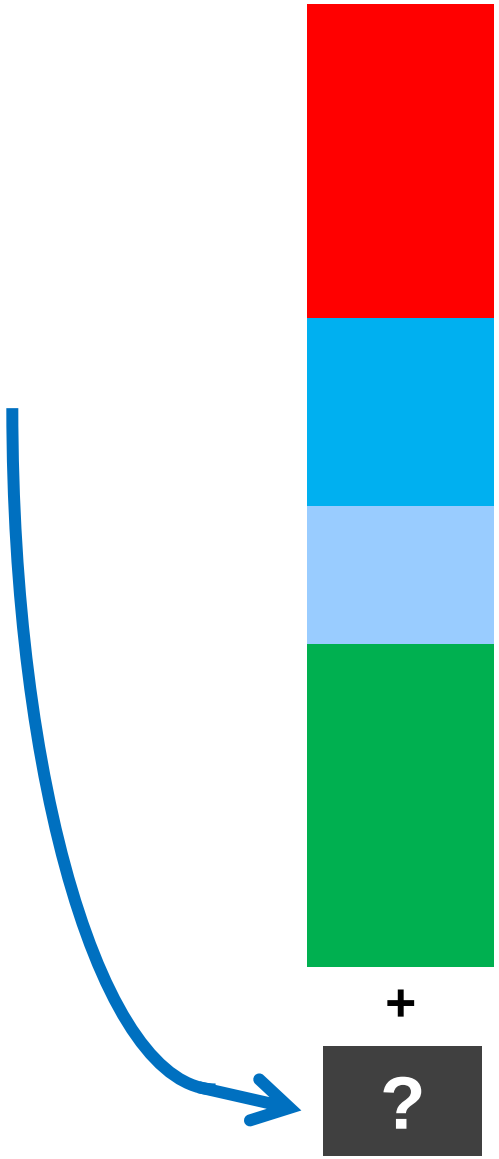
Paul.Wassink@nationalgrid.com

City of Melrose:



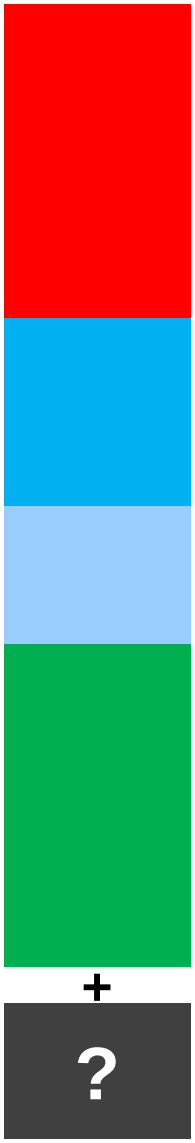
Coming Soon: Clean Peak Standard

- First-in-the-nation program to incentivize clean energy, demand response during peak periods
- Qualified resources:
  - New MA Class I renewable energy
  - Existing Class I/II renewable energy w/ new energy storage
  - Energy storage systems
  - *Demand response resources*
- Another layer of the value stack
- Visit https://www.mass.gov/service-details/clean-peak-energy-standard for more information or to provide comments



Poll

Questions & Discussion



Avoided Capacity Costs: ~$64/kW

Payments from for Summer Demand: ~$35/kW-Year

Payments from for Winter Demand: ~$25/kW-Year

Payments from ISO-NE for Reducing Demand through Forward Capacity Market ~$70/kW

+

?

Clean Peak Standard

Brooks Winner: *Clean Energy Specialist, MAPC*

bwinner@mapc.org

Paul Wassink: Demand Response Program Manager, National Grid

Paul.Wassink@nationalgrid.com

Joana Abreu: Program Manager Demand Response, Eversource

Joana.Abreu@eversource.com