



MASSACHUSETTS
**DEPARTMENT OF
ENERGY RESOURCES**

Peak Load Management & Demand Response

Leading By Example Council Meeting

March 10th, 2026

Presented by
Department of Energy Resources, Leading By Example Division

03/10/2026

Agenda

Time	Topic
10:00AM – 10:10AM	Introduction & Agenda
10:10AM – 10:20AM	2025 Climate Report Card <i>Speaker: Melissa Mittelman, Asst. Secretary for Decarbonization, EEA</i>
10:20AM – 10:45AM	What is Load Management? <i>Speaker: Lyn Huckabee, DOER</i>
10:45AM – 11:00AM	Demand Response Programs for State Entities: An Overview <i>Speaker: Dave Lewis, DCAMM</i>
11:00AM – 11:15AM	Demand Response in New England <i>Speaker: Philip Ciulla, CPower</i>
11:15AM – 11:25AM	What does this look like for facilities? <i>Speaker: TJ McCarthy, UMass Lowell</i>
11:25AM – 11:45AM	Fleet Peak Charging Programs & Managed Charging as a Strategy <i>Speaker: Hugh Reece, National Grid</i>
11:45AM – 11:55AM	Q&A
11:55AM – 12:00PM	LBE Updates & Reminders
12:00PM	Closing



Commonwealth of Massachusetts

Executive Office of
Energy and Environmental Affairs

2025 Climate Report Card Leading by Example Council

3/10/2026



2025 Climate Report Card – Context & Overview

Loss of a federal partner

- Attempts to dismantle state authority to regulate tailpipe emissions
- Revocation of \$3.7 billion in federal funding to the state
- Attempts to pause permitting and construction of offshore wind projects

Massachusetts still made progress on what it can control:

- Installed heat pumps in over 100,000 homes a year ahead of targeted schedule
- Made considerable progress on major clean energy projects, including Northeast Clean Energy Connect and Vineyard Wind
- Achieved conservation of 28% of state lands



Image of the Northeast Clean Energy Connect transmission project to bring 1200MW of hydroelectric capacity to New England. Significant progress was made during 2025, and work was completed in January 2026. *Photo Courtesy of Avangrid*

Despite the loss of a federal partner and global economic headwinds, the state is activating available tools to advance a clean, resilient future for residents.

Clean Transportation



Reducing transportation sector emissions depends on rapidly electrifying most vehicles while increasing public transit ridership, biking, and pedestrian opportunities

- MA fell short of 2025 EV benchmarks, with multiple factors chilling the market:
 - Rescission of \$7,500 federal tax credit for new EV purchases
 - Congressional withdrawal of EPA waivers that provide California authority to regulate tailpipe emissions
 - Federal administration efforts to roll back states' authority to adopt California's Clean Cars regulations
- Despite challenges, MA's medium- and heavy-duty EV registrations jumped 140%
- Number of public charging ports grew 18%, and Direct Current fast ports increased 58%.



9/9/2025 - Ribbon cutting for Lawrence Public Schools' and Contractor NRT Bus Inc's deployment of 25 new electric school buses and 10 minibuses – funded and supported by the EPA, MassCEC, and MassDEP. Photo credit [Zenobe](#).

Clean Buildings

 Energy efficiency interventions and electrification of heating and other appliances continue to be the primary methods for reducing emissions from buildings

- Massachusetts exceeded 2025 heat pump installation target a year early
- Over 92% of Massachusetts residents live in cities or towns with energy codes that drastically reduce the amount of energy needed to heat new buildings and major renovations
- The pace of heat pump installations and weatherizations significantly increased over the course of 2025 - installed measures in the fourth quarter of 2025 exceeded average installation rates in 2024



11/20/2025 - The Executive Office of Housing and Livable Communities (HLC), in collaboration with Massachusetts Housing Partnership (MHP), MassHousing and Local Initiatives Support Corporation (LISC) Massachusetts, announced the fourth round of funding awards under the Climate Ready Housing program.

⚡ The power sector accounts for 17.8% of statewide emissions as of 2022 and unlocks emissions reductions from the electrification of transportation, buildings, and other end uses.

- Massachusetts met more than half of its 2023 electric load with clean power.
 - The addition of Vineyard Wind and additional hydropower brought into the region from Canada is anticipated to meet about one-quarter of Massachusetts' electric load.
- Recent federal actions and policies have greatly slowed development of new offshore wind
 - These actions put at risk any new offshore wind capacity that is not already under development coming online before 2030



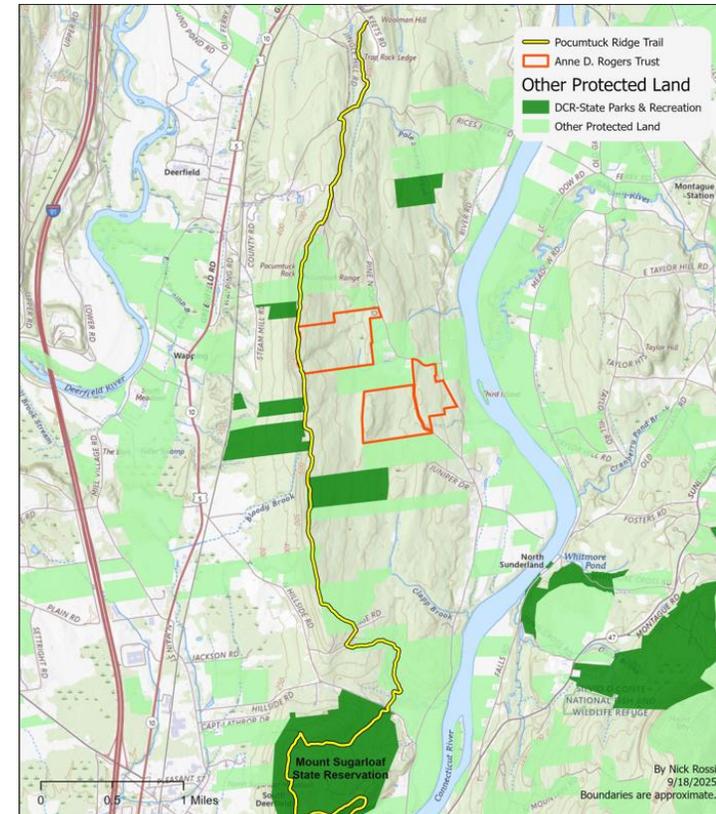
Construction of Vineyard Wind offshore wind farm. Photo credit Avangrid Renewables

Natural & Working Lands



Protecting, managing, and restoring MA's natural and working lands is critical for carbon removal and storage as well as resilience to hazards like flooding and extreme heat and protection of biodiversity.

- Permanently protected over 28% of MA's land, totaling 1.41 million acres (exceeding the state's 2025 target)
 - However, total statewide natural and working land area has declined roughly 4,800 acres per year between 2020 and 2024 due to conversion of unprotected lands - primarily forests
- Tree canopies covering nearly 48% of developed land statewide as of 2023 - up slightly from 2021



9/30/2025 - The Department of Conservation and Recreation (DCR) announced the acquisition of three parcels of private land in Deerfield, representing a total 262.5 acres that will now be under the state's protection. 8

Climate Adaptation and Resilience



As we experience more extreme weather events, climate adaptation and resilience is imperative

- Major new ResilientMass initiatives are underway:
 - Department of Conservation and Recreation's (DCR's) Project Shade to mitigate extreme heat impacts
 - ResilientCoasts Strategy to help prevent coastal damages
 - Office of Climate Science's efforts to develop the first Massachusetts Climate Science Report
 - Department of Fish and Game (DFG) wetland, forest, and floodplain restoration projects that mitigate flooding, drought, and extreme heat impacts while protecting biodiversity
- Through the Municipal Vulnerability Preparedness (MVP) Program, EEA has also supported nearly all cities and towns and three Tribes in planning and implementing projects to enhance community readiness
- The Mass Ready Act will streamline permitting, expand resources for MVP, ResilientCoasts, and ResilientMass, and create new financing tools like a Resilience Revolving Fund



Single-post / cantilever shade at DCR's Magazine Beach

Environmental Justice



As energy bills rose nationwide, Massachusetts held the line on measures of energy burden for households across the state.

- At a time when the federal administration is zeroing budgets for environmental justice (EJ) work, state grants and supplier contracts supporting or going to these communities show increases year over year.
- The Commonwealth's efforts to establish community agreements as part of energy siting processes, to embed best practices on EJ principles into agency workflows, to build on language accessibility, and to establish a grant program to support burdened community efforts will meaningfully advance EJ in the state.



Image from Growing Places Garden, Inc – a recipient of the Office of Environmental Justice and Equity's inaugural round of Environmental Justice Capacity Building Grants



MASSACHUSETTS
**DEPARTMENT OF
ENERGY RESOURCES**

What is Load Management?

Why does it matter?

For the Leading by Example Council Meeting
March 10, 2026

Presented by
Lyn Huckabee, Consumer Energy & Policy Manager
Energy Efficiency Division



Electricity 101

Electricity can't be stored

To store electricity, you need to convert it into another form, so it must be used at the same time it's made.

The system is sized for times we use the most

All electricity system investments - capacity, transmission, and distribution - are a function of how big the system needs to be to meet demand.

Electricity rates socialize the cost of peaks

Biggest driver of rates is the cost of building system to meet various peaks divided by a company's customer base



Source: [ISO-NE website](https://www.iso-ne.com) 2/27/2026 at 3:45pm

Our Electric Grid is Distributed

The first four columns must be sized to meet the demand in the last column

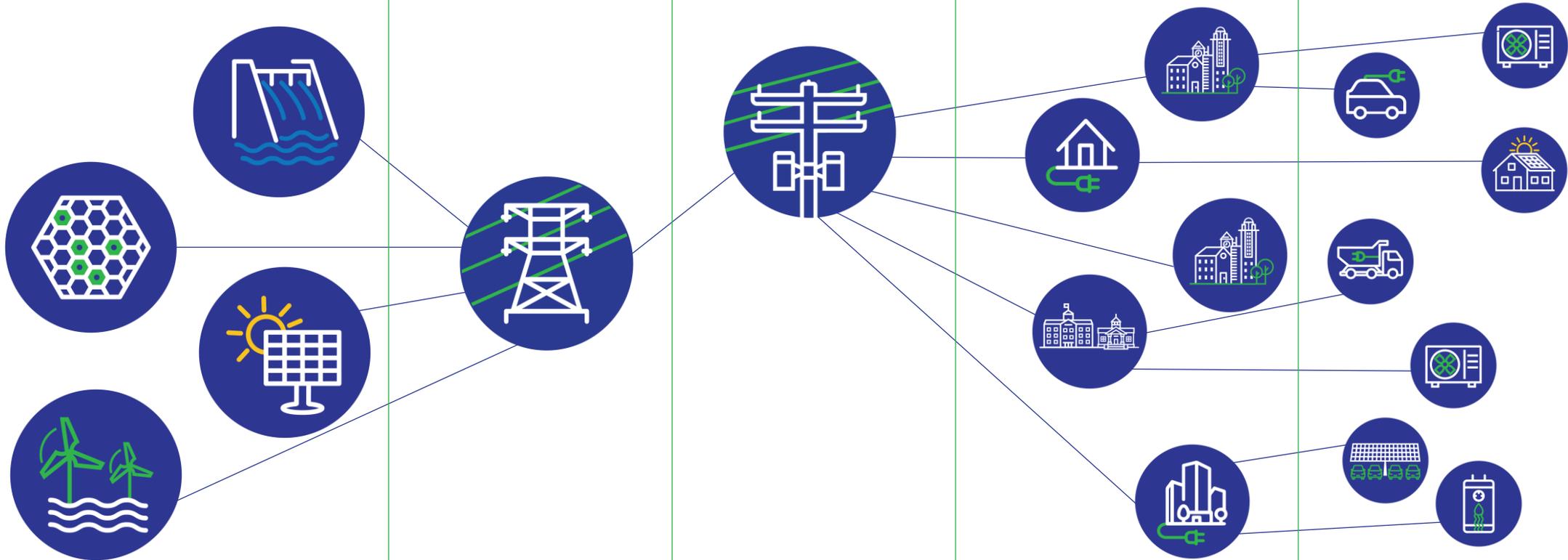
Grid Scale Generation

Transmission

Distribution

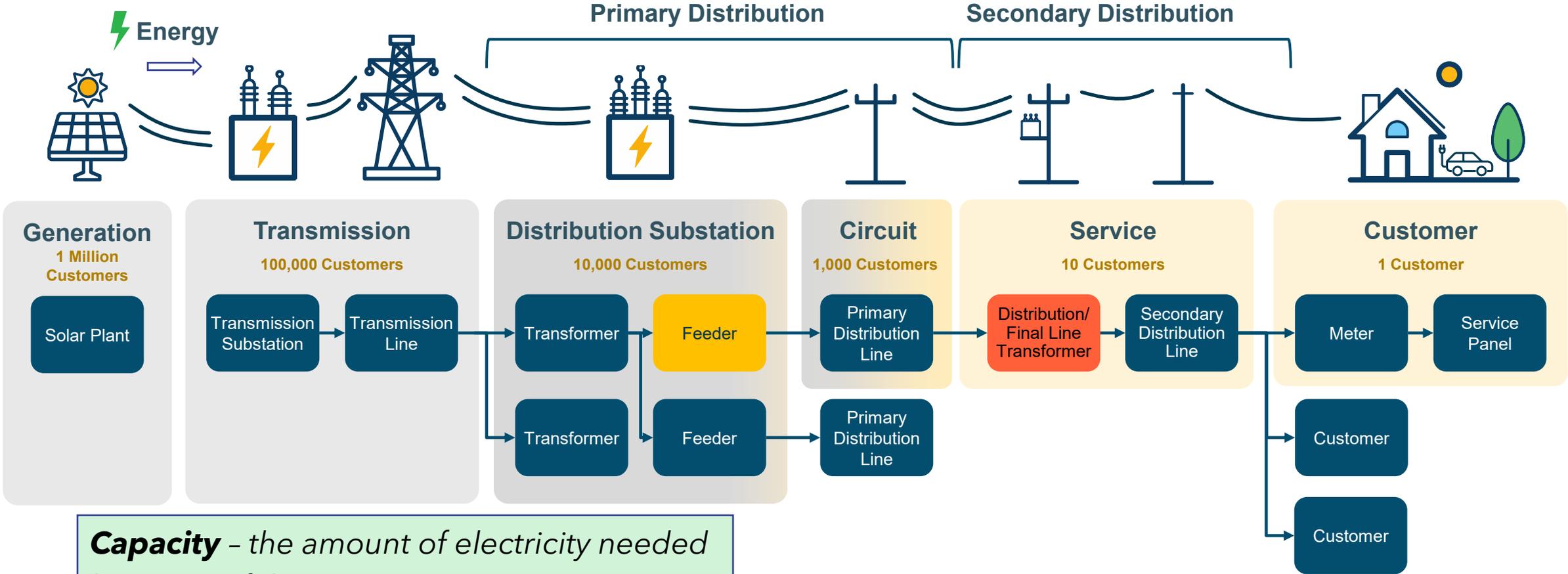
Neighborhoods and Buildings

End Uses and BTM Generation



BTM: Behind the Meter

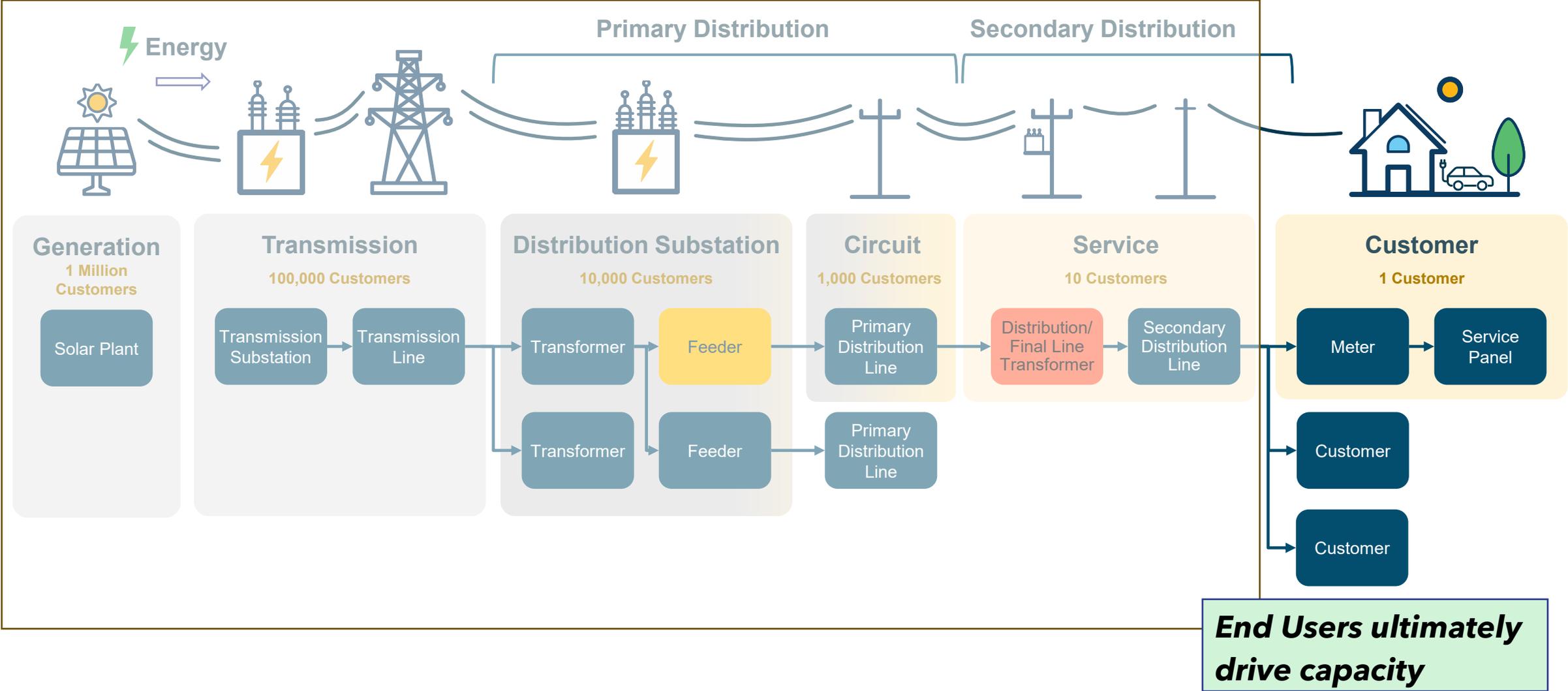
Load management addresses reduces peak in space and time



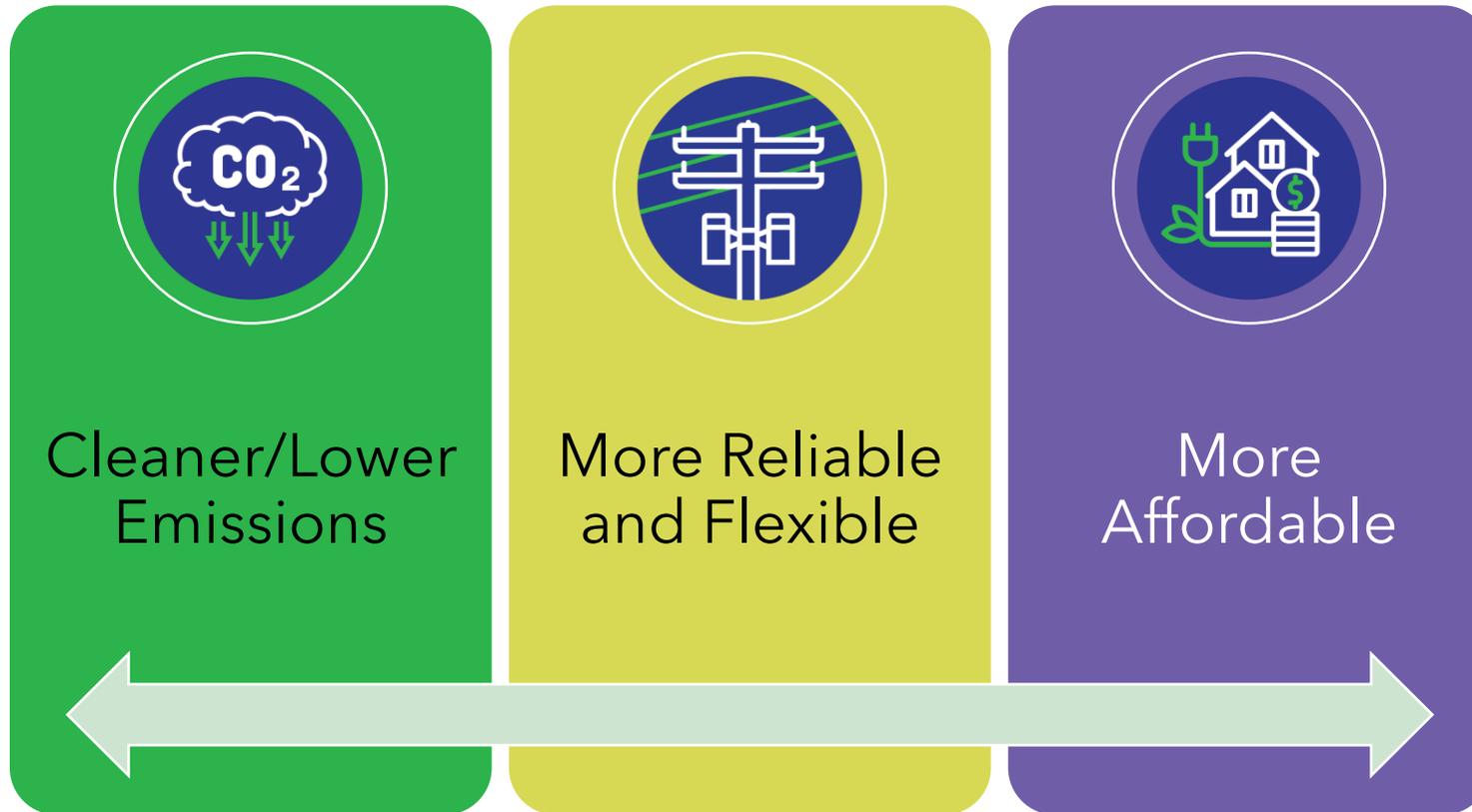
Capacity - the amount of electricity needed by a part of the system at one time

- Generation capacity
- Transmission capacity
- Distribution capacity

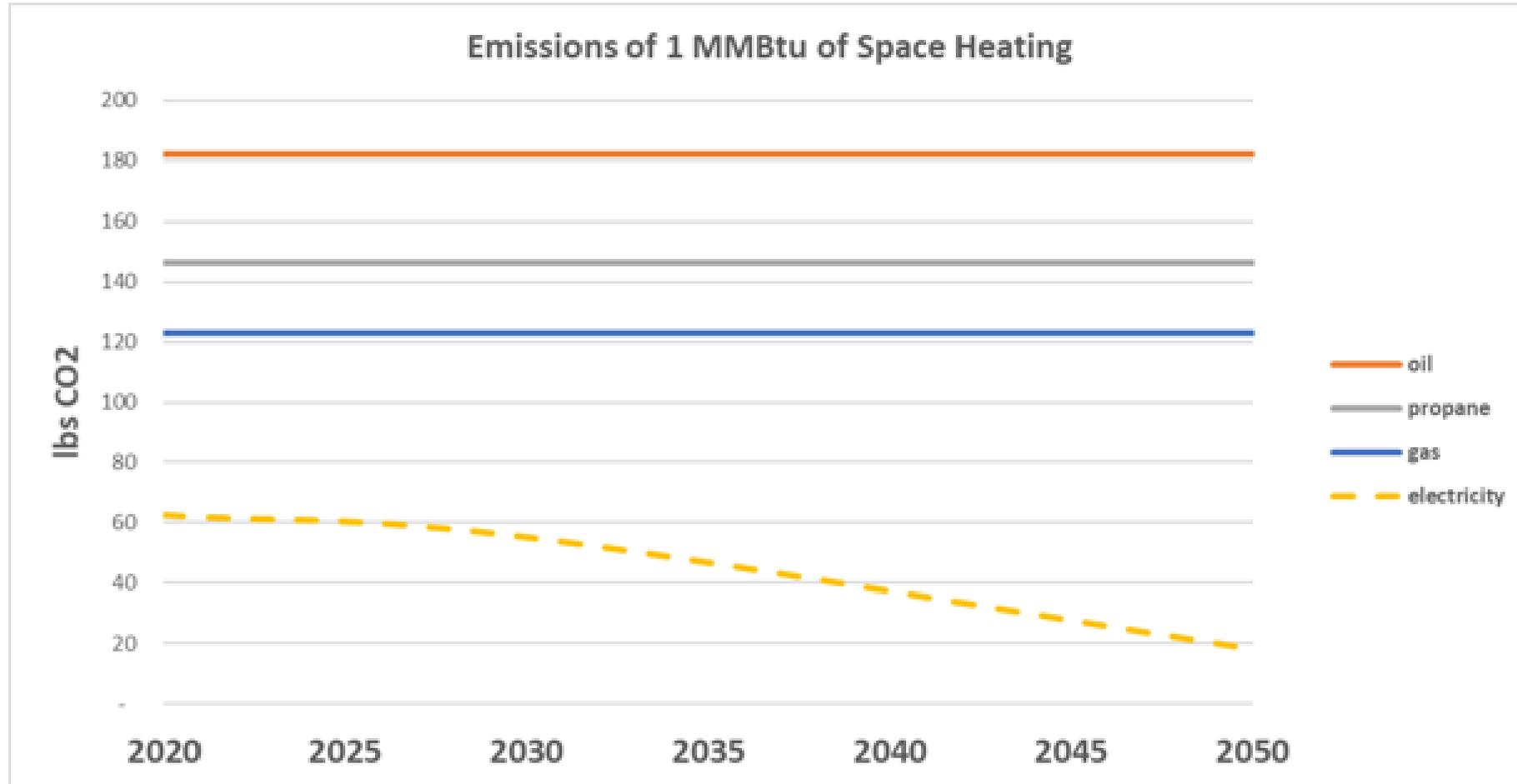
Peak is managed at the end of the line



Managing Load Helps the Grid Become

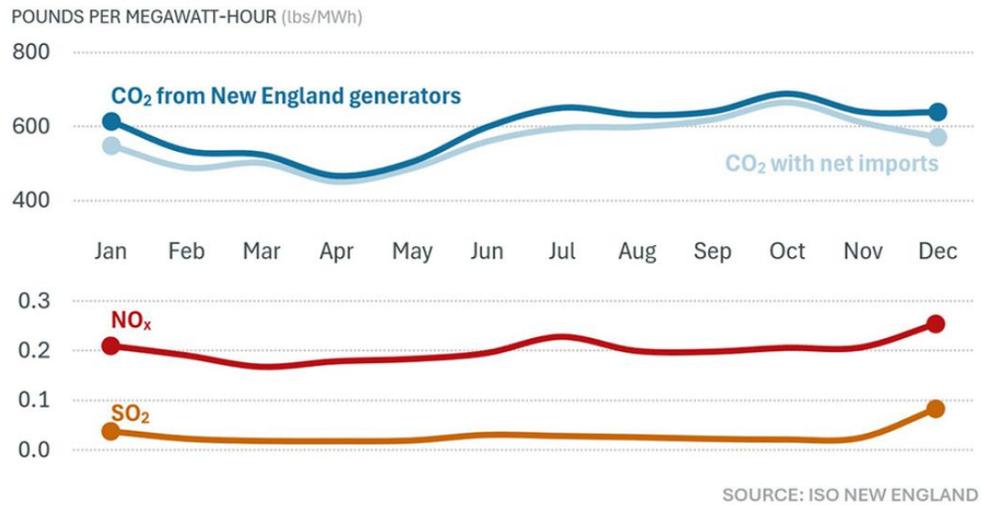


Cleaner: Electrify Fossil Fuel End Uses



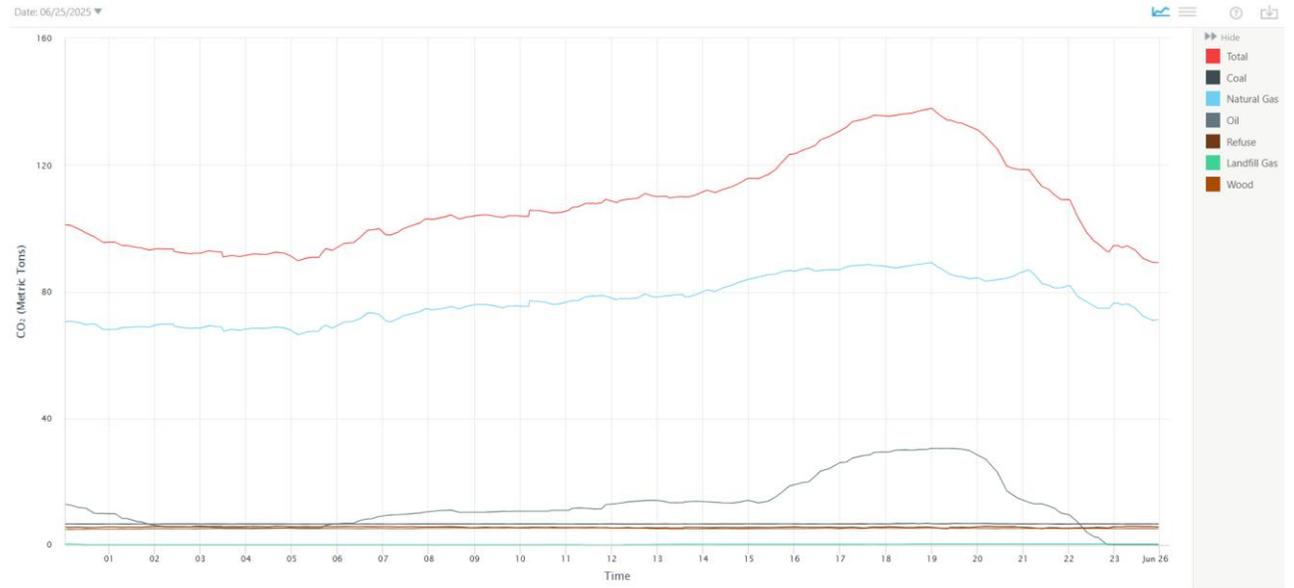
Cleaner: Use lower emission capacity

2024 Monthly Average Emission Rates



Source: 2024 ISO New England Electric Generator Air Emissions Report

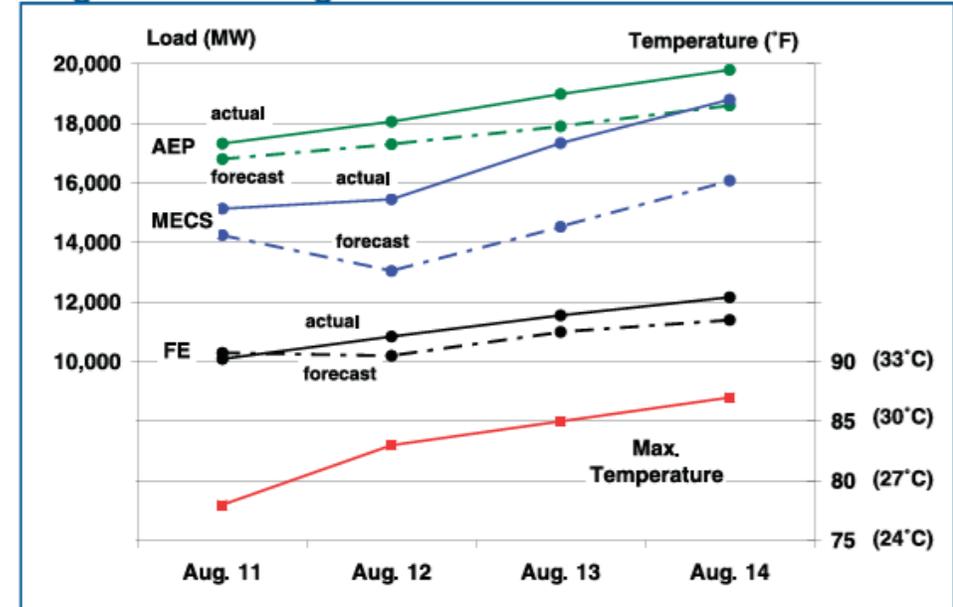
ISO-NE Hourly Emissions for June 25, 2025



Reliable: Reducing Outages and Faster Response to Grid Events



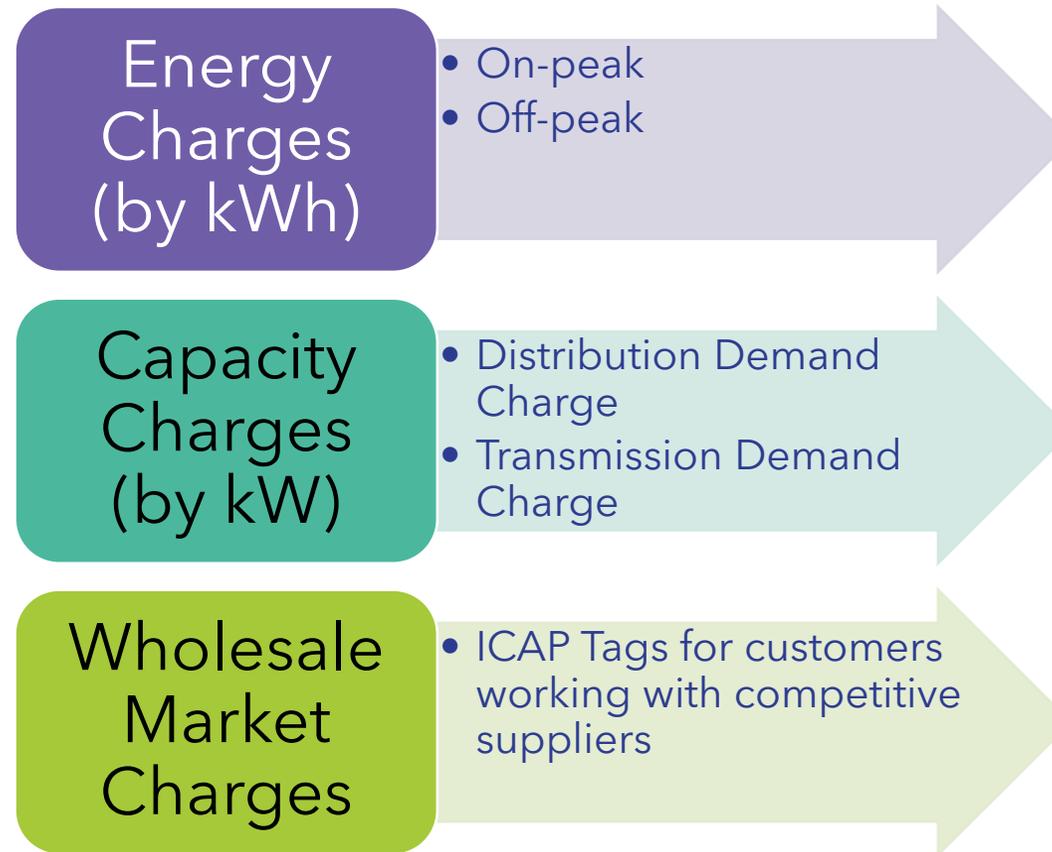
Figure 4.2. Load Forecasts Below Actuals, August 11 through 14



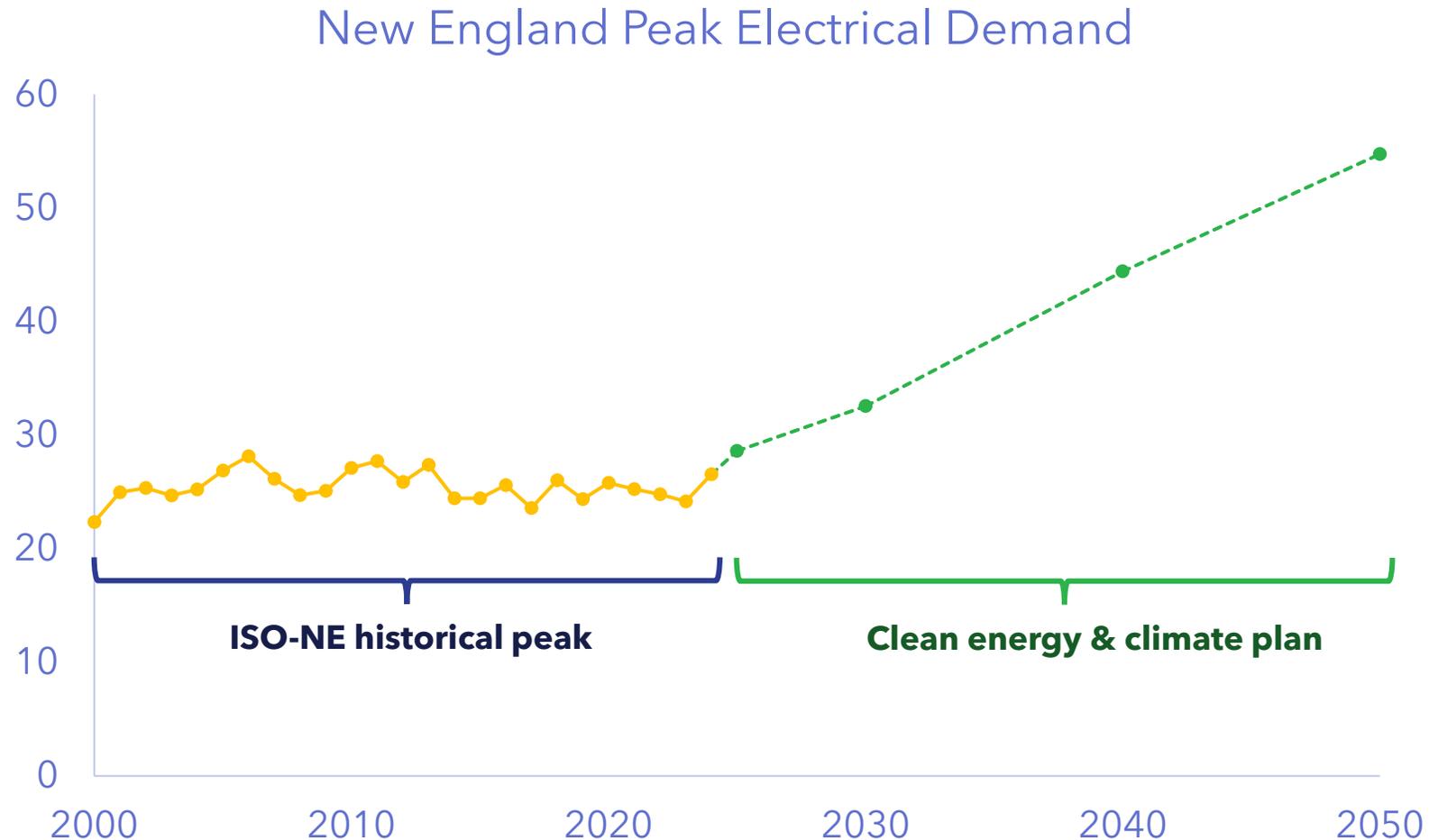
2003 Northeast Blackout started with overload conditions

Affordable: How Rates Reflect Capacity

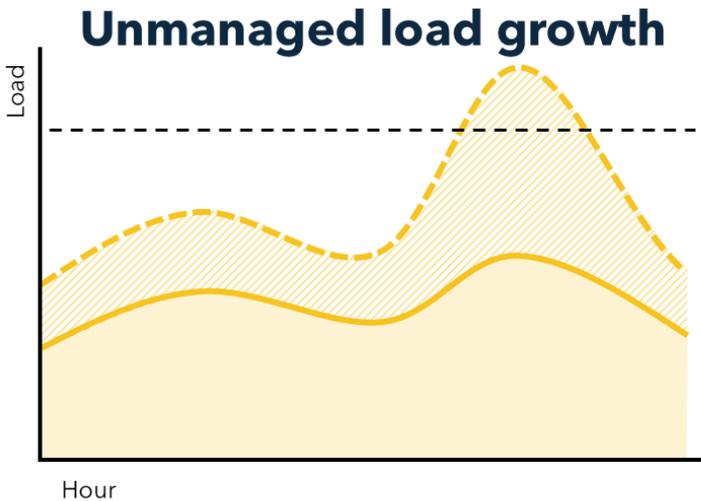
Sample ways capacity affects billed costs for users



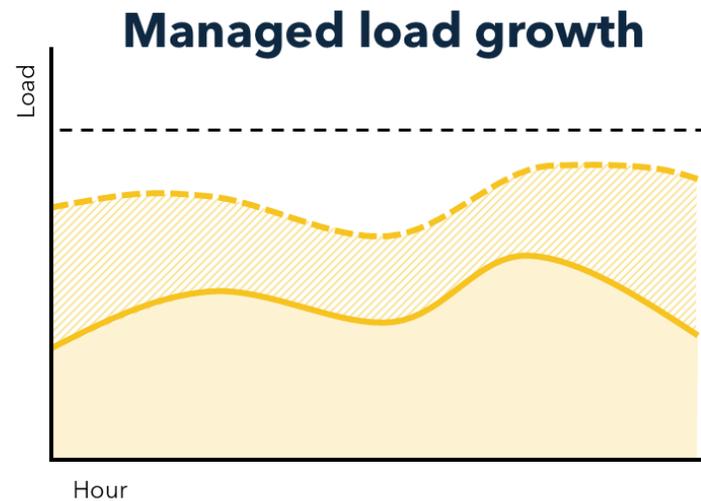
Massachusetts is facing growing load...



Load growth only increases rates if unmanaged



If peak demand increases faster than total use, it can increase rates.



If peak demand increases slower than total use, it can decrease rates.

Higher peak demand increases grid costs



$$\text{Electricity rates} = \frac{\text{Revenue requirement (\$)}}{\text{Energy sales (kWh)}}$$



Managed growth spreads costs over more kWh

Load Management Incentives

Demand Management Incentives - rebates or the absence of penalties for specific grid needs

Time Varying Rates - rates that vary based on differing grid needs

History and Future of Load Management In Massachusetts



Real-time data and more grid value



Demand Response Programs for State Entities

An Overview

March 10, 2026



DIVISION OF
CAPITAL ASSET
MANAGEMENT &
MAINTENANCE

What is Demand Response?

- A temporary reduction or shift in a facility's electricity use during the hours when the electrical grid experiences peak demand (e.g. hot summer days).
- By participating in demand response programs, facilities help the electrical grid manage increased demand for power during critical times and, in return, receive financial compensation for participation.
- Demand Response is also an environmental benefit as it reduces the need to operate large inefficient “peaker” power plants during times of grid stress.

ENE 51- Statewide Contract for Demand Response (DR) Services

ENE51 is an OSD Statewide Contract delegated to DCAMM for administration

DCAMM issues the procurement and manages the contract.

Current contract term: October 1, 2025 through September 30, 2027

Who may use this contract?

- Cities, towns, districts, counties, and other political subdivisions
- Executive, Legislative, and Judicial Branches, including all departments and elected offices therein (Division of Capital Asset Management and Maintenance-Controlled [DCAMM-Controlled] for this contract)
- Independent public authorities, commissions, and quasi-public agencies
- Local public libraries, public school districts, and charter schools
- Public hospitals owned by the Commonwealth of Massachusetts
- Public institutions of higher education
- Public purchasing cooperatives
- [Non-profit](#), UFR-certified organizations that are doing business with the Commonwealth

DR Program Options:

- **ISO NE Active 30 minute:** MUST curtail load within 30 minutes of notification. Typically audits called once in the Summer and once in the Winter. Actual events can happen anytime.
- **Connected Solutions Targeted Dispatch** (Eversource/Ngrid/Unitil): Targeted Dispatch events typically coincide with Captag day. Usually called 5-7 days during summer months and are notified day ahead of the events.
- **Clean Peak:** Provide incentives for reduced demand during peak demand periods. Also coincides with typical Targeted Dispatch days so no additional action needed for sites enrolled in Targeted Dispatch.
- **Daily Dispatch:** Participants are given a day ahead notice and are typically called 30-40 days per summer period.

DR Program Benefits:

- **Facilities earn money through their participation.**
- **Payments are directed to the participating sites to use for operational improvements and do not go to the General Fund.**
- No additional procurement steps. All contract services have been set up for your participation
- No facility out-of-pocket costs. Any costs (excepting costs for actual BMS upgrades) are covered
- No penalties for non-performance. Any potential penalties will be offset against program earnings.

DR Revenue Example:

Example for a facility with 600 kW curtailment:

<u>Program</u>	<u>Average Annual Revenue</u>
ISO NE ADCR	\$16,000
Targeted Dispatch (Ngrid/Eversource/Until)	\$15,225
Clean Peak	\$3,132
Total Annual Revenue	\$34,357
CAP Tag (avoided cost)	\$31,000
Total	\$65,357

DR Revenue Distribution:

- Money is distributed to your facility through DCAMM Expendable Trust Account.
- Expendable Trust funds are to be used exclusively and expended solely for the purpose of the operations and maintenance of facilities with priority given to projects with high energy savings potential. Funds shall not be used to fill staff vacancies.
- Funds are distributed via Intergovernmental Service Agreement on a quarterly basis from the DCAMM Office of Finance.

DR Program Qualification:

- Have a working BMS system or manual protocols for setbacks
- DCAMM will pair your EMS provider up with Cpower to set up automatization of your BMS so that you can curtail at the “push of a button”

- No upfront costs to the facility for this integration. DCAMM will coordinate between Cpower and your EMS provider to set up the programming.
- Backup generators that are permitted for non-emergency use can enroll in the ISO NE 30-minute program only. (not Connected Solutions)

DR Enrollment Steps:

- Email us!
 - To formally enroll, you only need to provide an email of your approval to opt in to ENE51 Statewide Contract to [Dave Lewis: Dave.Lewis@mass.gov](mailto:Dave.Lewis@mass.gov) with a copy to Phil Ciulla at CPower: Philip.Ciulla@CPowerEnergy.com
- We will set up a meeting to learn about your facility and operations and explore the potential Demand Response earnings and savings for your site(s) and determine the appropriate category of enrollment.
- Email electronic copies of your most recent June-August and December/January electric bill for all electric accounts.
- CPower will draw up a Letter of Authorization (LOA) to review your eligible interval accounts usage profiles.

DR Contacts:

- Dave Lewis – Program Manager, DCAMM Dave.Lewis@mass.gov
- Nina Mascarenhas – Project Manager, DCAMM Nina.Mascarenhas@mass.gov
- Phil Ciulla – Cpower Philip.Ciulla@CPowerEnergy.com



Demand Response in New England

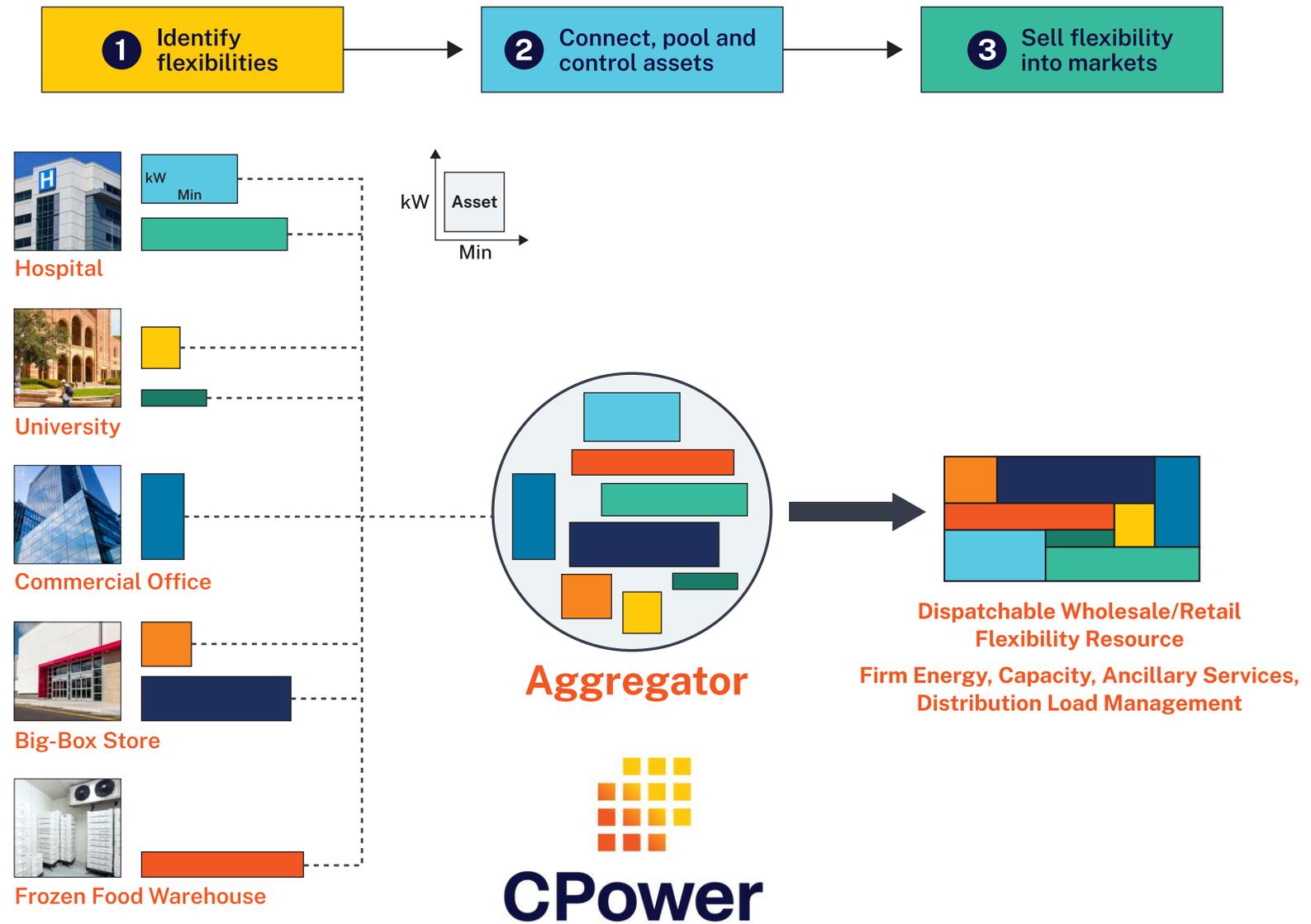


Virtual Power Plants

An aggregation of DERs that provides grid services via a coordinated dispatch.

Can include:

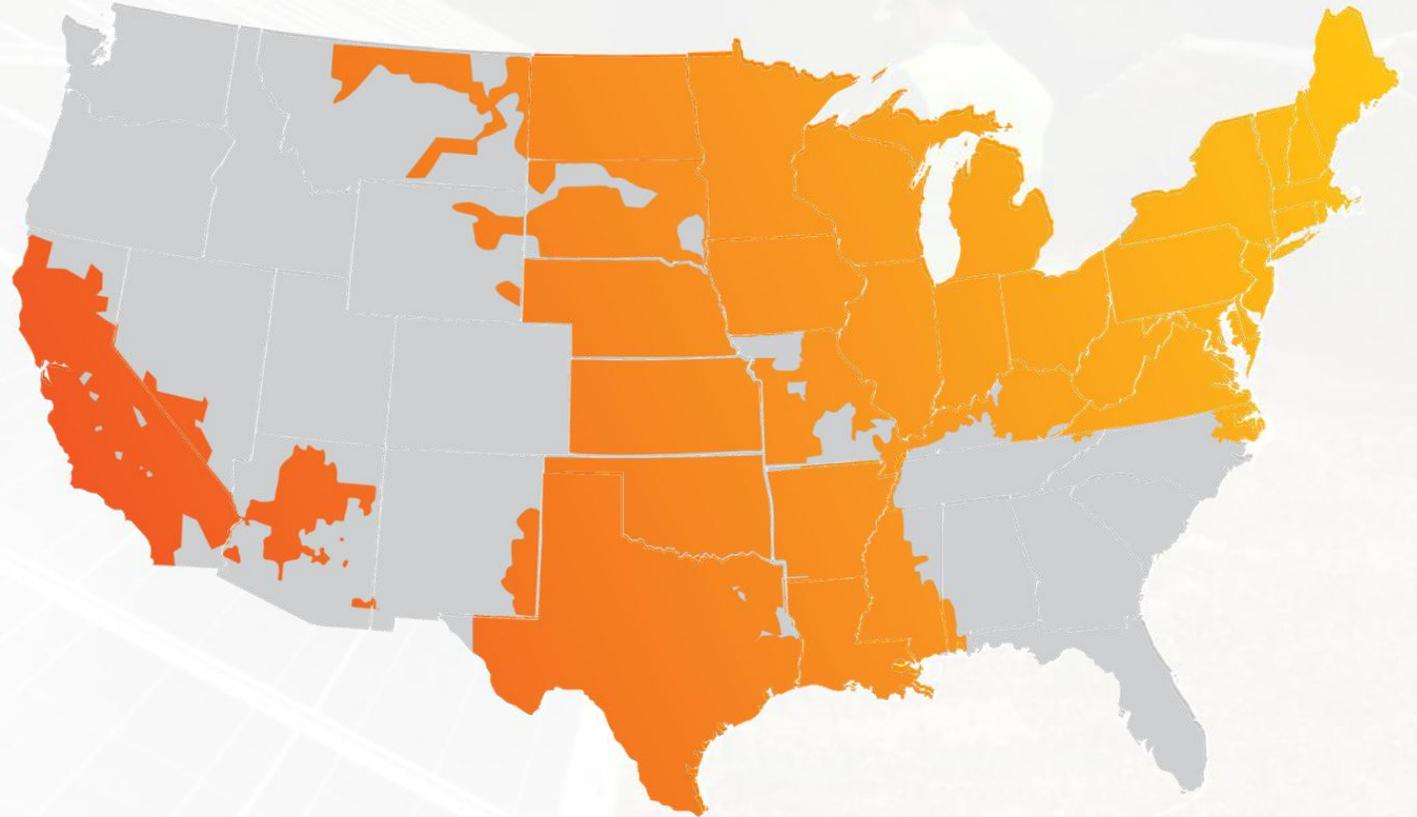
- 1) commercial and/or residential DERs
- 2) single type or heterogeneous mix of DERs
- 3) multiple control and communication methods between grid operator, VPP operator and DER.



Leading Virtual Power Plant Platform

**6.7 GW at
23,000 sites**

**\$1.2 BILLION+
in grid revenue
paid to customers
since 2015**



New England Demand Response Options

Program Name	Purpose	Notification Lead Time	Typical Event Length	Typical Curtailment Frequency	Administrator
Active Demand Capacity Resource	Avoid Blackouts	30 minutes	3.5 Hours	2 x 1 Hour Mandatory Tests	ISO-NE
Connected Solutions	Lower System Peaks	Day Ahead	3 hours	4-6 calls per season Summer only	Utility
Peak Demand Management (Cap Tag)	Lower utility bills costs	Day Ahead & Day Of	3 hours	4-6 calls per year Summer only	Supplier

Curtailment Planning

Typical Curtailment Strategies WASTE WATER TREATMENT PLANT – SUMMER

Equipment Type	Action Required
HVAC	
Administration Building and Maintenance Shop	Increase stat setpoints up 2 to 4 degrees
GENERATION	
Generators	At event start time, activate all generators to handle pump and process loads
LIGHTING	
Administration Building and Maintenance Shop	Reduce lighting manually or thru control system down to 50% of normal lighting
MANUFACTURING OR PROCESS LOAD	
Well and Deep Well Pumps	Thru SCADA system, fill reservoir prior to event start and shut down pumps. Monitor water level and fill to minimum requirements accordingly
Water Filtration Pumps	Thru SCADA system, shut down filtration pumping system and monitor accordingly
DeSalter Plant Equipment	Thru SCADA system, shutdown desalter plant and monitor accordingly
Booster Pump Stations	Thru the SCADA system, only allow pumps to run when necessary and monitor accordingly.
Wash Water Tank Station	Thru SCADA system, allow only one wash pump to run and monitor accordingly
Backwash Water Recovery Pumps	Thru SCADA system, allow only one recovery pump to run and monitor accordingly
Receiver Tank Pump Stations	Thru SCADA system, allow only one pump to run and monitor accordingly
Multiple Ultra Violet Disinfection Substations	If multiple plants and thru SCADA system, send all effluent for testing to secondary processing area and shutdown one (1) plant including UV cooling system with primary chiller
BEHAVIORAL OUTREACH AND AWARENESS	
Notify staff/customers of the event	Thru global staff email, text, announcement that an event is occurring

Typical Curtailment Strategies OFFICE BUILDING – SUMMER

Equipment Type	Action Required
HVAC	
Chillers	Increase chill water supply temp. by 4 degrees
Cooling Towers	4 cell towers (2) will unload as chill water temp. is increased
Chilled water and condenser water pumps with VFD's	4 chill water supply and (2) condenser water supply pumps
AHU's	Increase discharge air temp. from 55 to 60 degrees
Decrease static pressure down from 1.25" to .75	Thru BAS system, decrease static pressure
Global temp. change on all area VAV boxes	Increase setpoints from 72 to 74 degrees
Cycle computer room Liebert units on 10 minutes, then off 10 minutes	Thru BAS, control min./max runtimes
Reduce Garage exhausts fans down to minimums	Thru BAS, set minimums of exhaust per codes
Manually shut down all outside fountain pumps	Manually shut down pumps
AHU/RTU Units	Pre-cool facility 1 hours prior to event start
AHU/RTU Units	Shutdown or cycle units thru BAS pre-set unoccupied mode
AHU/RTU Units	Thru BAS, activate global temp reset program up 4 degrees
AHU/RTU Units	Thru BAS, activate VFD's on all fans to run at lower speed or shut down
Elevators	Stage elevators to not allow 1 bank to run
GENERATION	
Connected Loads	Allow generators to pick up all connected load during the event
LIGHTING	
Reduce lighting in all corridor areas to 50%.	Set lighting control system in corridors to unoccupied mode
BEHAVIORAL OUTREACH AND AWARENESS	
Building Ancillary Equipment	Manually shutdown or reduce back-of-the-house exh. Fans, lighting, service elevators and/or delivery doors
Load - in Shipping Area	Limit use of bay doors and shutdown air curtains
Notify Staff/customers of event	Thru global staff email, text, announcement that an event is occurring

Curtailment Planning – BMS Codes

Category	DR Strategy	Definition / Action
30-minute Real-Time DR event management	Install GUI button on main display to initiate a Load Curtailment Event dispatch / restore action	Supervisory control algorithm that suppresses whole building demand through a combination of sequential DR control strategies such as listed below.
Initiate DR action	Activate GUI Button	Set Event Flag = ON
Zone Temperature Control	<p>Seasonal DR Global Temperature Setpoints</p> <p>Cooling Seasonal DR Setpoint = Normal Cooling Setpoint + 4 degrees (user adjustable)</p> <p>Heating Seasonal DR Setpoint = Normal Heating Setpoint – 2 degrees (user adjustable)</p>	<ol style="list-style-type: none"> Zone Temperature Setpoint = Normal Temperature Setpoint for <u>then current time-of-day</u>. <ul style="list-style-type: none"> If Occupancy = UNOCCUPIED: Remain in UNOCCUPIED mode, else If Event Flag = ON go to line 2, else stay on line 1. Reset Zone Temperature to Seasonal DR Setpoint for the <u>then current time-of-day</u>. <ul style="list-style-type: none"> If Event Flag = ON wait 35 minutes, go to line 3, else If Event Flag = OFF during wait-time go to line 1. Restore Zone Temperature Setpoint to Normal Temperature Setpoint for <u>then current time-of-day</u>. <ul style="list-style-type: none"> Wait 10 minutes (user selectable), then go to line 4. If Occupancy = UNOCCUPIED go to line 1, else <ul style="list-style-type: none"> If Event Flag = OFF go to line 1, else go to line 5. Reset Zone Temperature to Seasonal DR Setpoint for the <u>then current time-of-day</u>. <ul style="list-style-type: none"> Wait 45 minutes (user selectable), then go to line 3, else If Event Flag = OFF during wait-time go to line 1.

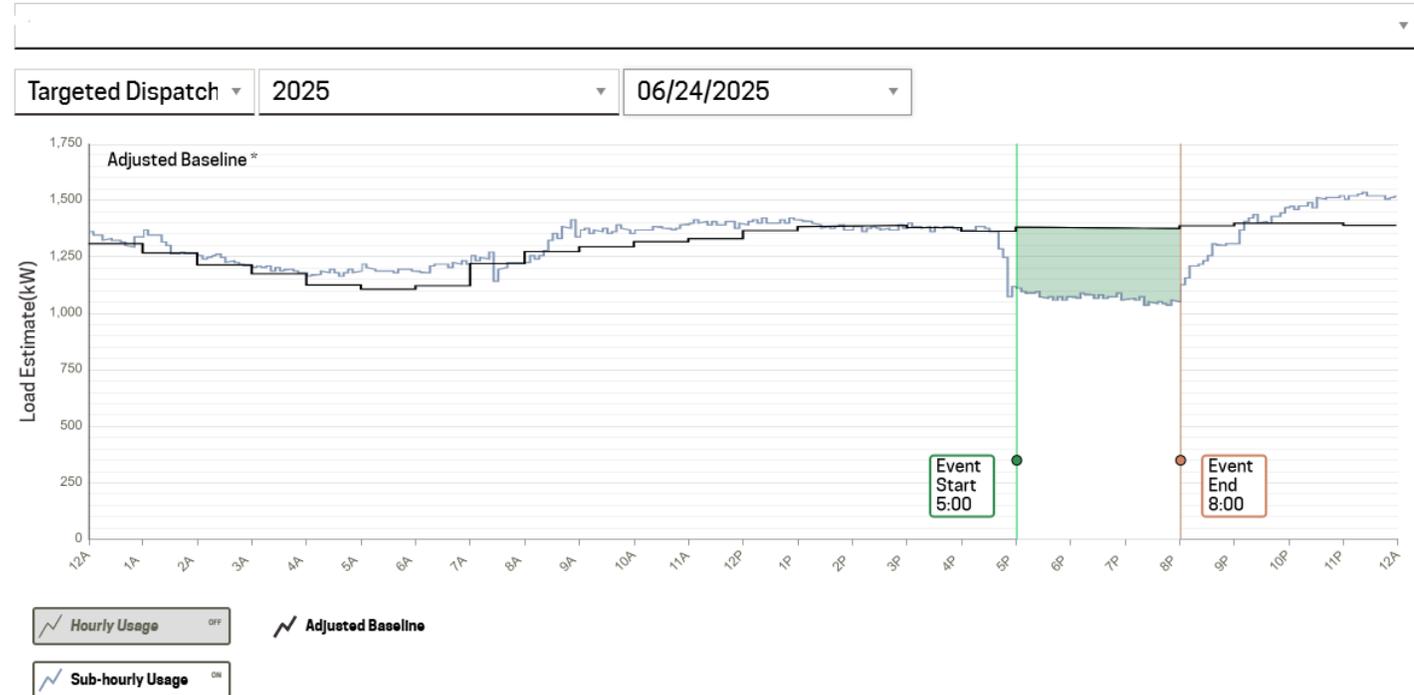
Category	DR Strategy	Definition / Action
Air Distribution	Duct static pressure decrease	<ol style="list-style-type: none"> Duct Static Pressure = Normal Static Pressure for then current time-of-day and conditions. <ul style="list-style-type: none"> If Event Flag = ON go to line 2, else stay on line 1. Reduce Duct Static Pressure by 75% (user selectable). <ul style="list-style-type: none"> If Event Flag = ON wait 35 minutes, then go to line 3, else If Event Flag = OFF during wait time go to line 1. Restore Duct Static Pressure to Normal Static Pressure for then current time-of-day and conditions. <ul style="list-style-type: none"> Wait 10 minutes (user selectable), then go to line 4. If Event Flag = OFF go to line 1, else go to line 5. Reduce Duct Static Pressure by 75% (user selectable). <ul style="list-style-type: none"> Wait 45 minutes (user selectable), then go to line 3, else If Event Flag = OFF during wait time go to line 1.
Air Distribution	Fan variable speed drive limit	<ol style="list-style-type: none"> Fan Speed = Normal Speed for then current time-of-day and conditions. <ul style="list-style-type: none"> If Event Flag = ON go to line 2, else stay on line 1. Reduce Fan Speed by 50% (user selectable) from the <u>then current fan speed</u>. <ul style="list-style-type: none"> If Event Flag = ON wait 35 minutes, then go to line 3, else If Event Flag = OFF during wait time go to line 1. Restore Fan Speed to Normal Speed for then current time-of-day and conditions. <ul style="list-style-type: none"> Wait 10 minutes (user selectable), then go to line 4. If Event Flag = OFF go to line 1, else go to line 5. Reduce Fan Speed by 50% (user selectable) from the <u>then current fan speed</u>. <ul style="list-style-type: none"> Wait 45 minutes (user selectable), then go to line 3, else If Event Flag = OFF during wait time go to line 1.

Sites in Action


CPower

- Dashboard
- Event Performance**
- Historical Usage
- Reports
- Settings
- Sign Out

Event Performance



[Download Baseline](#)

* Adjusted baseline is set in accordance with baseline compliance per program participation rules, and can be affected by the Baseline Adjustment Window.

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Stacking Benefits



Stacking Benefits (cont.)



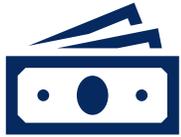
500 KW of Curtailment is worth upwards of \$285K in Earnings and Savings over the next 5 years

\$625K in Daily Dispatch over the next 5 years

EnerWise™

Site Optimization by  CPower

Financial



- On-bill Savings
- Grid Service Revenues
- Incentives
- Optimizing returns requires considering all simultaneously

Resilience



How important is resiliency?

- Lost operations, lost revenue
- Data loss
- Critical life & safety

Green & Sustainability



- Corporate Objectives (ESG)
- Increasing demand for sustainable partners

Philip Ciulla 781•214•7519
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ENERGY INTELLIGENCE IN ACTION

UNIVERSITY OF MASSACHUSETTS LOWELL

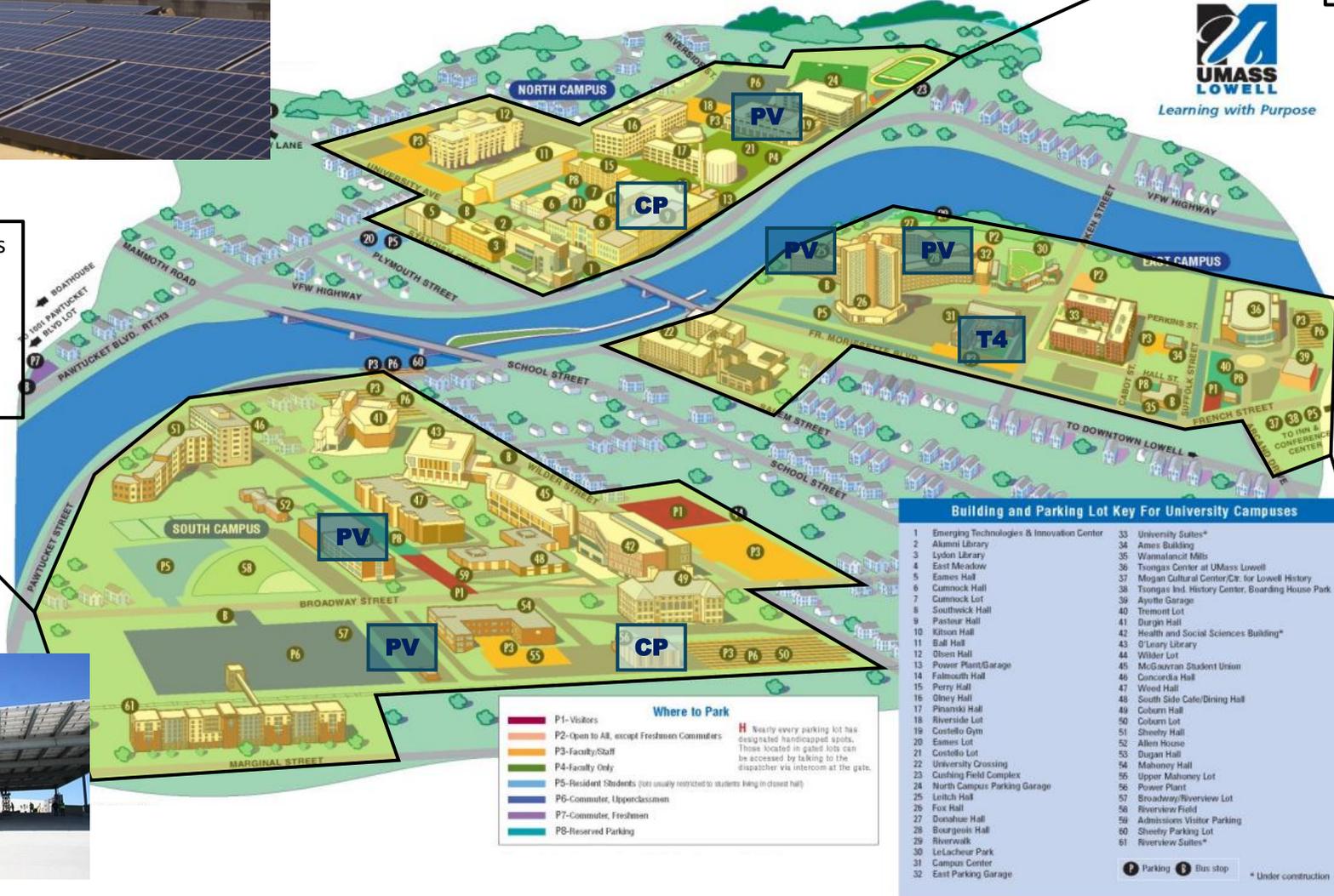
Facilities, Operations & Services

UMASS LOWELL | CAMPUS PORTFOLIO



- Academics, Business Centers, Labs, Recreation
- Main electric feed from North Power Plant
- 23.5 MWh annual
- 8 MW peak
- 99,000 Dth annual

- Academics, Dormitories, Labs
- Main electric feed from South Power Plant
- 16 MWh annual
- 4.5 MW peak
- 87,000 Dth annual



- Business Centers, Dormitories, Labs, Recreation
- Each bldg. has independent electric feed
- 12.5 MWh annual
- 3.5 MW peak
- 62,000 Dth annual



EXECUTIVE ORDER 594 | PROGRESS TO DATE

EO594 aims to accelerate decarbonization and set emission reduction targets through 2050.

- 1. Reduce emissions by 95%**
 - a. Achieved 2030 milestone
 - b. Energy efficiency, alternative energy, and electrification
- 2. Transition fleet vehicles to zero emissions**
 - a. UML currently has 11 zero-emission vehicles
 - b. Sustainability finalizing masterplan to support transition
- 3. Reduce fuel oil use by 100%**
 - a. Achieved in 2009
- 4. Decrease total energy per square foot**
 - a. Achieved 2030 milestone
 - b. Energy efficiency and strategic demand management
- 5. Deploy vehicle charging stations**
 - a. UML currently has 24 stations
 - b. Sustainability finalizing masterplan to support transition

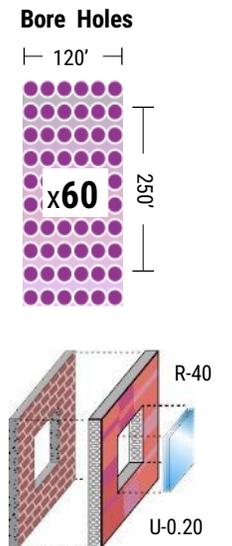
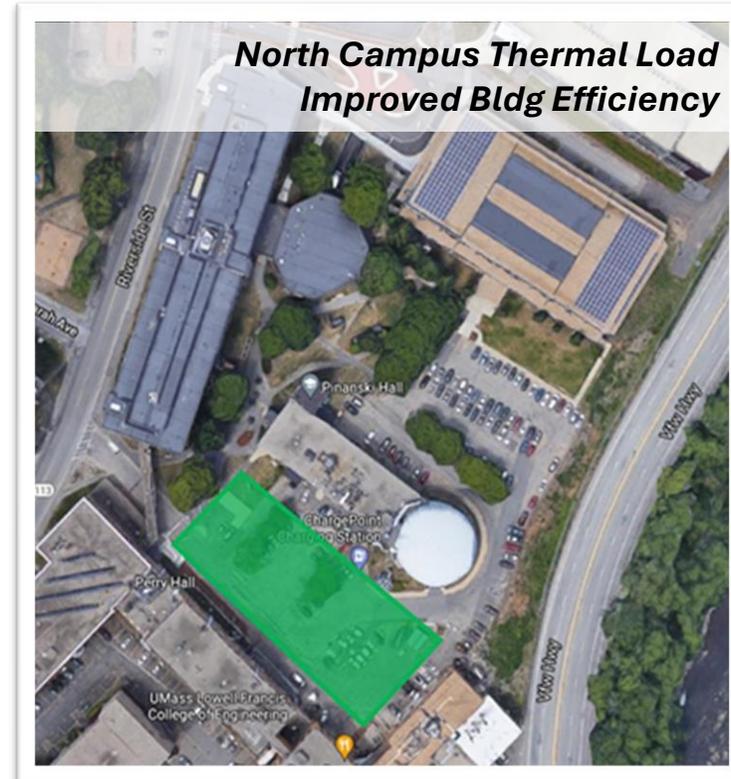
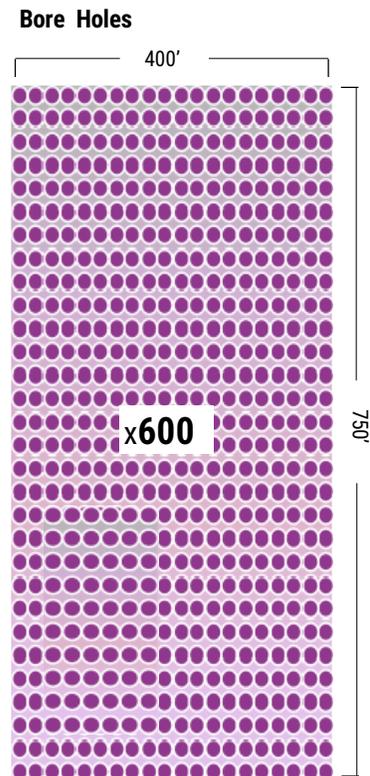
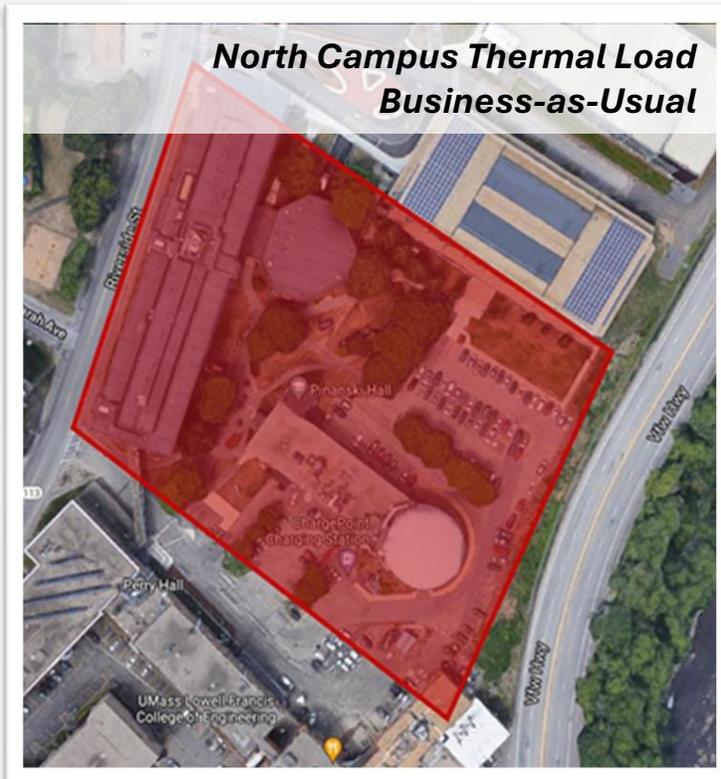
Objective	UML Progress	2030	2040	2050
Reduce emissions from onsite fossil fuels	-46%	-35% ✓	-60%	-95%
Zero emission vehicles (ZEVs) in overall state fleet	10% (11 vehicles)	20% of fleet (1,625 vehicles)	75% of fleet (3,250 vehicles)	100% of fleet (6,500 vehicles)
Reduce fuel oil use	-100%	-95% ✓	TBD	TBD
Energy use intensity (site EUI) reduction	-51%	-25% ✓	TBD	TBD
EV charging stations at state facilities	24 stations	500 stations	TBD	TBD

✓ - UML Achieved

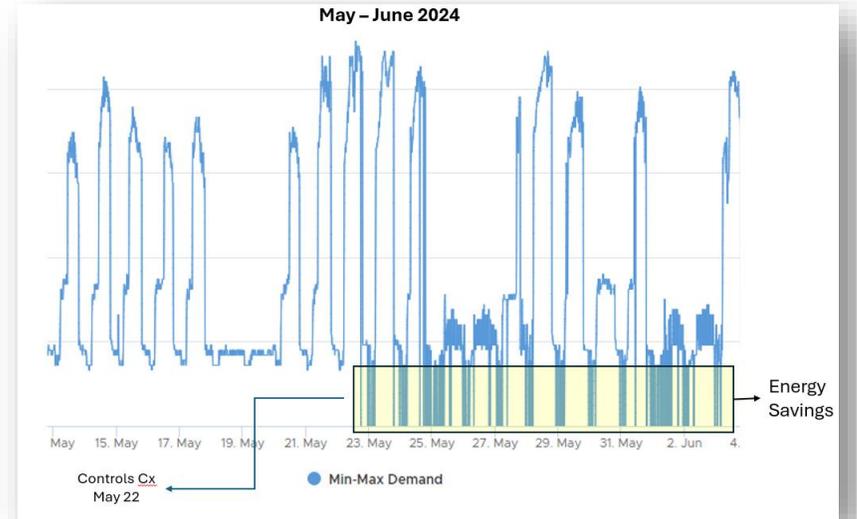
DECARBONIZATION MASTERPLAN | BUILDING SHELL IMPROVEMENT

Geothermal system size and costs depend on demand management.
Better demand control = Smaller geothermal system

Geothermal Site Comparison...

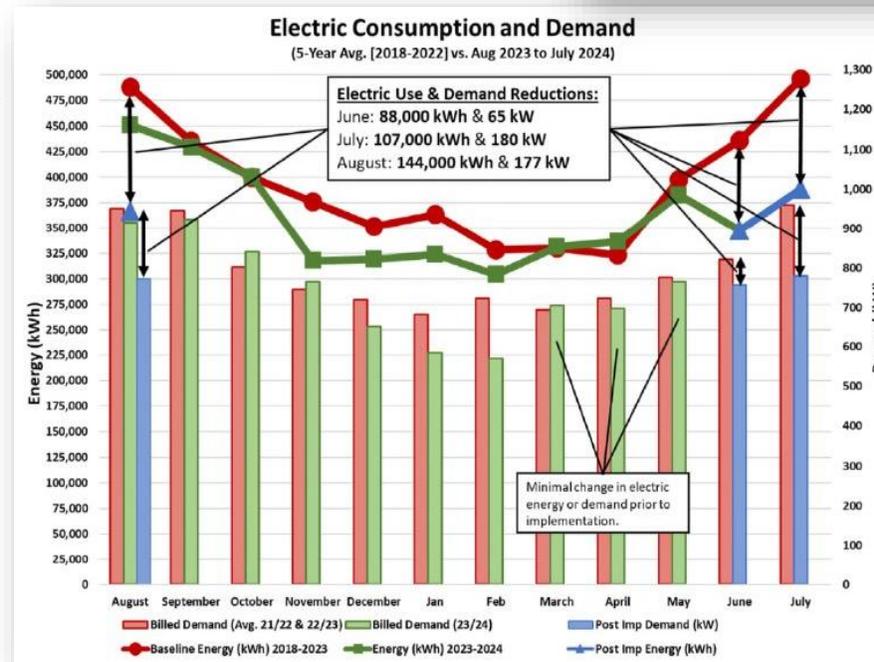
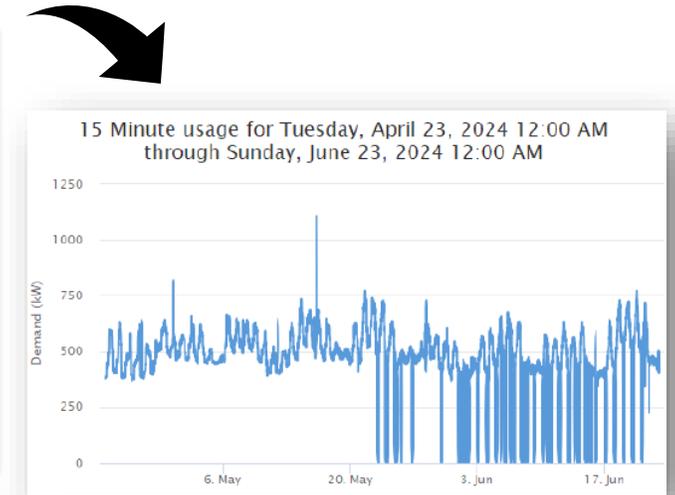


ENERGY WASTE | LIGHTING SCHEDULES



ENERGY WASTE | RESULTS-DRIVEN COMMISSIONING

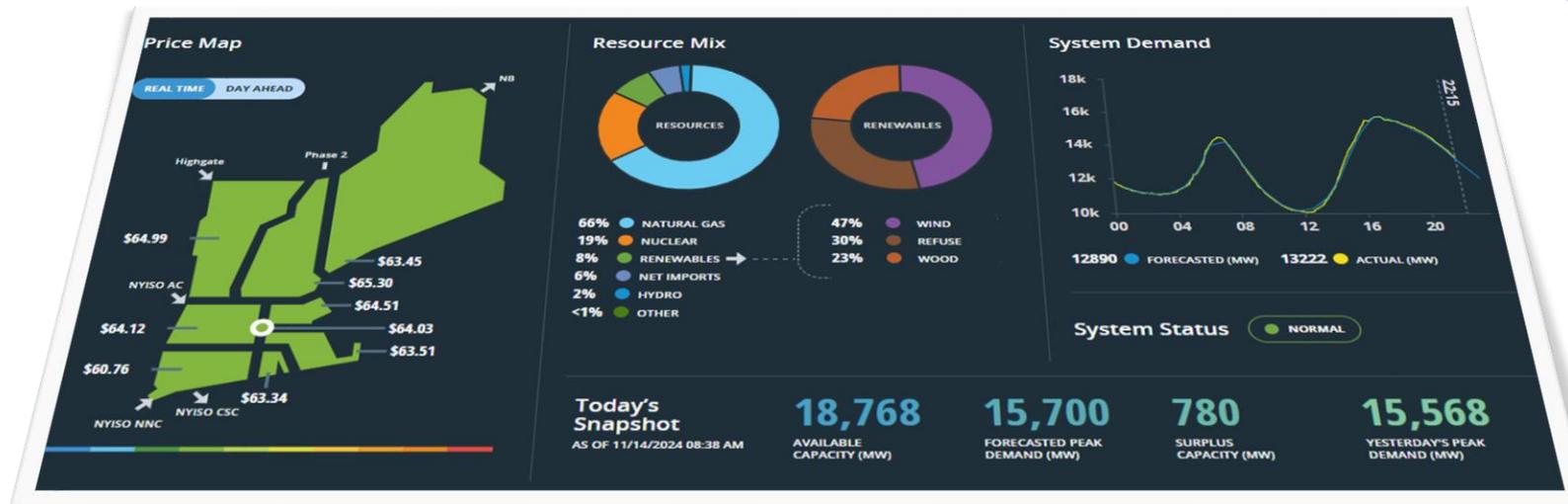
- Airflow & Exhaust Optimization
- Static Pressure Resets
- Occupancy Sensor Repairs
- Heat Recovery Optimization
- Outdoor Air Control Limits
- Sensible Heat Wheel Optimization
- Condenser Water Pump Optimization
- Condenser Water Temperature Resets
- Hot Water Flow & Temperature Resets



RCx Costs	\$475,893
Cost Savings, FY25	\$311,518
LDC Incentives	\$395,901
Payback Months	6
3-Yr NPV	\$768,349
EUI Redux	-23%
\$13m Budget Impact	-6%
Emissions MTCO2e	-922

ENERGY INTELLIGENCE IN ACTION

MANAGE PEAK DEMAND



DEMAND RESPONSE | STACKED PROGRAMS

Active Capacity Resource Program

- Emergency response to grid shortfall
- 30-min response time
- \$30,000 annual incentives



On-Peak Demand Management

- Self-directed response
- Capacity tag management
- \$120,000 utility cost savings



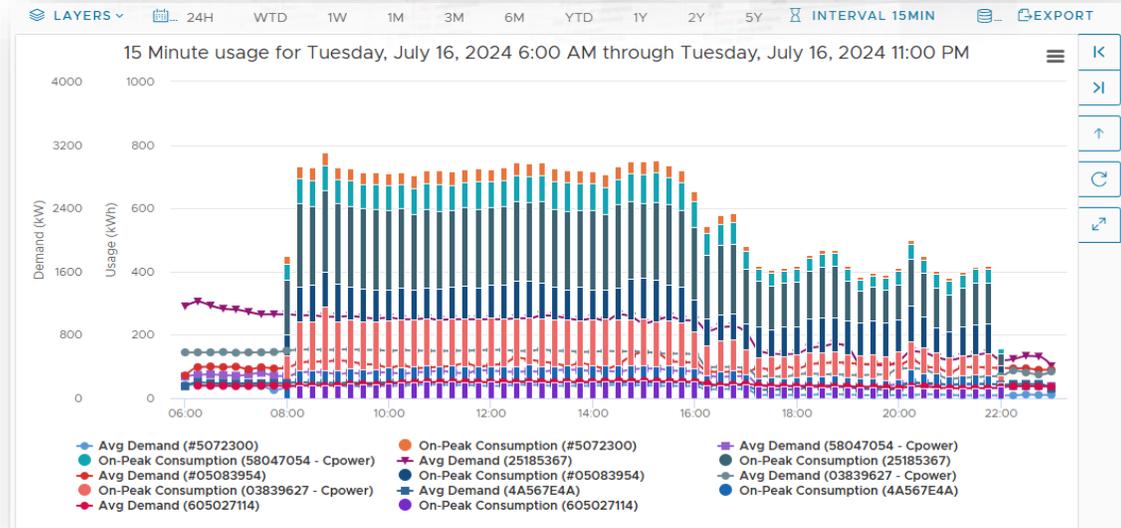
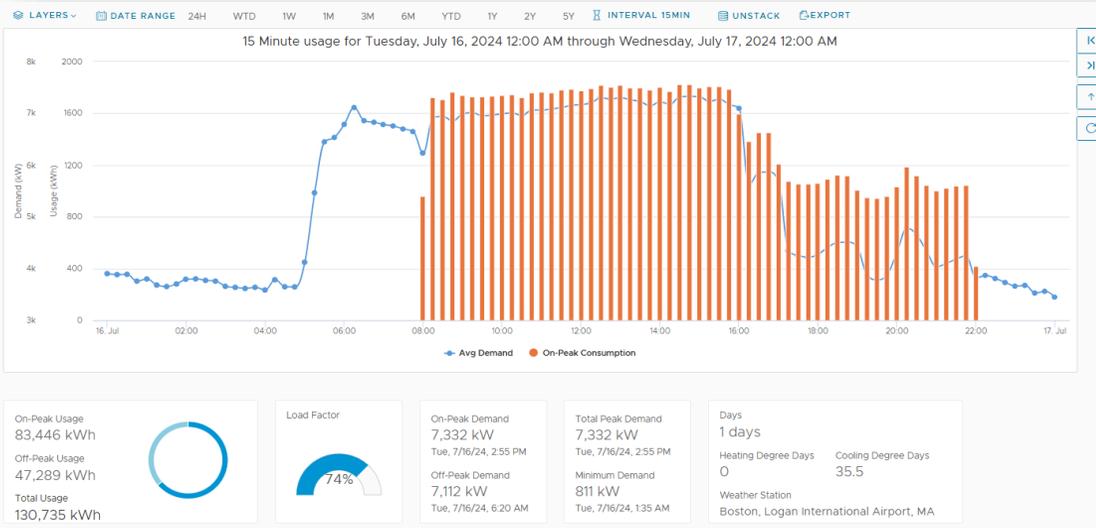
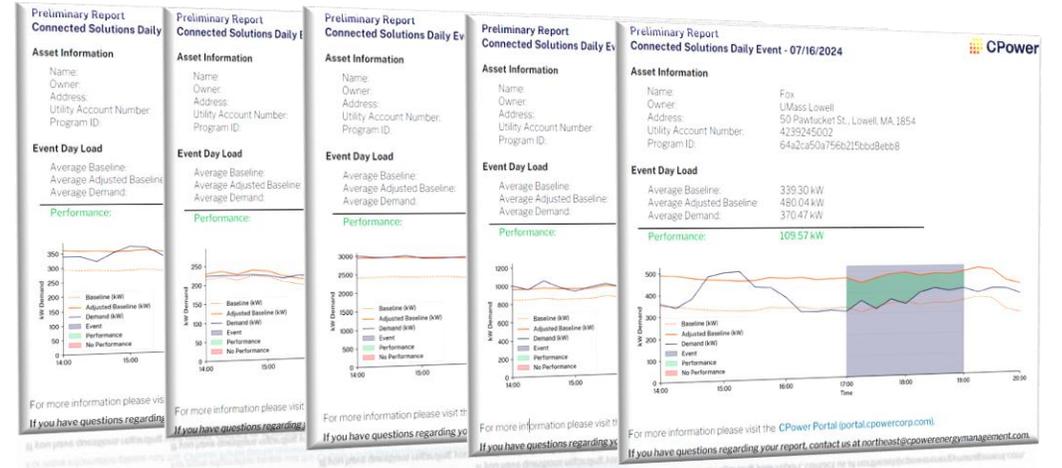
Connected Solutions Daily Dispatch

- Incentive-based summer program
- Daily grid alleviation
- \$220,000 annual incentives



DEMAND RESPONSE | RESPONSE IMPROVEMENT

Capacity Tag Peak Day



ENERGY INTELLIGENCE IN ACTION

GENERATE USER AWARENESS



The image shows a screenshot of a news article on the UMass Lowell website. The article is titled "Computer Science Graduate Student Turns Data into Energy-Saving Action" and is dated 10/18/2024, written by Ed Brennan. The main headline reads "As Facilities Intern, Neha Miryala Builds Dashboards to Raise Awareness About Campus Energy Consumption". A photograph shows Neha Miryala, a graduate student, sitting at a desk and working on a laptop. The article text describes how she developed energy dashboards for campus buildings to help UML Energy Manager Daniel Abrahamson track real-time energy use, cost, and emissions.

Computer Science Graduate Student Turns Data into Energy-Saving Action

As Facilities Intern, Neha Miryala Builds Dashboards to Raise Awareness About Campus Energy Consumption

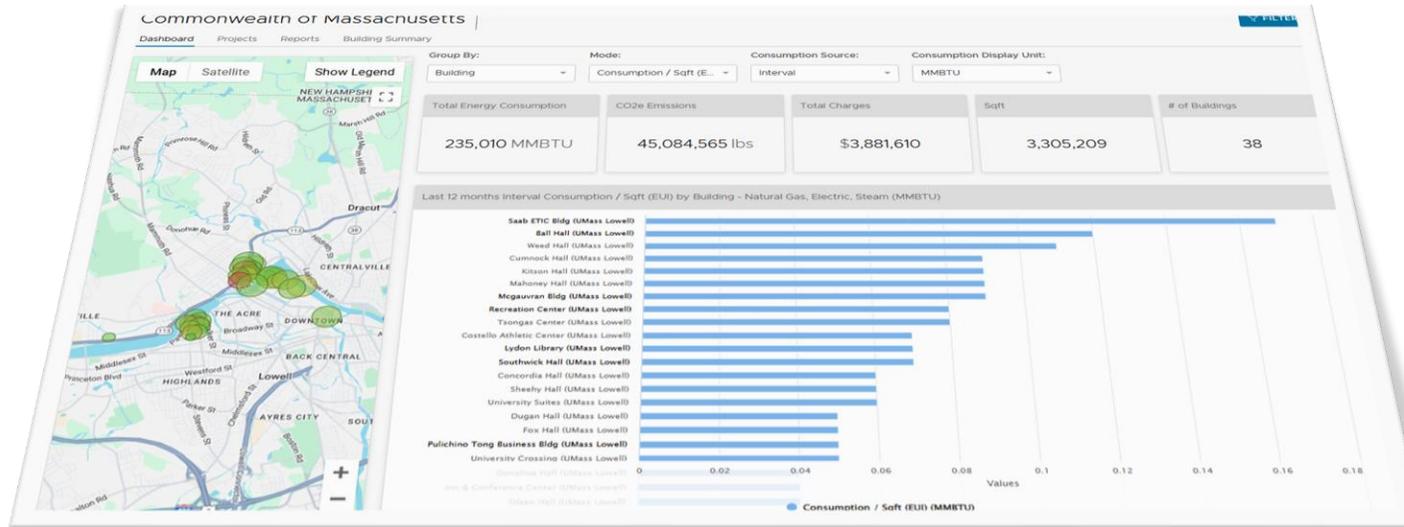
10/18/2024
By Ed Brennan

Neha Miryala was looking for work that would enhance her data analytics and visualization skills while she pursues a [master's degree in computer science](#) at UMass Lowell.

UML Energy Manager Daniel Abrahamson needed someone to build [dynamic dashboards](#) to display the real-time energy use, cost and

ENERGY INTELLIGENCE IN ACTION

IDENTIFY AREAS OF ENERGY WASTE



USER AWARENESS

DASHBOARDS, DASHBOARDS, DASHBOARDS

Saab ETIC Bldg Lowell, MA, 01854

Dashboard Utility Interval Projects Energy Star Reports

KPIs for LAST 12 MONTHS - November 2023 - October 2024

Total Energy Consumption

Electric	Natural Gas
29,062,842.93 kBtu EUI: 943.28 kBtu/sqft	14,053,628.15 kBtu EUI: 365.99 kBtu/sqft
15,009,216 kBtu EUI: 177 kBtu/sqft	

Fox: September Electric Use

Cost per Student **\$45.43**

September's Electric Use: 557,440 kWh
lbs. of pollution

Unplugging your laptop's charger when not in use can save energy.

Riverview Suites ENERGY USAGE OCT 2024

\$35.62 **21,396**

ELECTRIC COST PER STUDENT

1 gallon of gasoline is equal to approximately 33.7 kilowatt-hours of energy.
Approximately 721,045.2 kWh of electricity is equal to 24,315.1 gallons of gasoline.

EASY WAYS TO REDUCE YOUR ENERGY CONSUMPTION

- Reusable Bottles

University Crossing's Electric Profile Date Range: 11/16/2023 - 7/2/2024

0.76M lbs of CO₂, which equals to... 135 homes' electricity use per year OR 71M smartphones charged OR 1.48M miles driven by an avg gas vehicle

Weekly Electric Use

Day	% Difference from Last Week
Wednesday	▲ 1%
Thursday	▲ 2%
Friday	▼ 1%
Saturday	▼ 9%
Sunday	○ 0%
Monday	▼ 13%
Tuesday	○ 0%

CO₂ Emissions (MT CO₂e)

North Campus

Electric Consumption (kWh)

Electric Use Intensity (kWh/sq ft)

Energy Scoreboard- October 2024

ELECTRIC COST PER OCCUPANT

Leitch	\$24.66
River Hawk	\$26.59
Donahue	\$28.65
Concordia	\$29.08
Bourgeois	\$30.13
Riverview	\$35.62
Sheehy	\$42.52
USuites	\$43.33
Fox	\$48.26
Townhouses	\$198.29

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.

USER AWARENESS

END-USER COMPETITIONS



Energy Scoreboard- October 2024

ELECTRIC COST PER OCCUPANT

Leitch	\$24.66
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LEITCH
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BOURGEOIS
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RIVERVIEW
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SHEEHY
\$42.52



USUITES
\$43.33



FOX
\$48.26



TOWNHOUSES
\$198.29

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Donahue: October Electric Use

Cost per Student
\$28.65



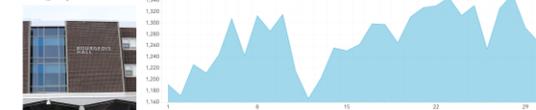
October's Electricity Use is equal to:
131,235 lbs. of pollution 6,698 Gallons of Gas Consumed 1,141,038 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Bourgeois: October Electric Use

Cost per Student
\$30.13



October's Electricity Use is equal to:
123,847 lbs. of pollution 6,321 Gallons of Gas Consumed 1,076,800 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Sheehy: October Electric Use

Cost per Student
\$42.52



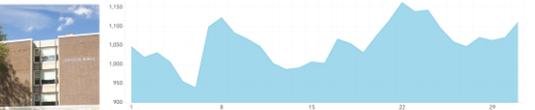
October's Electricity Use is equal to:
178,738 lbs. of pollution 9,123 Gallons of Gas Consumed 1,554,055 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Leitch: October Electric Use

Cost per Student
\$24.66



October's Electricity Use is equal to:
102,709 lbs. of pollution 5,242 Gallons of Gas Consumed 893,018 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Concordia: October Electric Use

Cost per Student
\$29.08



October's Electricity Use is equal to:
86,135 lbs. of pollution 4,396 Gallons of Gas Consumed 748,909 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



Riverview Suites: October Electric Use

Cost per Student
\$35.62



October's Electricity Use is equal to:
419,202 lbs. of pollution 21,396 Gallons of Gas Consumed 3,644,797 Cellphones Charged

Keeping doors and windows closed while the heat is on maintains a comfortable space and conserves energy.



USER AWARENESS | DATA WAREHOUSE

Home > Facilities Management > Operations and Services

Energy Management

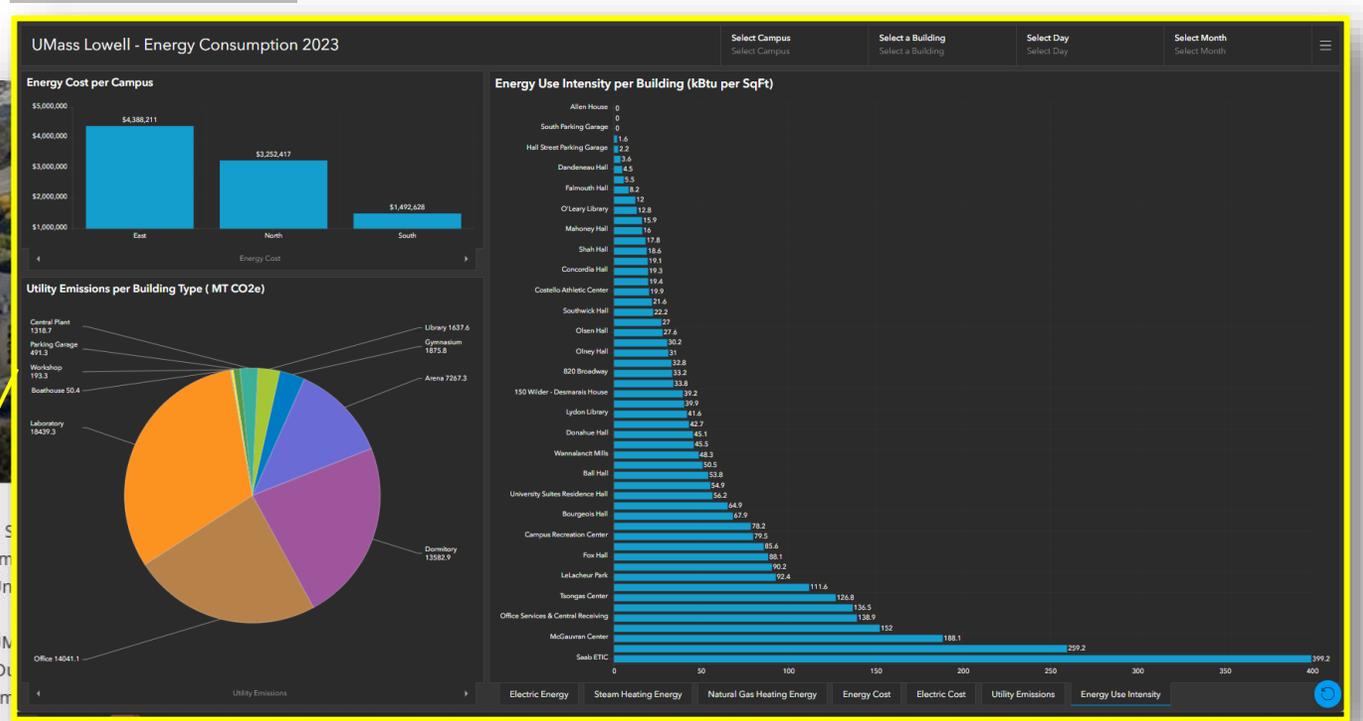
UMass Lowell's Energy Management mission is to cost-effectively manage energy resources to support the university's commitment to excellence and innovation while minimizing associated environmental impacts.

ENERGY MANAGEMENT

- Energy Projects
- Energy Operations

The Energy Operations team, in coordination with Capital Planning, S Campus Community, works to collaboratively design, operate, and m processes that meet or exceed energy management goals for the Un

Since the beginning of the Energy Management program in 2005, UM tremendous growth in both campus size and campus community. D Facilities Department has implemented an array of energy managem to help reduce the campus's overall energy use.



UMass Lowell Energy Dashboards

 **Utility Costs**

Utility Costs by Account

- Electric
- Natural Gas
- Water

→

 **Energy Use**

Energy Use by Account

- Electric
- Natural Gas

→

 **Utility Emissions**

Utility Use CO2 equivalents

→

National Grid
Clean Transportation
Managed Charging and Programs



nationalgrid

What is Managed Charging

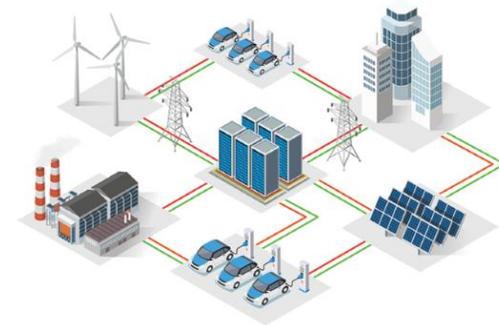
Unmanaged Charging - Uncontrolled or unmanaged charging is when EVs start charging as soon as they are plugged in without considering factors such as electricity cost, grid capacity, overall energy demand, and other factors.

Managed Charging - Managed EV charging refers to the strategic control of when and how vehicles are charged without compromising the fleets' operational needs. Managed charging balances energy needs among EVs...and grids through sophisticated communication and defined control objectives.

Types of Managed Charging

Types of Managed Charging

- Passive - relies on influencing customer charging behavior via incentives, guided communications, or varying electricity costs based on time of charging
- Active - relies on signals from the electric utility or aggregator to a vehicle or charging station to manage charging activity.
- Presently, ~15% of the US EVs (& National Grid-MA EVs) manage charging in some way. 95% of that is via passive managed charging (EPRI 2024).



Benefits of Managed Charging

Benefits of Managed Charging

- Reduce Charging Electricity Costs
- Reduce EV Charger Installation Costs and Timelines
- Optimize Fleet Operations



Managed Charging Strategies

Time-Based Scheduling/Power Management

- This initial level sets simple charging windows to use off-peak electricity, reducing costs with minimal technology

Vehicle to Everything (V2X)

- Concept in which an electric vehicle is viewed as a mobile battery, and stored energy in the vehicle can be discharged for some benefit (V2G, V2L, etc)

Dynamic Control

- Fully automated charging optimized by real-time data like schedules and energy prices, enabling scalability

Implementing Managed Charging

Implementing Managed Charging



MA: National Grid Fleet Offerings Summary

Fleet EV Charging Program:



~\$30M
for fleets

- Supports fleet electrification by providing utility and customer-side EV infrastructure rebates for private and publicly owned fleets
- Tiered charger rebates for eligible public fleets

EV Off-Peak Charging Program:

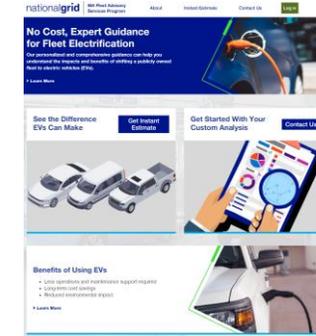
\$0.03-\$0.05
per kWh rebate



- Allows fleet vehicles to earn rebates when they charge EV during off-peak times
- \$0.03/kWh in the winter / \$0.05/kWh in the summer

National Grid

Fleet Advisory Services:



275
studies

- No-cost, expert analysis to help 275 publicly-owned fleet customers in electrifying their fleet vehicles
- Private Fleets can leverage MA Fleet Advisor

Demand Charge Alternative:

\$0
demand charge
in 1st year

Load Factor Threshold	Enrollment Years	Demand Charge Discount
None	1	100%
LF <= 5%	2 to 9	100%
5% < LF <= 10%	2 to 9	75%
10% < LF <= 15%	2 to 9	50%
LF > 15%	2 to 9	0%

$$\text{Load Factor} = \frac{\text{Billed Energy in kWh}}{\text{Billed Demand in kW} * \text{Hours in Billing Period}}$$

- 100% discount on demand charges in 1st year of operation
- Up to 100% discount for years 2-9, for load factors (i.e. EVSE utilization) below 15%

MA: EV Off-Peak Charging Program

The EV Off-Peak Charging Program allows fleet customers to earn rebates when charging commercial EVs during designated off-peak times.

The program is available to all fleets, including private and government-owned commercial vehicles.

Estimated Yearly Savings:

Fleet Type	kWh / Day (Conservative)	Op. Days per Year	Total kWh	Off-Peak Rebate
LDV	25	300	7,500	\$275
MDV	100	300	30,000	\$1,100
HDV	300	300	90,000	\$3,300

Months	Rebate	Off-Peak Hours*
June 1 – September 30	\$0.05/kWh	9:00 pm – 1:00pm
October 1 – May 31	\$0.03/kWh	9:00 pm – 1:00pm



MA: EV Off-Peak Charging Program (cont.)

Eligibility Requirements

Operate one or more commercial Electric Vehicle (PHEV or BEV)

Receive retail electric delivery service on either the G-1, G-2, or G-3 service tariffs

Networked EV Charger(s) used exclusively for Fleet EVs within National Grid's electric service territory

Eligible Networks: SWITCH, Lynkwell/Livingston, OpConnect, Blink, ChargePoint, AmpUp, Autel, FLO, EV Connect, The Mobility House, Synop, Flipturn (if your NSP is not listed, we can explore integration)

Registration Link - <https://ngrid.anbetrack.com/>

MA: Demand Charge Alternative Program

The Demand Charge Alternative Program supports customers in reducing their operating costs of EV chargers by providing a tiered load factor-based discount on their demand charges.

The Demand Charge Program is approved and currently available for 10 years starting in 2023 with new enrollments accepted through 2032.

Eligibility:

- All new and existing separately metered DCFC and L2 EVSE customers on General Service Demand Rates (G-2 or G-3)
- Eligible customers can enroll anytime during the first 9 years of the program

Website for more info: ngrid.com/ma-evcharging

Load Factor Threshold	Enrollment Years	Demand Charge Discount
None	1	100%
LF <= 5%	2 to 9	100%
5% < LF <= 10%	2 to 9	75%
10% < LF <= 15%	2 to 9	50%
LF > 15%	2 to 9	0%

$$\text{Load Factor} = \frac{\text{Billed Energy in kWh}}{\text{Billed Demand in kW} * \text{Hours in Billing Period}}$$

2 x 150 kW Example:

- Rate Class: MA G-3
- Peak Demand: 300 kW
- 375 kWh per day
- 5.2% Load Factor (75% discount)
- Estimated monthly bill (years 2-9):

	No DCA	DCA
Customer charge	\$223	\$223
Supply Charge	\$1,300	\$1,300
Delivery Charge	\$600	\$600
Demand Charge	\$2,900	\$725
Total	\$5,023	\$2,848
Effective kWh	\$0.44	\$0.25

~43%
cheaper electricity
in years 2-9¹

Note: 1) Year 1 has a 100% demand charge discount, which leads to ~58% electricity savings. Bill estimate above is for illustrative and analysis purposes only. National Grid cannot forecast or predict actual bill impacts. This does not create a binding or enforceable agreement. These rates are subject to change and are estimates only.



Q&A

**Feel free to raise your hand or write questions
in the chat!**



LBE Reminders & Updates

Large Building Energy Reporting (LBER) Program

Some upcoming deadlines...

Date	Deadline
March 15	Changes to the Covered Buildings List (Claim My Building, Update CBL Information, etc.)
April 30	Exemption requests, campus designation requests
May 31	Utility energy data submission
June 30	Energy data uploaded and shared with DOER on Energy Star Portfolio Manager (ESPM)
July 30	Campus energy data submission

Contact Arianna
(Arianna.Zrzavy@mass.gov)
if you have general state
entity questions.



MASSACHUSETTS
**DEPARTMENT OF
ENERGY RESOURCES**

Thank You!