Leading by Example Council Agenda
May 9th, 2023

- Welcome
- News and Updates
- FY22 LBE Portfolio Progress
- EV and EVSE Policies and Resources
- Breakout Discussions: Preparing for the Next Phase of EVSE

The MBTA's

ENERGY PROGRAM

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MBTA ENERGY OVERVIEW

1st	Largest Electric Consumer in MA
2nd	Largest Land-Owner in MA
176	Facilities
128 + 143	Subway + Commuter Rail Stations
1 million	Pre-Covid Daily Customers Served
587,000	Present Average

TYPES OF FUEL

Electricity

- Trains
- Facilities

Diesel

- Commuter Rail
- Bus
- Ferries
- Heavy-Duty Non-rev.

Natural Gas

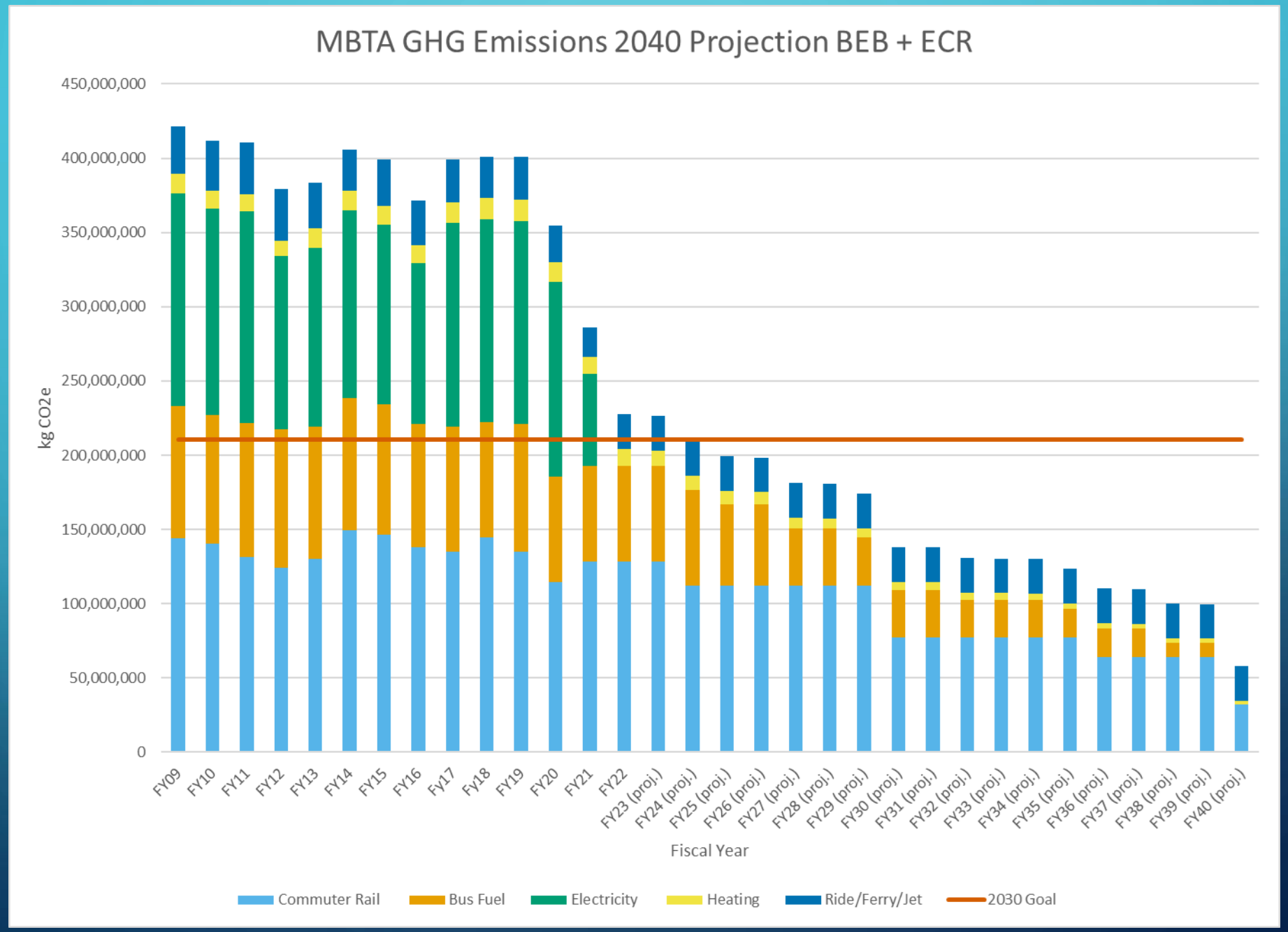
- CNG Buses
- Heating

Gasoline

- Light Duty Non-rev.

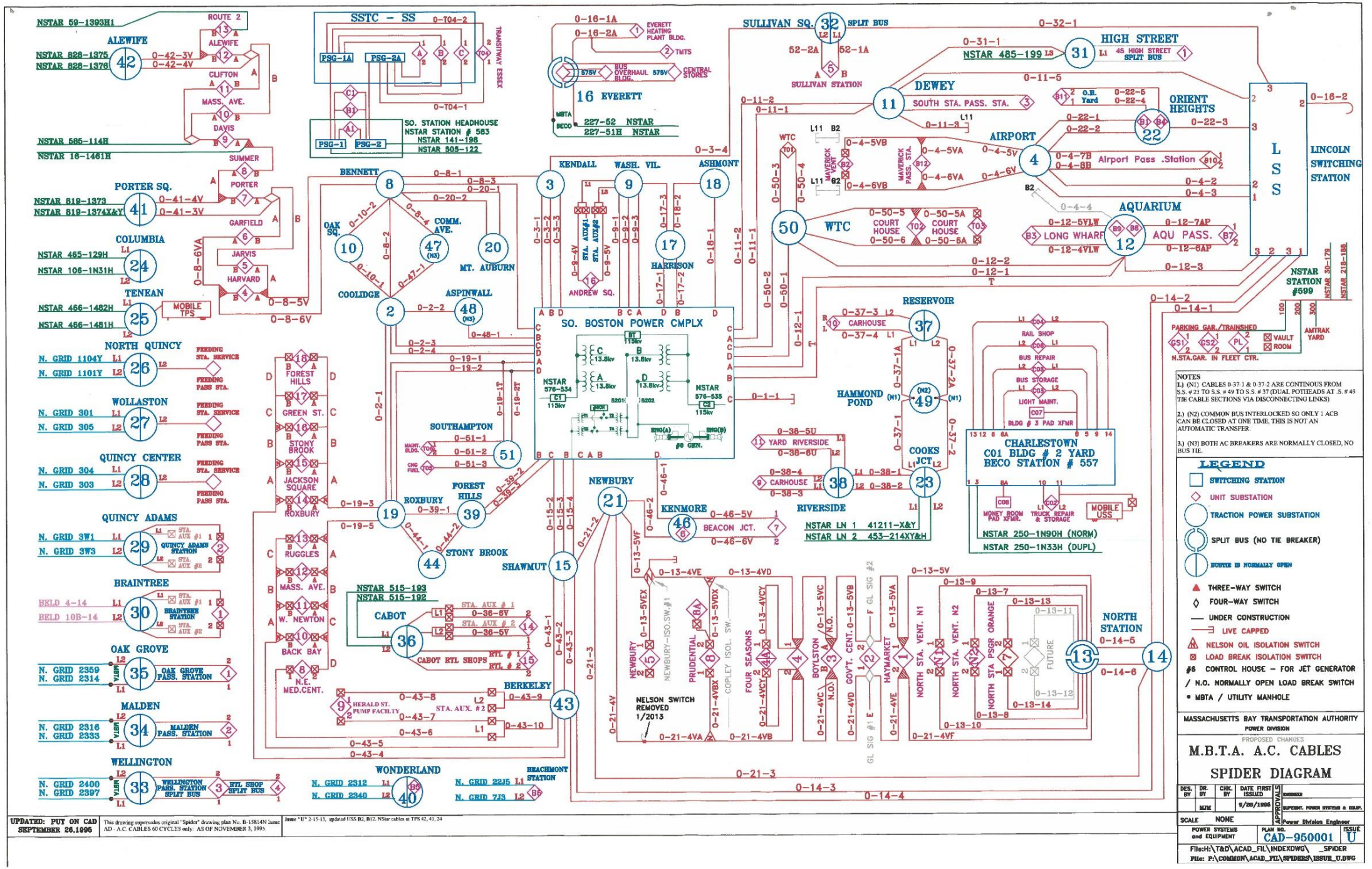
Kerosene (Jet Fuel)

- MBTA Power Plant

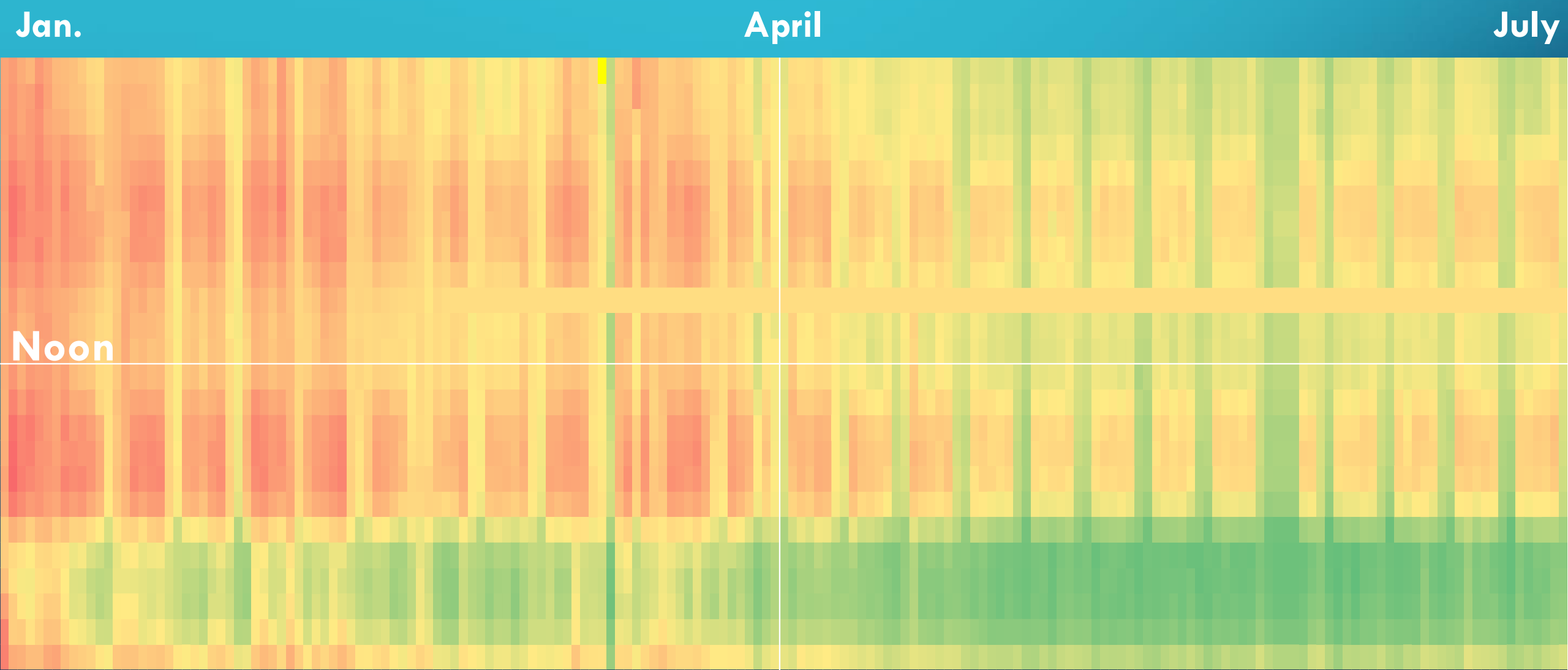

MBTA GHG Emissions 2040 Projection BEB + ECR
450,000,000
400,000,000
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
kg CO2e
FY09
FY10
FY11
FY12
FY13
FY14
FY15
FY16
FY17
Fy18
FY19
FY20
FY21
FY22
FY23 (proj.)
FY24 (proj.)
FY25 (proj.)
FY26 (proj.)
FY27 (proj.)
FY28 (proj.)
FY29 (proj.)
FY30 (proj.)
FY31 (proj.)
FY32 (proj.)
FY33 (proj.)
FY34 (proj.)
FY35 (proj.)
FY36 (proj.)
FY37 (proj.)
FY38 (proj.)
FY39 (proj.)
FY40 (proj.)
Fiscal Year
Commuter Rail
Bus Fuel
Electricity
Heating
Ride/Ferry/Jet
2030 Goal

JETS AKA SOUTH BOSTON POWER PLANT

- Bid Jet into daily markets
- Receive FCM credits for the jet being on standby
- Purchase jet fuel (Kerosene)
- Do not manage the Jet operation or Maintenance


SSTC - SS
SO. BOSTON POWER CMPLX
SO. STATION HEADHOUSE
NSTAR STATION # 583
NSTAR 141-198
NSTAR 505-122
16 EVERETT
ALEWIFE
PORTER SQ.
COLUMBIA
TENEAN
NORTH QUINCY
WOLLASTON
QUINCY CENTER
QUINCY ADAMS
BRAINTREE
OAK GROVE
MALDEN
WELLINGTON
BENNETT
COOLIDGE
OAK SQ.
COMM. AVE.
MT. AUBURN
ASPINWALL
KENDALL
WASH. VIL.
ASHMONT
HARRISON
ANDREW SQ.
SULLIVAN SQ.
SULLIVAN STATION
HIGH STREET
DEWEY
SOUTH STA. PASS. STA.
ORIENT HEIGHTS
AIRPORT
Airport Pass .Station
WTC
COURT HOUSE
AQUARIUM
LONG WHARF
AQU PASS.
LINCOLN SWITCHING STATION
NSTAR STATION #599
PARKING GAR./TRAINSHED
N.STA.GAR. IN FLEET CTR.
RESERVOIR
CARHOUSE
HAMMOND POND
COOKS JCT
RIVERSIDE
YARD RIVERSIDE
CHARLESTOWN
C01 BLDG # 2 YARD
BECO STATION # 557
RAIL SHOP
BUS REPAIR
BUS STORAGE
LIGHT MAINT.
BLDG # 3 PAD XFMR
MONEY ROOM PAD XFMR.
TRUCK REPAIR & STORAGE
MOBILE USS
NSTAR 250-1N90H (NORM)
NSTAR 250-1N33H (DUPL)
NSTAR LN 1 41211-X&Y
NSTAR LN 2 453-214XY&H
BEACON JCT.
KENMORE
NEWBURY
SHAWMUT
FOREST HILLS
ROXBURY
STONY BROOK
SOUTHAMPTON
CABOT
BERKELEY
WONDERLAND
BRACHMONT STATION
NORTH STATION
NELSON SWITCH REMOVED 1/2013
NOTES
1.) (N1) CABLES 0-37-1 & 0-37-2 ARE CONTINOUS FROM S.S. # 23 TO S.S. # 49 TO S.S. # 37 (DUAL POTHEADS AT .S. # 49 TIE CABLE SECTIONS VIA DISCONNECTING LINKS)
2.) (N2) COMMON BUS INTERLOCKED SO ONLY 1 ACB CAN BE CLOSED AT ONE TIME, THIS IS NOT AN AUTOMATIC TRANSFER.
3.) (N3) BOTH AC BREAKERS ARE NORMALLY CLOSED, NO BUS TIE.
LEGEND
SWITCHING STATION
UNIT SUBSTATION
TRACTION POWER SUBSTATION
SPLIT BUS (NO TIE BREAKER)
BUSTIE IS NORMALLY OPEN
THREE-WAY SWITCH
FOUR-WAY SWITCH
UNDER CONSTRUCTION
LIVE CAPPED
NELSON OIL ISOLATION SWITCH
LOAD BREAK ISOLATION SWITCH
#6 CONTROL HOUSE - FOR JET GENERATOR
/ N.O. NORMALLY OPEN LOAD BREAK SWITCH
MBTA / UTILITY MANHOLE
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
POWER DIVISION
PROPOSED CHANGES
M.B.T.A. A.C. CABLES
SPIDER DIAGRAM
UPDATED: PUT ON CAD SEPTEMBER 26,1995
This drawing supersedes original "Spider" drawing plan No. B-15814N Issue AD - A.C. CABLES 60 CYCLES only. AS OF NOVEMBER 3, 1995.
Issue "U" 2-15-13, updated USS B2, B12. NStar cables at TPS 42, 41, 24
DES. BY
DR. BY
CHK. BY
DATE FIRST ISSUED
9/28/1995
APPROVALS
ENGINEER
SUPERNT. POWER SYSTEMS & EQUIP.
Power Division Engineer
SCALE NONE
POWER SYSTEMS and EQUIPMENT
PLAN NO. CAD-950001
ISSUE U
File:H:\T&D\ACAD_FIL\INDEXDWG\ _SPIDER
File: P:\COMMON\ACAD_FIL\SPIDERS\ISSUE_U.DWG

MBTA TOTAL SYSTEM HOURLY LOAD



Draft

CLIMATE ACTION PLAN

50% reduction in emissions vs. 2009 baseline by 2030

Net Zero by 2050

No onsite fossil fuel combustion for new facilities

Electrify Everything

ENERGY SAVINGS GOALS

1. Ongoing station lighting upgrades with accessibility improvements
2. Replace tunnel lighting T12s with LEDs
3. Eliminate #2 heating oil and steam heating systems
4. Upgrade existing HVAC and install Energy Recovery Systems
5. Complete track switch and third rail heater equipment upgrades
6. Audits of existing windows and upgrade installation

ENERGY CONSERVATION: CURRENT PROJECTS

- Electrification of Everett Maintenance Facilities
- Charlestown Steam Trap Audit & Repairs
- Charlestown Steam Boiler Replacement
- Building 2 & 3 Envelope and Lighting Upgrades

SUSTAINABLE DESIGN

- Wollaston Station
- Hingham Intermodal
- Government Center Station
- Green Line Extension
  - Vehicle Maintenance Facility

SUSTAINABLE DESIGN – FUTURE STATE

All BEB Garages will be designed to Envision and LEED standards

Sustainable design standards in place for all future construction

CLIMATE ACTION PLAN

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Electrify Everything

CLEAN ENERGY

- Renewable Energy Credits
  - Since 1/1/21 the MBTA has offset 100% of its electricity
  - Class 2 RECs from Maine Hydro
- Wind Turbines
  - 150kW Kingston Turbine
  - 750kW Bridgewater Turbine
  - >1.5M kWh total annual output
  - $150,000+ cost savings
- Solar
  - 100kW Orient Heights Station
  - Parking lot Solar Canopy Air Rights

CLEAN ENERGY – FUTURE

- Quincy Battery Electric Bus Solar
  - Incorporating Renewable into future buildings
- Seeking Better mix of RECS in upcoming contract
- Long term perusing Off Shore Wind supply
  - Direct connection to K St

CLIMATE ACTION PLAN

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Net Zero by 2050

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Electrify Everything

CLEAN VEHICLE EFFORTS

- 30 EV Charging Station
- Hydrogen Bus Pilot
- >500 Diesel Electric Hybrids
- Regenerative breaking Ultra-capacitors
- Electric Bus Feasibility Study

CLEAN VEHICLE EFFORTS -FUTURE

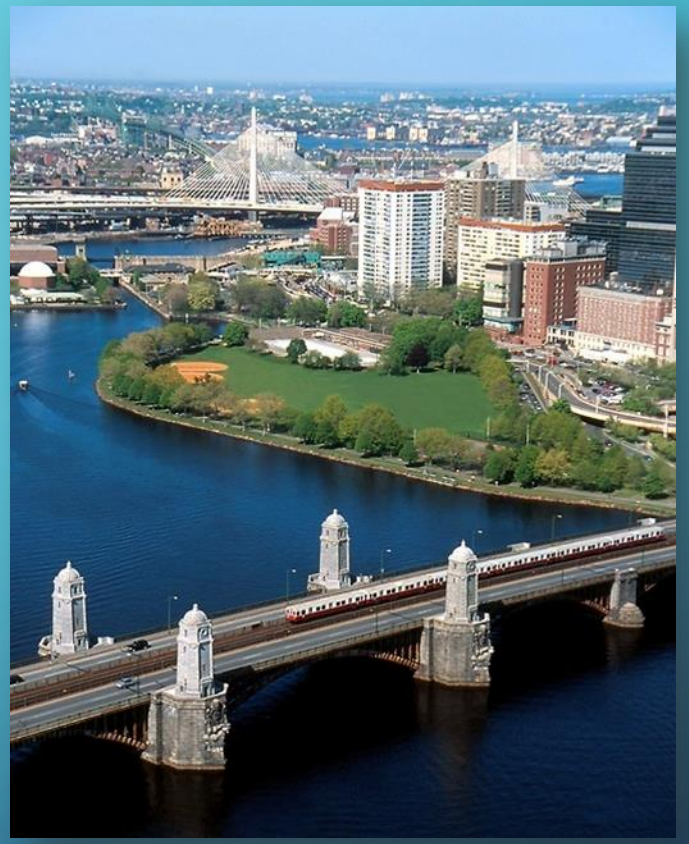
Converting all Buses to Battery

Installing EVSE for Non-revenue Vehicles

Long term goal of converting Commuter Rail

Adding Public EVSE on South Coast Rail

QUESTIONS?

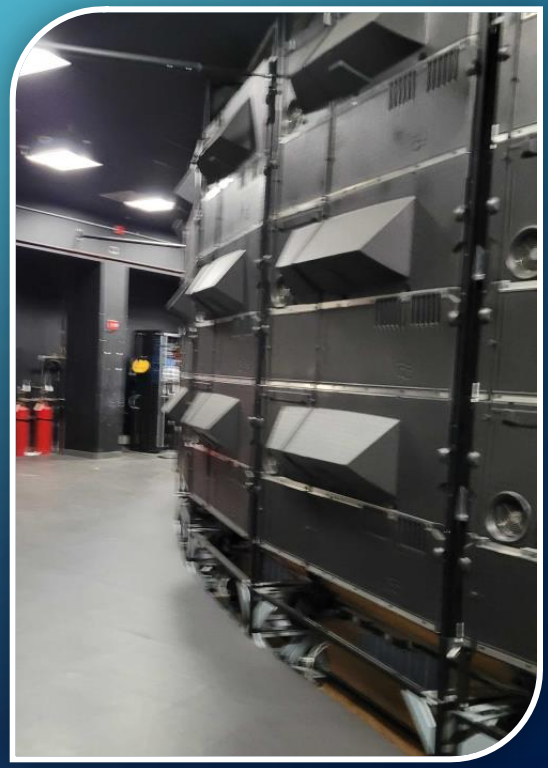


ENERGY SAVINGS OPPORTUNITIES

Lighting	BMS	HVAC	Envelope	Other Equipment
Facility	HVAC + Process Controls	#2 Heating Oil Replacement	Roof and Wall Insulation	Rectifier Transformers
Tunnel	Lighting Controls	Heat Pumps	Window Replacement	Track Heaters
Exterior		Energy Recovery	High Bay Doors	Escalators
		Efficient Design		

LIGHTING

HVAC DESIGN



ENVELOPE IMPROVEMENTS

OTHER EQUIPMENT

It’s No Mow May!

- Support early-season pollinators by allowing your lawns to grow and flowers to bloom for the month!
- Skipping a weekly mow on 1-acre of lawn can avoid ~175lbs of CO_2 from being emitted per month*
- Several state sites already maintain limited mow zones, including:
  - DCR
  - MassDOT
  - UMass Amherst
  - Department of Correction
  - Massasoit Community College

*Based on LBE Lawn to Pollinator Habitat Calculator

Climate Change Making Things…Bumpier

- Since satellites began observations in 1979, the amount of wind shear has grown by 15% in the jet stream, leading to more ‘clear air’ turbulence
- Climate models suggest clear-air turbulence in parts of Northern Hemisphere could triple in the next 30-60 years depending on future GHG emissions

Source: NPR

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News and Updates: Massachusetts

Grid Modernization Advisory Council (GMAC)

- Pursuant to An Act Driving Clean Energy and Offshore Wind, GMAC is tasked with ensuring the grid is ready to meet our electrification needs as we decarbonize buildings and vehicles
- GMAC will review and provide recommendations on electric-sector modernization plans each electric distribution company is developing. These plans will include:
  - A summary of distribution system investments and alternatives
  - Distribution system improvements to increase resiliency and facilitate transportation/building electrification
  - Forecasts considering 5- and 10-year horizons and demand through 2050
- GMAC members include leadership and representation from DOER, AG, MassCEC, advocacy groups, community-based organizations, renewable energy and EV industry, and other industry stakeholders

Find more information, including notices on upcoming public meetings, on the GMAC website

Interagency Offshore Wind Council

- Includes representatives from DOER, MassCEC, CZM, DMF, MassDEP, DPU, and others
- Will formalize communication, alignment, collaboration, and joint execution between agencies to advance offshore wind efforts
- Responsible for developing and maintaining an Offshore Wind (OSW) Strategic Plan that will aim to:
  - Develop strategies to meet emission reduction targets and mitigate environmental impacts
  - Strengthen the supply chain and promote workforce development
  - Ensure the inclusion of communities in strategic development
  - Identify opportunities for DEI and accessibility as the OSW industry grows

Source: Mass.gov

Draft RFP Released for up to 3,600 MW of Offshore Wind

- The RFP represents largest ever solicitation in New England

  >25% of the state's annual electricity demand

- Procurement team can evaluate bids ranging from 400 MW to 2,400 MW in size
- RFP will allow DOER to consider in its evaluation direct and indirect costs and benefits, environmental and socioeconomic impacts from siting, and DEI plans
- DPU will review the RFP, invite public comments, and issue an order with any necessary changes before final RFP is issued
- Under draft RFP, proposals would be due January 31, 2024

Source: Mass.gov

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Massachusetts Department of Energy Resources

Offshore Wind Development Snapshot

	Project	Developer	Size	Current Status	Expected operational date
Round 1	Vineyard Wind 1	Copenhagen Infrastructure Partners, Avangrid	800 MW	Under construction	2023/2024
Round 2	SouthCoast Wind *(formerly Mayflower Wind)*	Shell, Oceans Wind	800 MW	Project review and permitting	2027
Round 3	Commonwealth Wind	Avangrid	1,200 MW	Contract Approved, Under Appeal	Before 2030
	SouthCoast Wind	Shell, Oceans Wind	400 MW	Project review and permitting	Before 2030
Round 4	TBD		Up to 3,600 MW**	Draft RFP under review	*Draft RFP requires before 2032*

Total offshore wind procurement authority: 5,600 MW

***The new Draft RFP seeks to procure at least 400 MW and up to the maximum amount remaining of the statutory requirement of 5,600 MW of offshore wind energy generation under Section 83C, taking into account offshore wind energy generation under contract at the time when proposals are due, in any event not to exceed 3,600 MW.*

Hydro-Quebec Project May Proceed

- On April 20th, a jury ruled that construction on transmission line from Quebec to Maine can proceed given that substantial construction had been completed before the Maine Voter Referendum
- The new transmission line would supply up to 1,200 MW to the New England grid, between 2%-10% of the region's energy consumption
- Hydro-Quebec will supply Massachusetts with most of this project's electricity under a 20-year agreement, which will help the state achieve its GHG reduction goals

Sources: Boston Globe; WCVB

Northeast Hydrogen Hub Update

- In April, MA, NY, CT, NJ, RI, and ME submitted a joint application to the U.S. DOE to compete for $8 billion in funding for the creation of regional clean hydrogen hubs
- Announcement of the awards is anticipated in September or October

Source: WWLP

Vehicle-to-Grid (V2G) Buses: Beverly Public Schools

- BPS operates 4 electric buses that use bidirectional chargers, allowing them to send energy to the grid during peaks
- Using two of these buses, the City sold 7 MWh back to the grid last summer… enough to power 200 homes for a day

If all 9,000 Massachusetts school buses were electric, National Grid estimates they could potentially contribute 450MW during peak times, equivalent to powering 375,000 homes!

Source: NPR

Regional Transit Authority (RTA) Bus Electrification

- As part of the $75 million Volkswagen settlement, MassDEP has allocated $26.8 million to the Cape Ann, Cape Cod, Montachusett, and Southeastern RTAs for bus electrification
- In 2019, MassDEP spent $22 million of settlement funds on electrifying the Pioneer Valley, Martha's Vineyard, and Greater Attleboro Taunton RTAs

LBE grants supporting RTA efforts across the state:
- Pioneer Valley: 1 MW solar + 530 kW storage
- Montachusett: Electrification study
- Cape Cod: 360 kW solar canopy + EVSE

Source: State House News

Massachusetts Department of Energy Resources

News and Updates: National

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Massachusetts Department of Energy Resources

New Proposed EPA Tailpipe Emissions Standards

- Proposed emissions standards for light-, medium-, and heavy-duty vehicles would effectively require approximately
  - 65% of all passenger car sales to be electric by 2032
  - 50% of buses and 25% of long-haul tractor trailers to be electric by 2032
- Automakers are already making the “shift” to EVs, e.g.
  - Ford sold 61,575 EVs last year, aims to build 600,000 per year by the end of 2023
  - GM sold 39,096 EVs last year, plans to build a million per year by 2025

Source: NPR

New York State Bans Gas in New Buildings

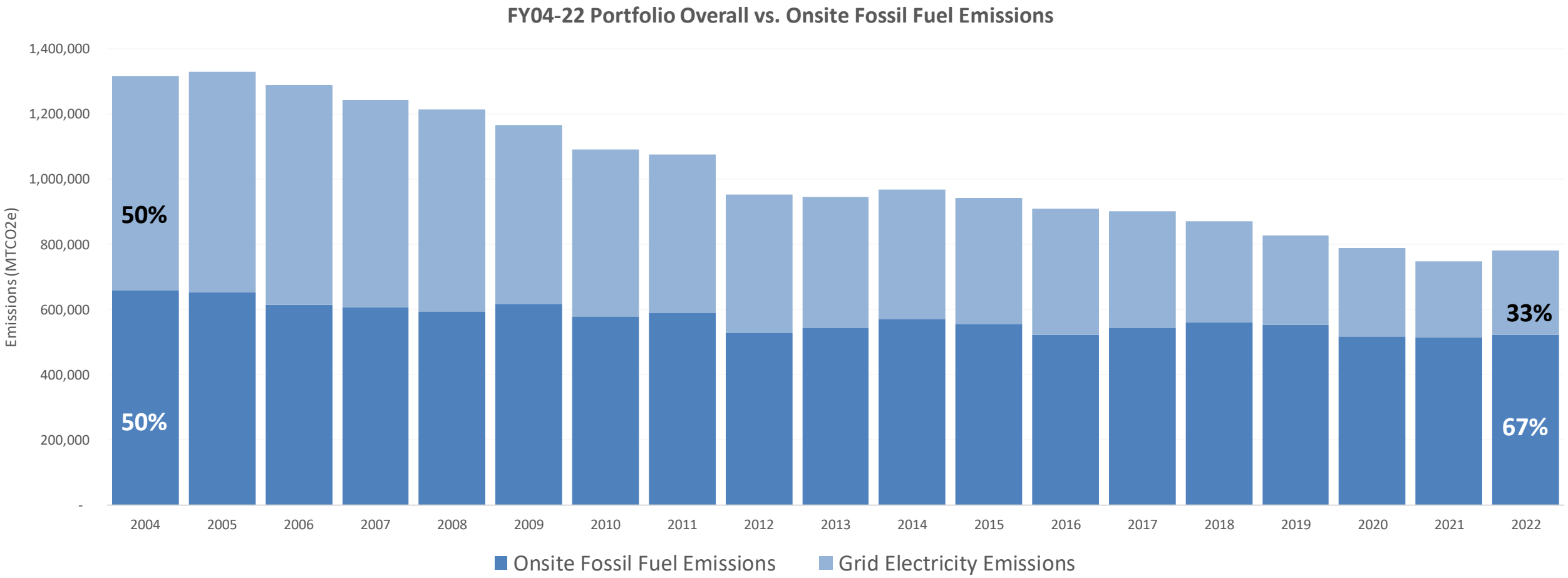
- Will prohibit fossil fuel hookups in most new construction
  - Applies to new buildings shorter than seven stories by 2026, and in 2029 for taller buildings
  - Exemptions may be made for renovations, manufacturing, restaurants, and hospitals

Source: Washington Post

Massachusetts Department of Energy Resources

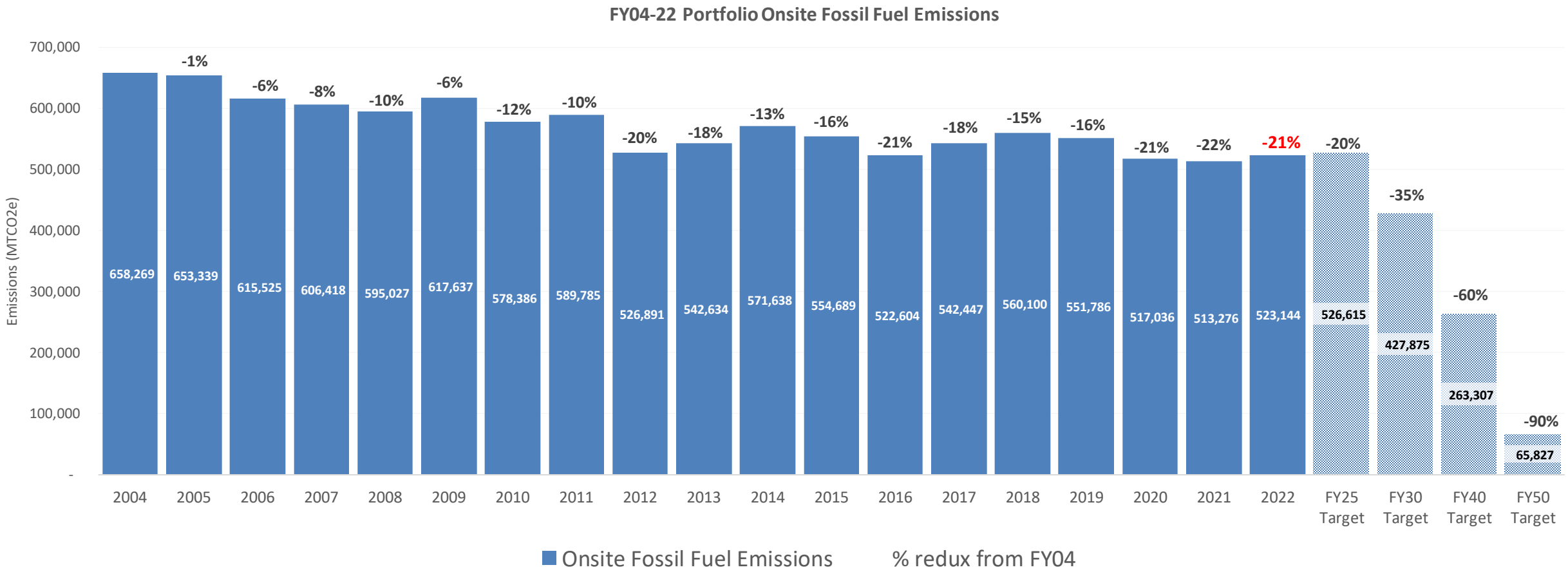
LBE Portfolio Progress: FY22

Grid Electricity vs. Onsite Fossil Fuel Emissions



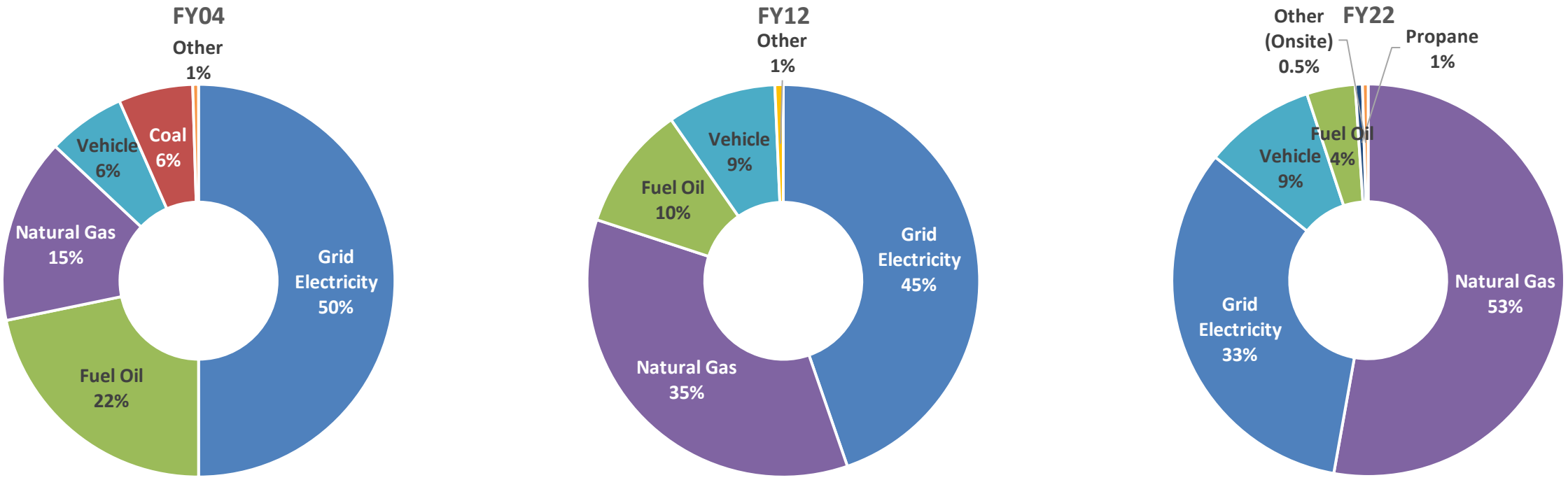
- While overall emissions have decreased from about 1.3 million MTCO2e to 780,700, the vast majority of those reductions have occurred in the electricity sector
- As of FY22, onsite fossil fuel emissions have increased as a share of total GHG emissions from 50% to 67%

Portfolio Onsite Fossil Fuel Emissions



- As of FY22, onsite fossil fuel emissions have decreased by 21% from the FY04 baseline
- As of FY22, the portfolio has met the FY25 target of at least a 20% reduction in onsite fossil fuel emissions
- To reach the FY30 target, emissions must decrease by ~95,300 MTCO2e (18% of current emissions)

GHG Emissions Contributions by Fuel

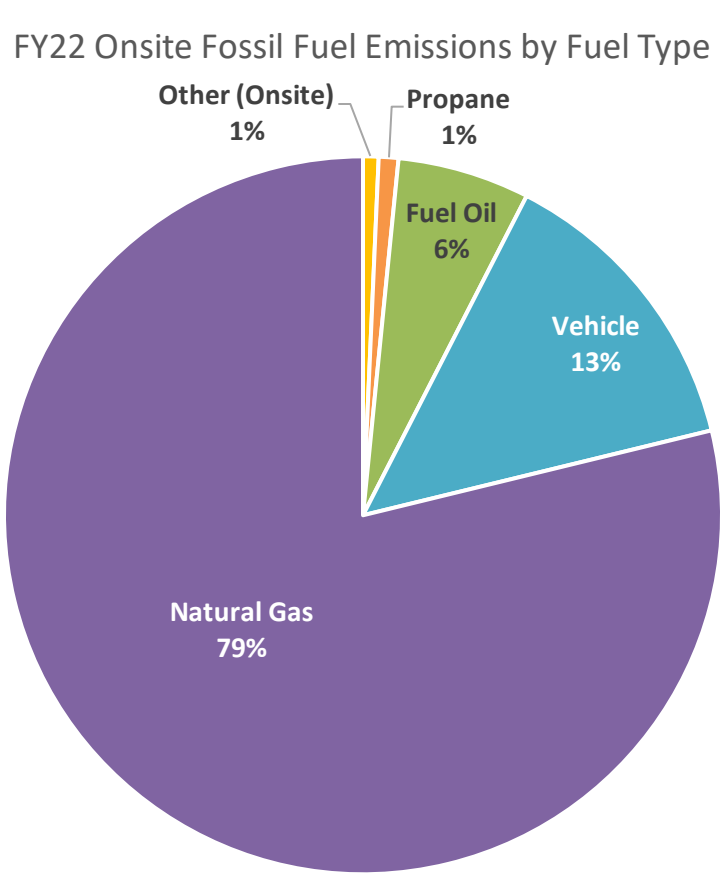


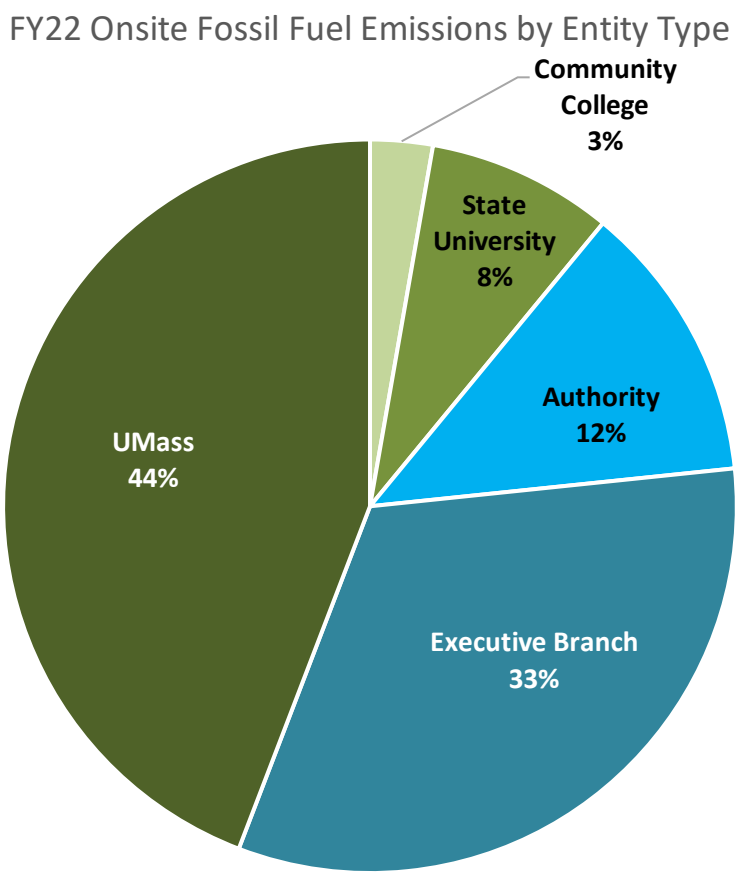
Note: "Other" includes propane & steam; steam is no longer used in portfolio as of end of FY21

From FY04 to FY22:

- Natural gas emissions as a share of the total emissions have more than tripled
- Share of total emissions from grid electricity and fuel oil have declined
- Contribution from vehicle fuel emissions have remained relatively constant

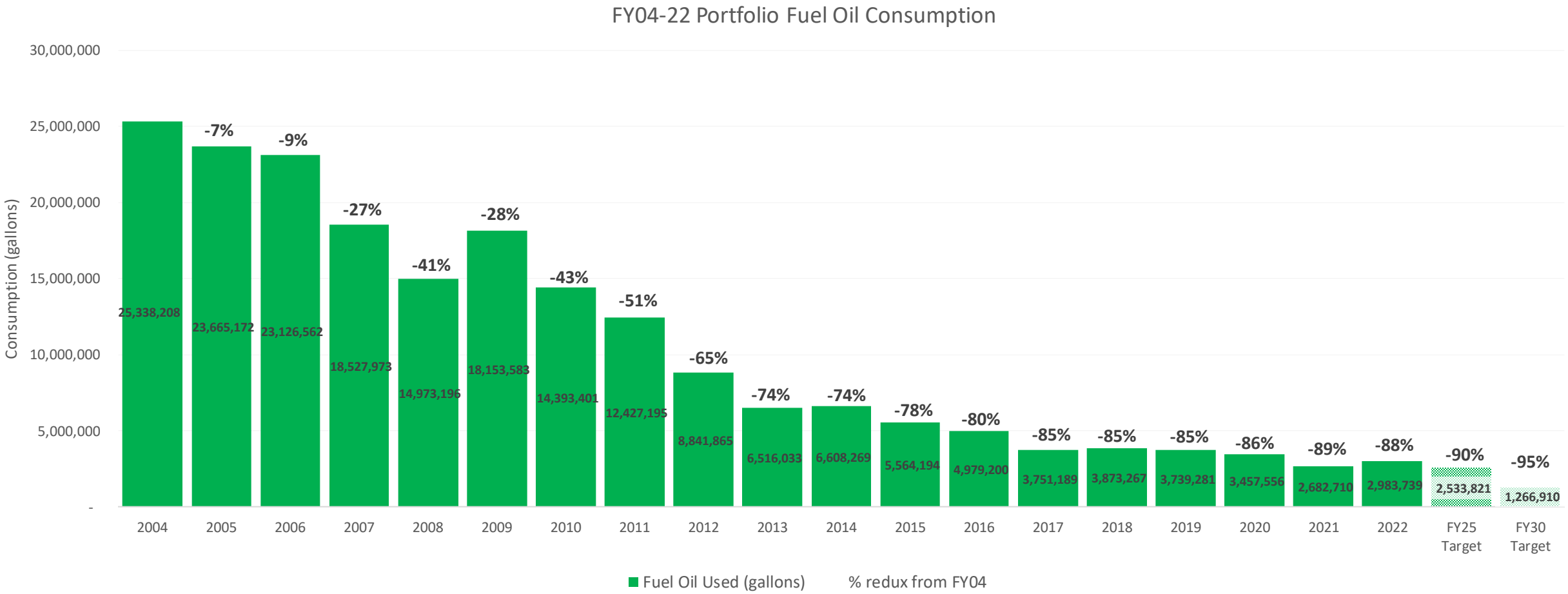
Onsite Fossil Emissions FY22





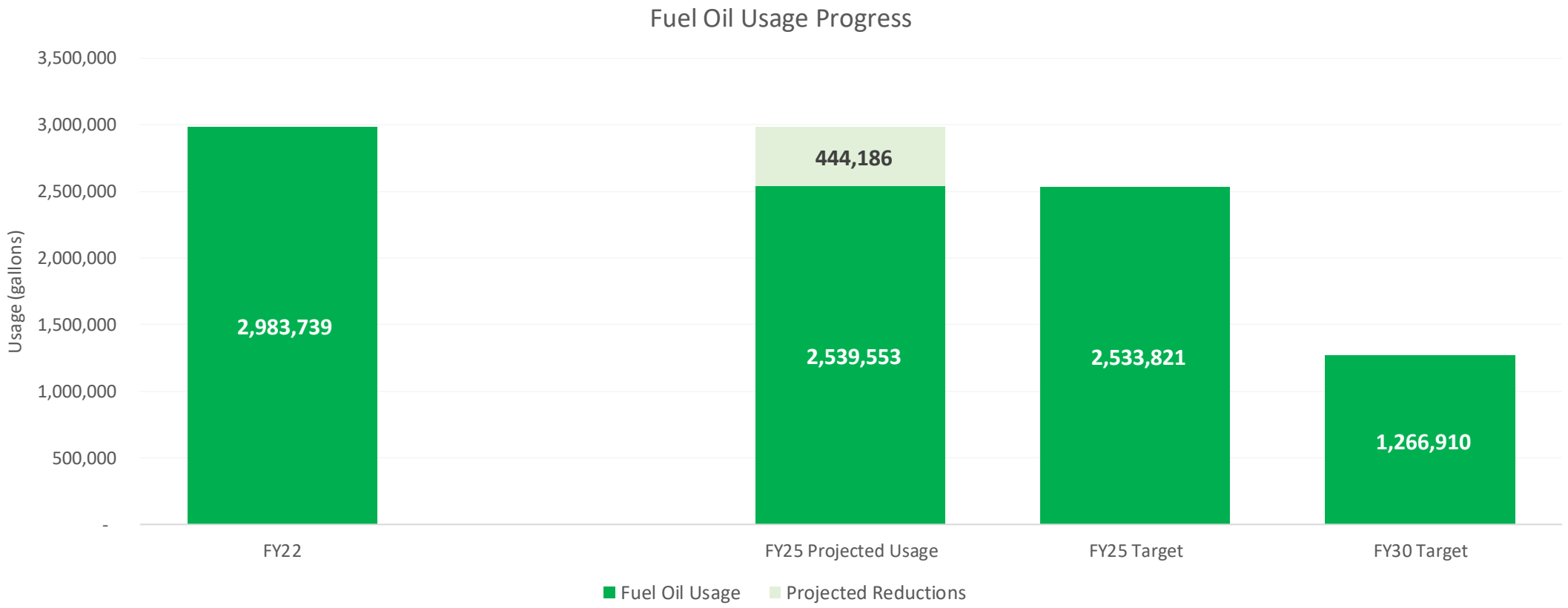
- As of FY22, natural gas emissions represent the majority (79%) of portfolio onsite fossil fuel emissions
- The executive branch agencies and the UMass system account for 77% of onsite fossil fuel emissions

Portfolio Fuel Oil Consumption



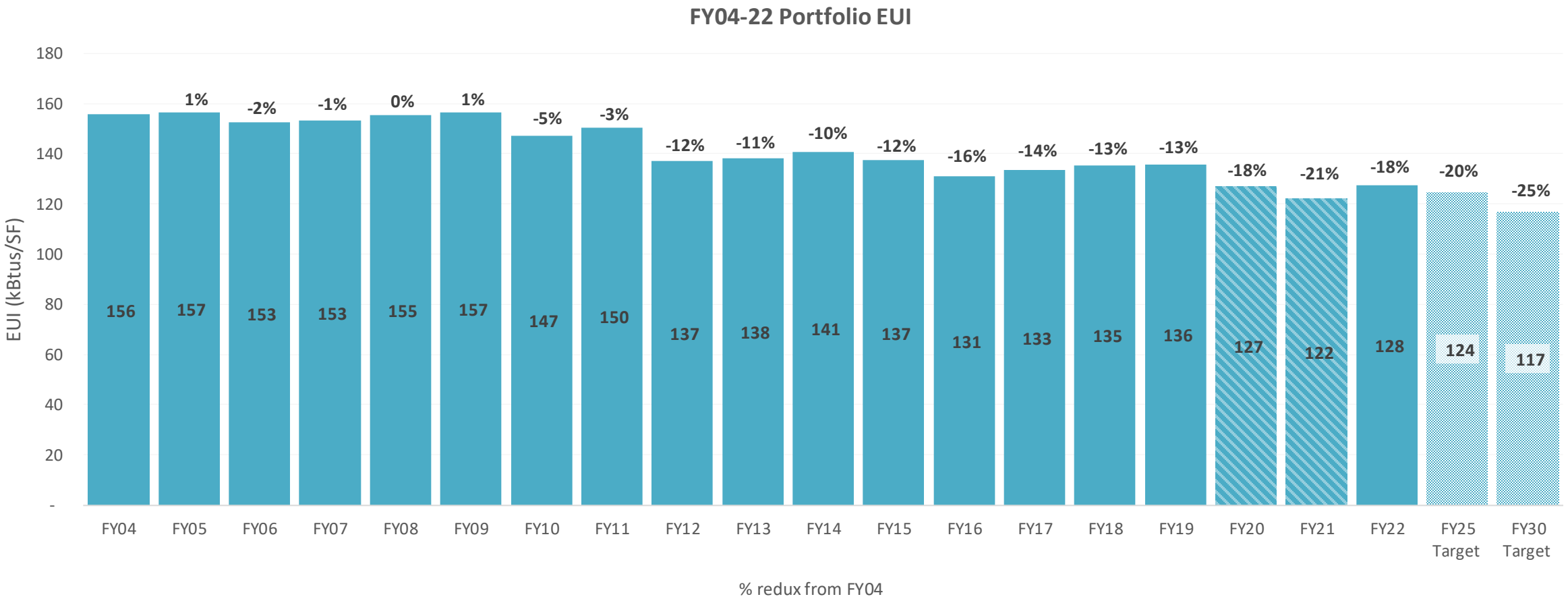
- As of FY22, state portfolio fuel oil usage has decreased by 88% from the FY04 baseline
- To meet the FY25 reduction target, fuel oil usage must decrease by ~450,000 gallons (15% of current usage)
- To meet the FY30 target, fuel oil usage must decrease by ~1.7 million gallons (58% of current usage)

Projected Fuel Oil Use Progress

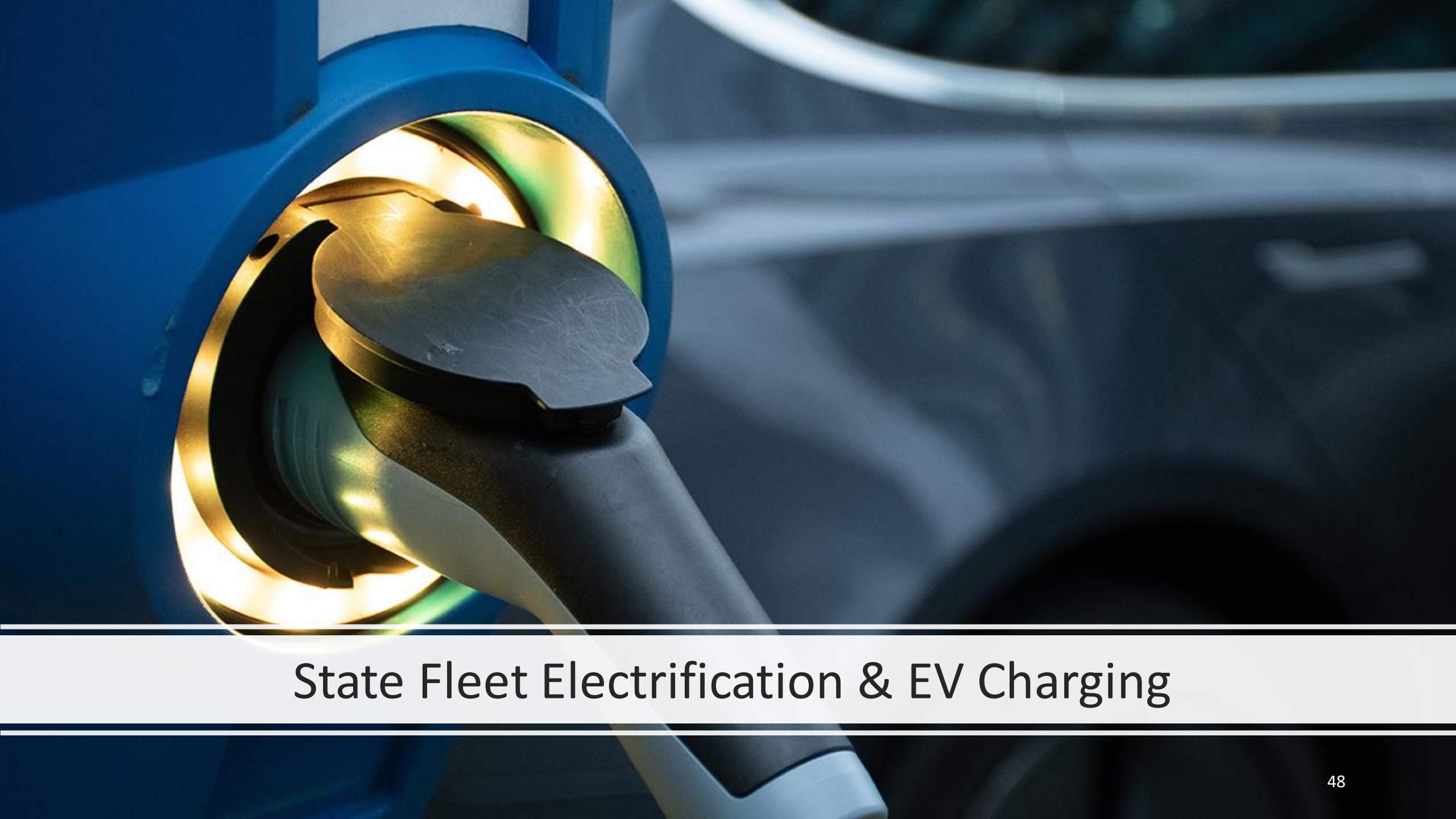


- Planned oil reduction projects including elimination of oil use at agency sites and installation of heat pumps are projected to reduce fuel oil usage by about 450,000 gallons by FY25

Portfolio Energy Use Intensity

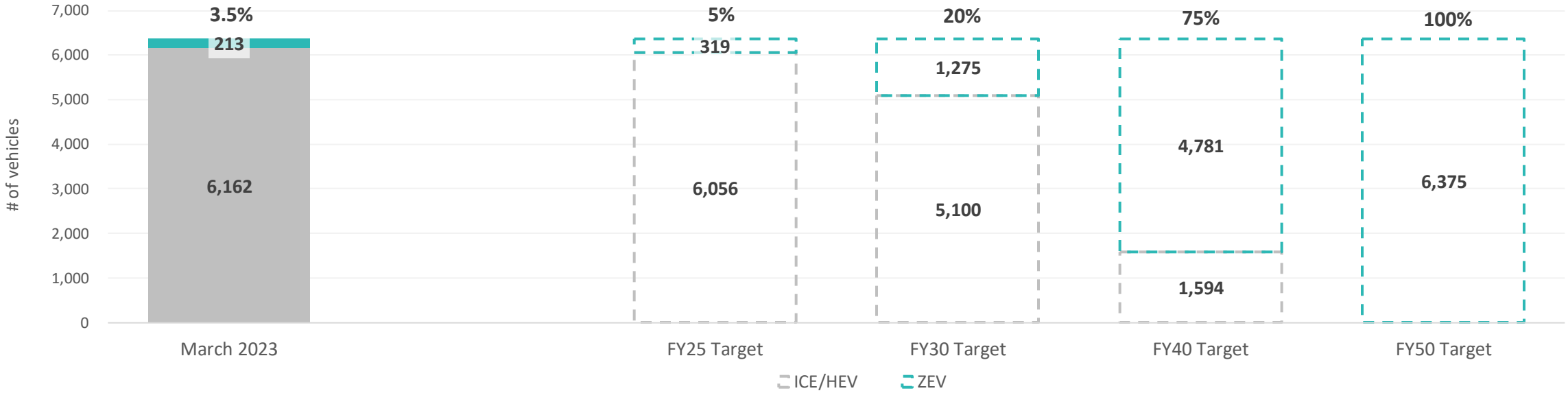


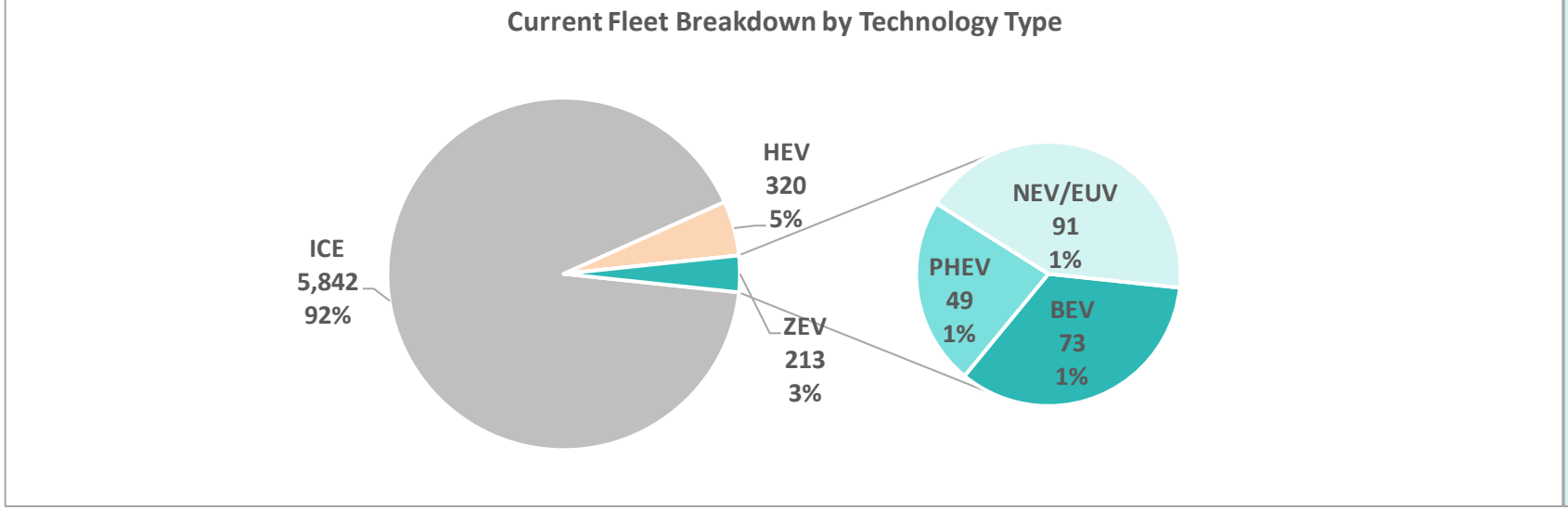
- In FY22, portfolio EUI was about 128, representing an 18% decrease from the FY04 baseline
- Note: FY20/FY21 EUI progress includes impacts derived, in part, from COVID-19 related closures and operational changes



State Fleet Electrification & EV Charging

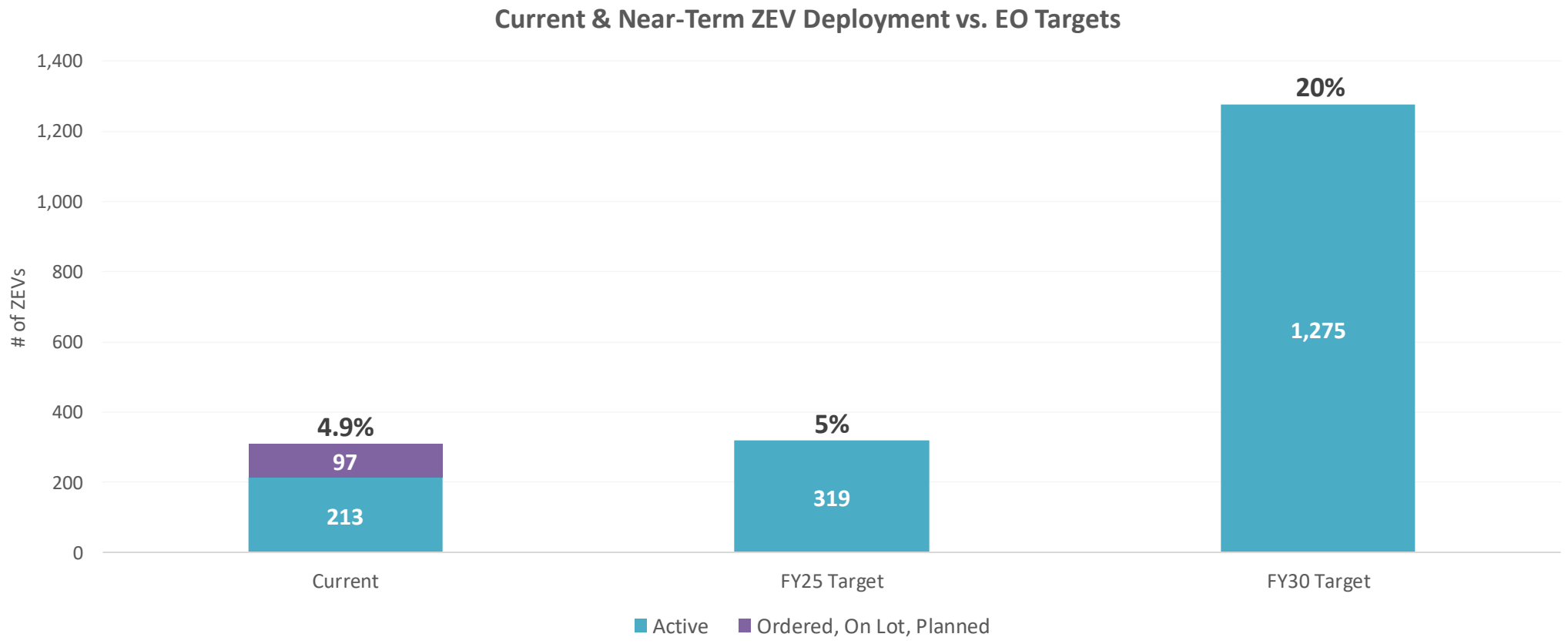
Fleet Electrification





- Currently, 213 electric vehicles in the state fleet, representing **3.5% of fleet**
- To meet FY25 target, fleet **needs to add 106 EVs**

Projected Near-term ZEV Deployment



- In addition to the 213 ZEVs currently in the state fleet, OVM has ordered or plans to order another 97 EVs over the next few years
- Additionally, many state entities have indicated plans to acquire EVs in FY23 (and beyond)

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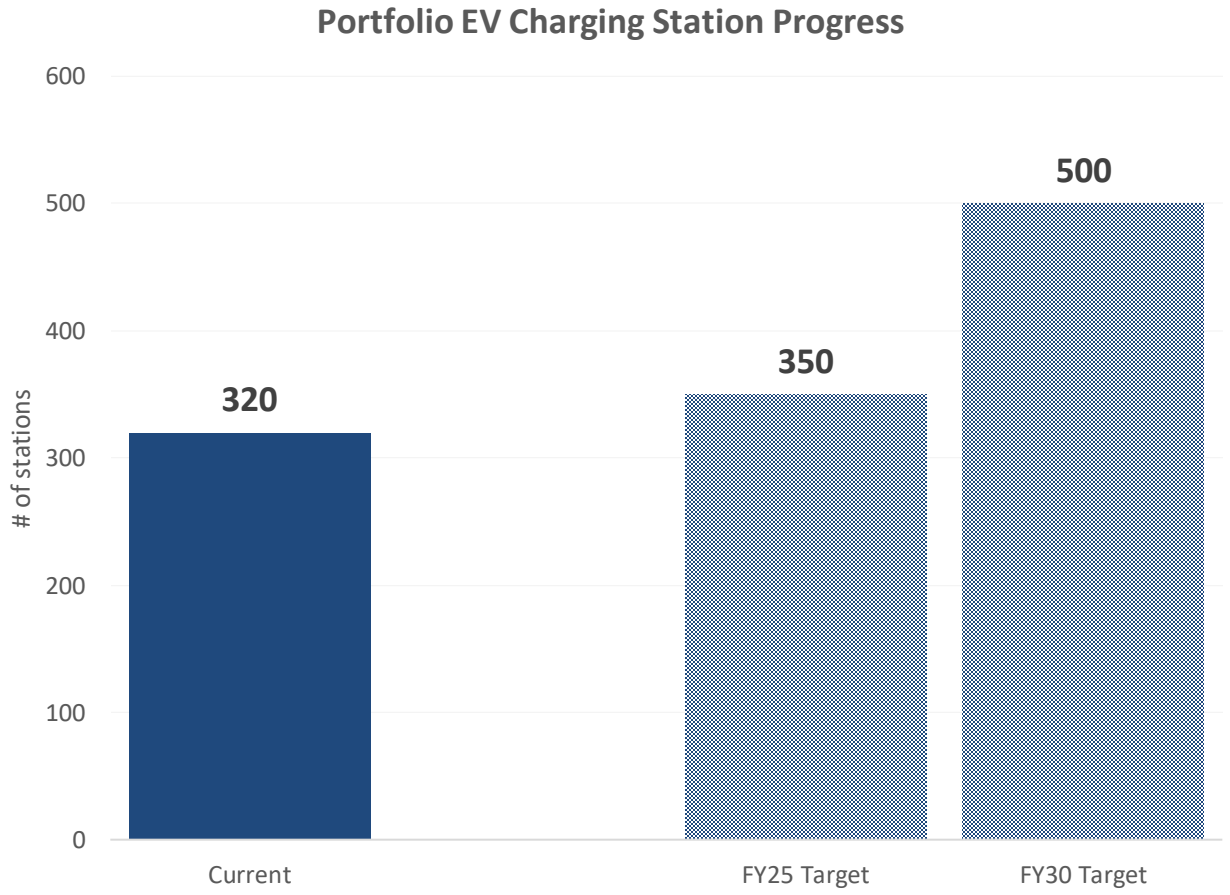
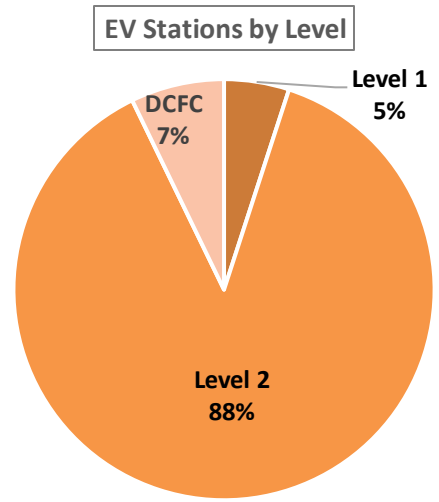
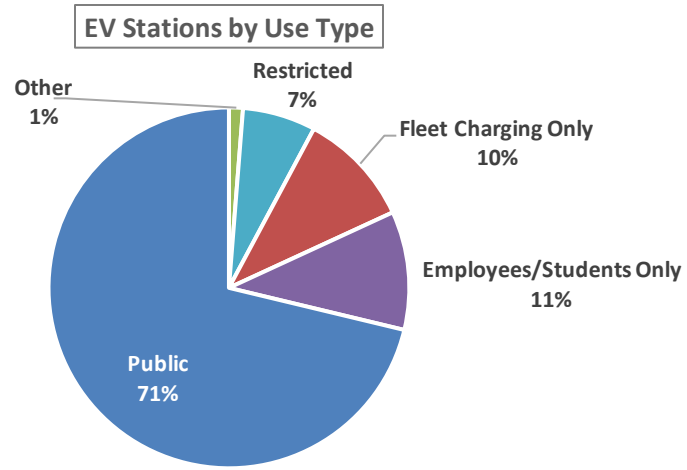
EV Charging







- Currently 320 active & installed EV charging stations (538 ports) in the state portfolio
- Majority of these stations are both Level 2 and for public use (62%)
- Additional 101 stations (188 ports) planned & in progress

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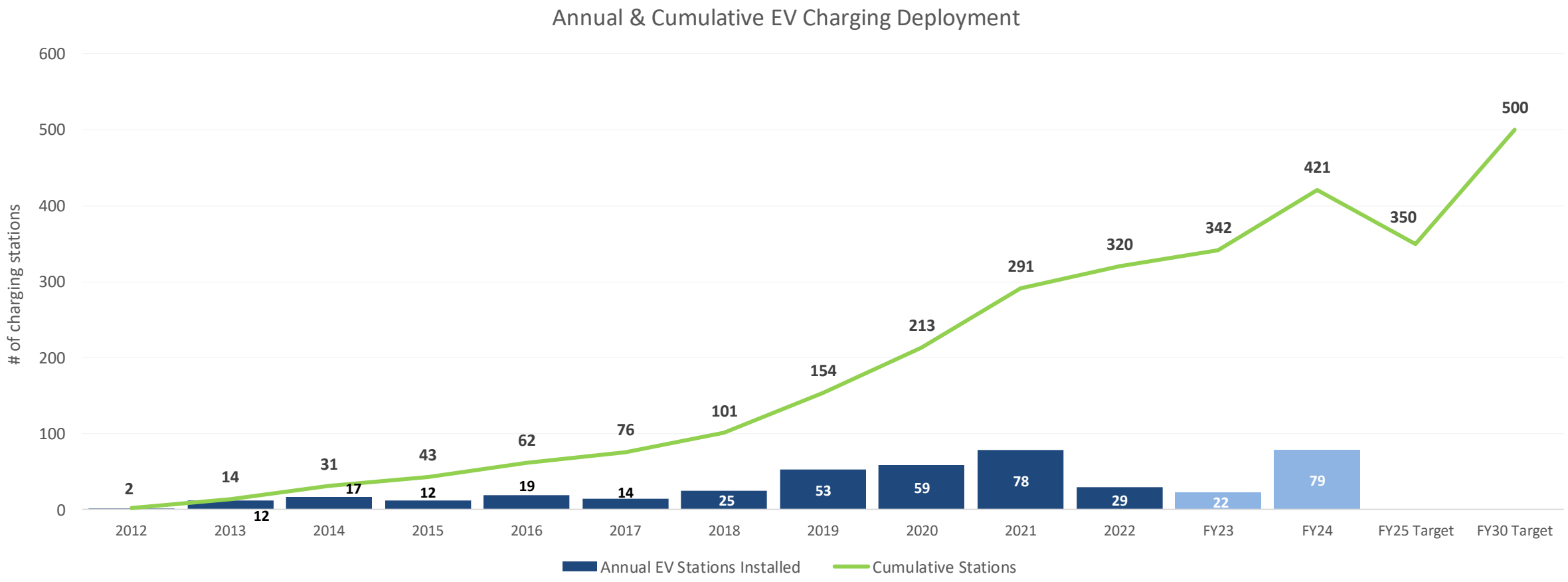
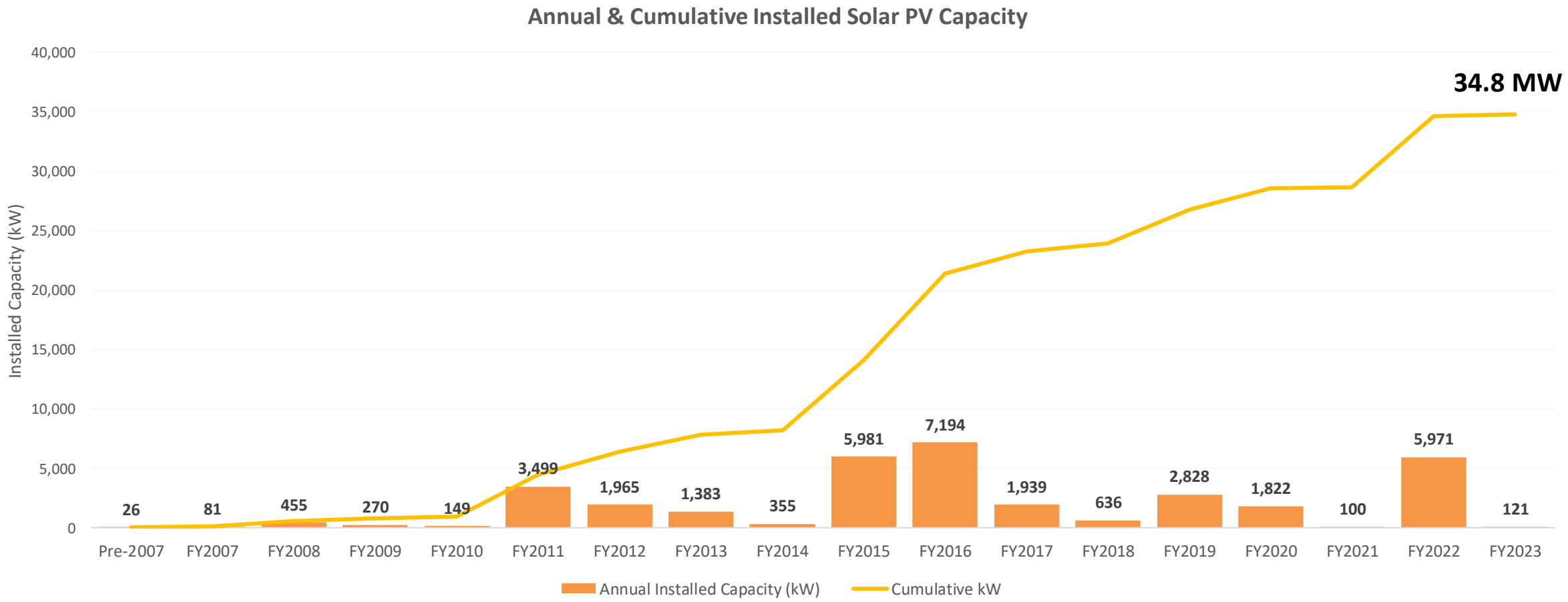
Near-Term EV Charging Station Deployment



- Installation of the additional 101 stations currently planned & in progress at state sites would bring total to 421 stations over next couple of years

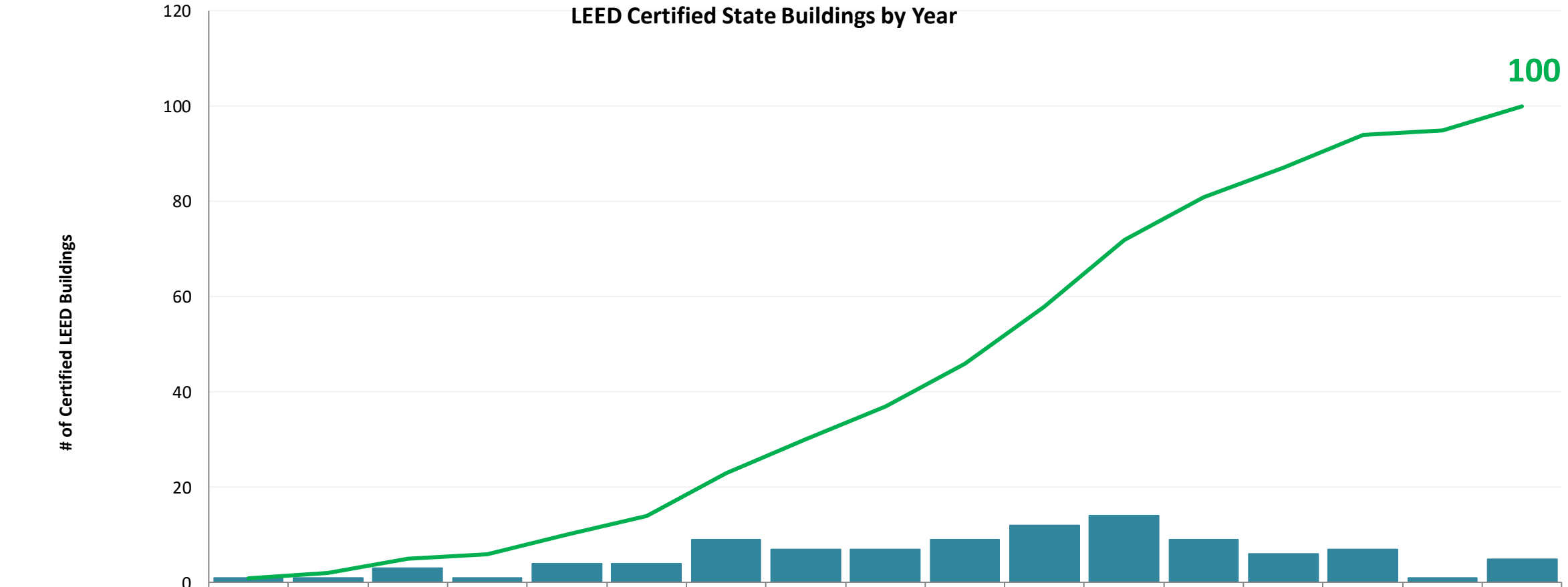
Additional State Sustainability Efforts

Portfolio Solar Progress



- Currently over 34 MW of solar PV installed at state sites
- Solar canopy installations account for majority (57%) of solar capacity, compared to roof- & ground-mounted systems (43%)

LEED Building Portfolio



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
# Certified by Year	1	1	3	1	4	4	9	7	7	9	12	14	9	6	7	1	5
Cumulative Certified	1	2	5	6	10	14	23	30	37	46	58	72	81	87	94	95	100

- Majority (63%) of LEED buildings are Platinum or Gold certified

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Meeting Spotlight:

Preparing for the Next Phase of Zero-Emission Transportation

Electric Vehicle (EV) Policy Landscape and Opportunities

Commonwealth of Massachusetts

Daniel Gatti, Director of Clean Transportation Policy, EEA

May 9, 2023

Significant EV Policy Developments

- November 2021: Congress passes the Infrastructure Investment and Jobs Act (IIJA), which provides billions in funding for EV-related initiatives
- June 2022: EEA releases Clean Energy and Climate Plan for 2025/2030 calling for 200,000 EVs on the road by 2025 and over 900,000 EVs by 2030
- August 2022: Gov. Baker signs *An Act Driving Clean Energy and Offshore Wind* and *An Act Relative to Massachusetts's Transportation Resources and Climate* which make a number of changes to EV incentive programs and provided funding authorization for EV infrastructure
- August 2022: Congress passes Inflation Reduction Act, extending federal EV tax credit and making a number of changes to encourage point of sale incentives and domestic manufacturing
- August-September 2022: MassDOT submits National EV Infrastructure Plan (NEVI) to USDOT, opening up $63M in federal funds for EV infrastructure along highway corridors in Massachusetts
- December 2022: EEA releases Clean Energy and Climate Plan for 2050.
- December 2022: DPU authorizes $400M in utility make-ready electric vehicle infrastructure programs.

Transportation Sector in CECP

	2025/2030 CECP	2050 CECP
Policy Portfolio	• Implementation of vehicle emission standards • Promote alternatives to personal vehicles (MBTA Communities, MBTA Bus Modernization program, multimodal infrastructure, new ebike incentive). • Improve electric vehicle incentives by making incentives available at point of sale, adding targeted incentives for low income drivers. • Build charging infrastructure through investments and changes in rate structures. • Electrify markets with critical health and equity implications, including vehicles for hire, school buses, and delivery trucks. • Engage Consumers and Facilitate Markets	Extension of Current Policy: • Implementation of Advanced Clean Cars 2 and Advanced Clean Truck Standards which will require manufacturers to increase the number of zero-emission vehicles on the road. • Build charging infrastructure, including a network of public fast charging stations sufficient to serve the needs of a fully electrified fleet, as well as support for charging at homes and workplaces. • Continue to expand housing production near public transportation stops. • Prioritize multimodal transportation infrastructure. • MassDOT and the MBTA will continue to work to meet the goals for electrification of transit outlined in the Climate Bill and detailed in MBTA Rail Vision. • Expand EV incentives until the upfront cost of electric vehicles reaches upfront cost-parity with internal combustion equivalents. New Policy: • Begin to add additional policy incentives to retire old combustion vehicles. • Require commitment to smart charging as part of all EV incentives by 2031. • Adopt fuels policies to promote clean biofuels and hydrogen in difficult to electrify sectors such as aviation, marine and long-haul trucking.
GHG Emission Sublimit	19.8 $MMTCO_2e$ (34% below 1990) for 2030	4.1 $MMTCO_2e$ (86% below 1990)
Key Targets & Metrics	• 200,000 passenger EVs on the road by 2025; 900,000 by 2030 • 15,000 public charging stations by 2025, 75,000 by 2030	• Essentially all passenger vehicles on the road are electric. • Sufficient public EV charging infrastructure in place.

EVs in the Federal Infrastructure Investment and Jobs Act (IIJA)

- **Overview: IIJA provides billions in funding for EV-related investments**
- $5B in formula funds for National Electric Vehicle Infrastructure Plan
- $2.5B in competitive funds for Charging and Refueling Infrastructure Grant Fund
- $5B for clean or electric school buses
- $13.2B in CMAQ funds with expanded eligibility for micromobility, bikeshare, and electrification of MDHD vehicles
- Additional funding for buses & bus facilities, MDHD electrification near ports, electric or low-emitting ferries, EV supply chain & battery recycling programs

EVs in the Federal Inflation Reduction Act (IRA)

- **Overview: IRA provides for several federal tax credit changes that will impact consumers, dealers, businesses, municipalities and manufacturers**

- Federal Tax Credit changes (Section 30D):
  - Removes per-manufacturer cap and extends EV tax credit for all OEMs through 2032
  - Allows tax exempt entities to claim the tax incentive for the first time
  - New MSRP caps: $55k for sedans, $80k for pickups/SUVs/vans
  - Credit can be transferred to dealership to allow point of purchase incentive
  - Additional domestic manufacturing requirements

- New Commercial EV credit (Section 45W)
  - Commercial EVs will be eligible for tax credits for the first time, until the end of 2032
  - Tax exempt entities can claim the value of the commercial tax credit
  - The eligible credit amount per qualified commercial EV is the lesser of 30% of the sales price or the incremental cost of the vehicle
  - The tax credit is capped at $7,500 for vehicles with a gross vehicle weight rating (GVWR) of less than 14,000 lbs, and capped at $40,000 for vehicles with a GVWR of more than 14,000 lbs
  - There are no battery or mineral sourcing requirements under Section 45W

EVs in the State "An Act Driving Clean Energy and Offshore Wind" and Funding Bills

- **Overview: Various pieces of state legislation codify many of the components of the CECP, establish incentives for implementation of those components, and create funding sources to afford implementation**

- An Act Driving Clean Energy and Offshore Wind
  - Increases MOR-EV rebate to $3,500.
  - Defines zero-emission vehicle to exclude PHEVs.
  - Creates $1,500 low-income incentive.
  - Provides additional incentive for vehicle trade ins.
  - Creates Intergovernmental Coordinating Council to implement EV charging plan
  - DPU must create plan to electrify TNC vehicles.
  - All MBTA bus purchases must be electric by 2030 and all on road buses must be electric by 2040.
  - Requires RTAs to develop EV rollout plans with goals for electrification of buses.

- An Act Relating to Economic Growth and Relief for the Commonwealth
  - Appropriates $50M for EV incentives and $50M for EV infrastructure grants

- Massachusetts Transportation Bond Bill (TRAC)
  - Authorizes $200M in bonding authorization for electric vehicle programs (e-bikes, vehicles for hire, delivery trucks, school buses, etc)

New Utility EV Infrastructure Programs

- Public and Workplace EV Charging program provides 100% of make ready costs for publicly accessible charging stations and between 50% and 100% of charging station costs.
- Fleet EV Infrastructure support covers 100% of make ready costs and 50-100% of charger costs for public fleets.
- Fleet Advisory Services for publicly owned fleets.
- Residential charging program provides 100% of make ready costs for homes and apartment buildings.
- Demand Charge Alternative provides relief from DCFC demand charges for 10 years for low-utilization stations.

Advanced Clean Cars II and Advanced Clean Trucks

Haidee Janak

Massachusetts Department of Environmental Protection
May 9, 2023

Mobile Sources Health Impacts

- Mobile sources are the greatest contributor to emissions of criteria pollutants and greenhouse gases, which pose significant threats to public health and lead to climate change respectively
- Pollutants of concern that contribute to poor air quality include nitrogen oxides (NOx) and particulate matter (PM)
- Public health impacts from on-road vehicle emissions disproportionately affect overburdened and underserved communities and environmental justice (EJ) populations
- Reducing pollutants through electrification can lead to better health outcomes for EJ populations

Federal Clean Air Act (CAA) Provisions

- The United States Environmental Protection Agency (EPA) is required to establish motor vehicle emissions standards
- California was given the ability to set stricter motor vehicle emission standards than EPA
- Section 177 authorizes states to adopt California's motor vehicle emission standards instead of EPA's
  - States that adopt California standards must provide at least 2 model years (MYs) notice to manufacturers

Massachusetts Law and Plans

- Massachusetts is required to adopt California motor vehicle emissions standards as long as those standards achieve greater motor vehicle emissions reductions than federal standards

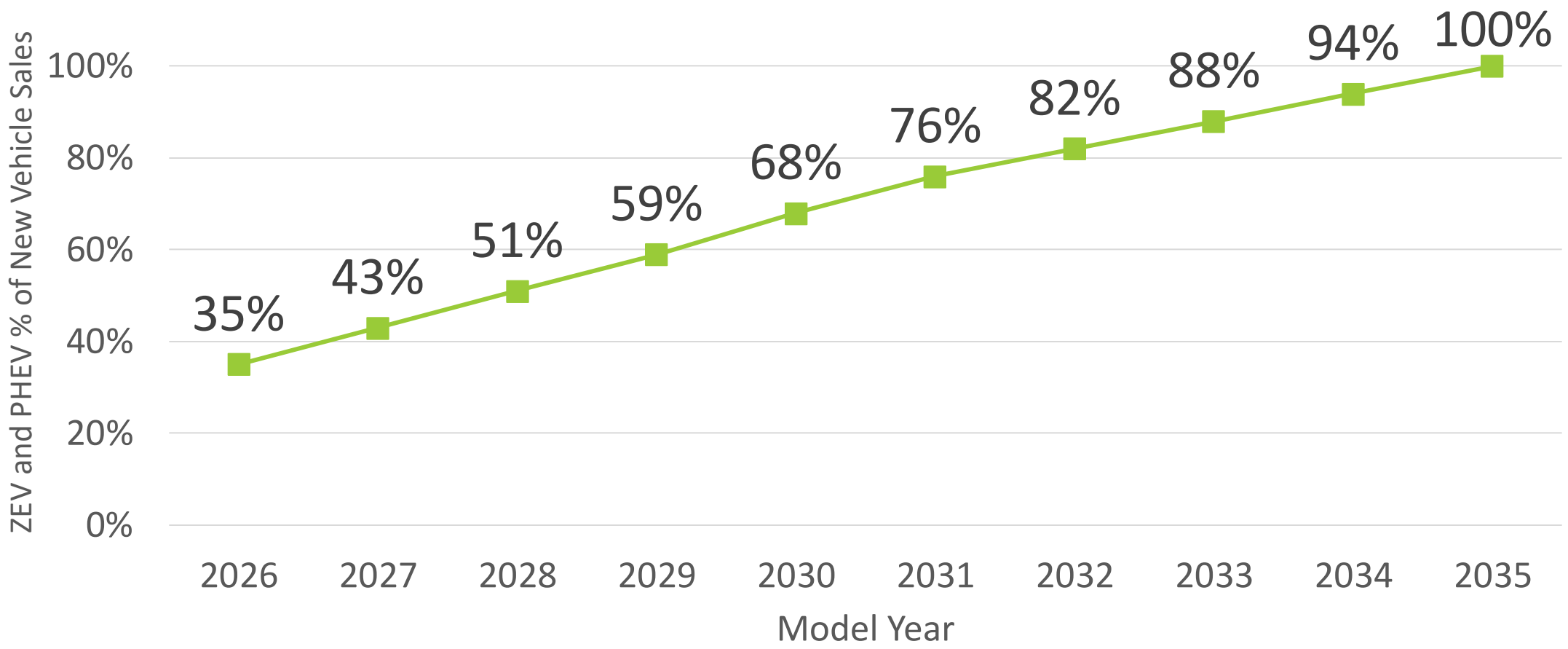
- The *Low Emission Vehicle Program (*310 CMR 7.40) was created to make that happen.

- Massachusetts Climate Plans include adoption of ACC II & ACT
  - *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*
  - *Massachusetts 2050 Decarbonization Roadmap*

ACC II standards

- Adopted in December 2022
- Requirements applicable to Passenger Cars and Light-Duty Trucks for MYs 2026+
- ZEV and plug-in hybrid electric vehicle (PHEV) increasing percentage sales requirement; minimum range (200 ZEV 40 PHEV), battery warranty for minimum 8 years/100k miles, durability requirements; credit for making ZEVs and PHEVs more affordable to EJ communities.

ACC II Annual ZEV Percentage Requirement



Advanced Clean Trucks

- Adopted in December 2021
- ZEVs must be a minimum percentage of annual sales
- Starts MY 2025
- Applies to vehicles greater than 8,500 lbs. gross vehicle weight rating (classes 2b-8)
- Manufacturers with less than 500 annual sales are exempt, but may opt-in to earn credits for selling ZEVs
- Report annually to demonstrate compliance

Vehicle Groupings Used in ACT

Class 2b-3

Class 4-8

Class 7-8 Tractors

MassDEP

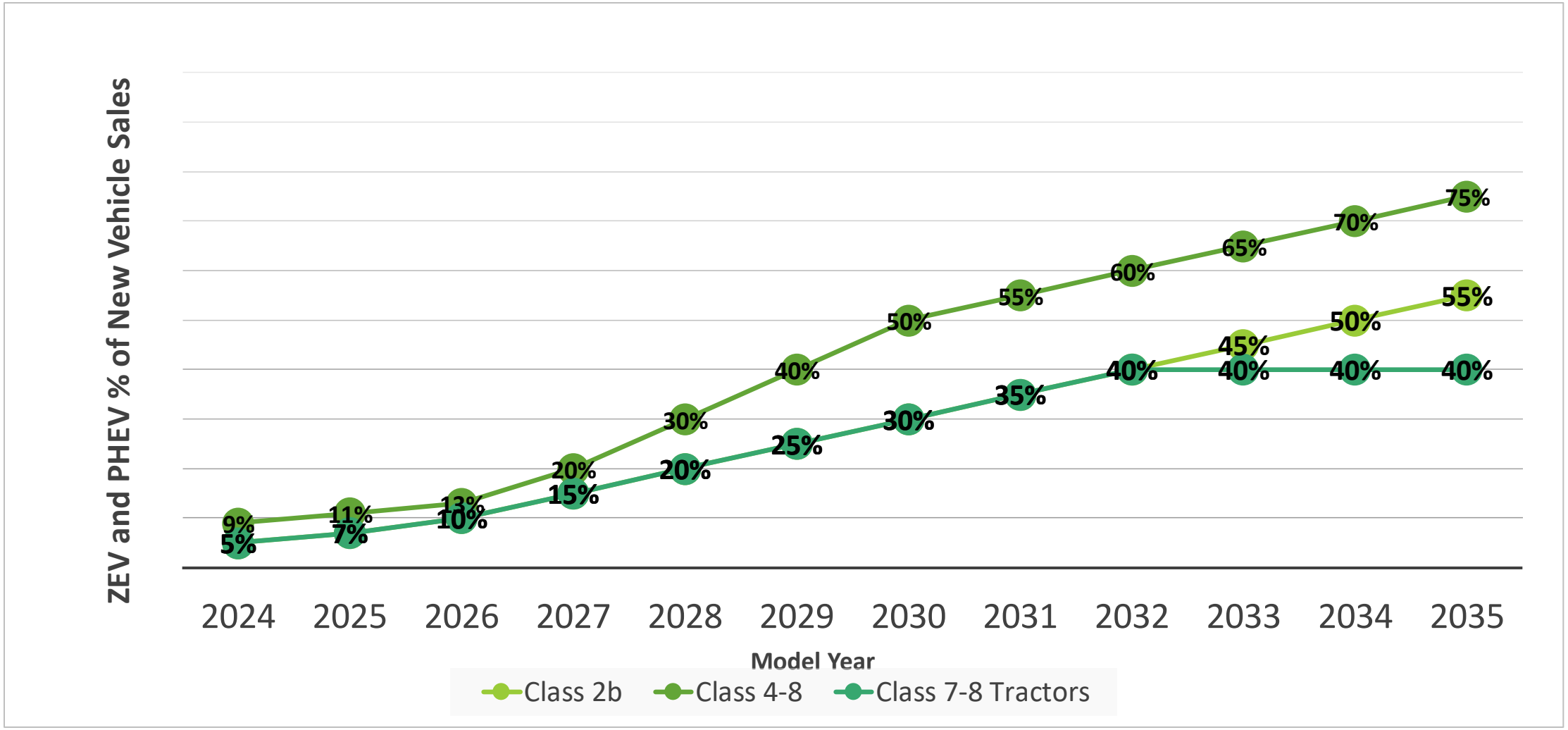
ACT Deficit Generation

- Deficit generation will begin in 2025 MY in MA (to provide required two 2 MY lead time)
- More deficits generated over time due to increasing percentage requirements

Model Year (MY)	Class 2b-3	Class 4-8	Class 7-8 Tractors
2024	5%	9%	5%
2025	7%	11%	7%
2026	10%	13%	10%
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%
2034	50%	70%	40%
2035+	55%	75%	40%

MassDEP

ACT Annual ZEV Percentage Requirement



What These Rules Mean For Us

- Requirements for vehicle makers to place ZEVs and PHEVs in MA means that there will be more of these vehicles available with each new model year.
- More EVs on the road will mean more demand for charging stations, decreasing the fear of running out of electricity mid-shift.
- More vehicles in general will mean more vehicle types available too, and costs should come down.
- For light-duty vehicles, you won't be able to buy a non-EV come 2035.
- Cleaner Air!

Additional Resources and Information

MassDEP Low Emission Vehicle Program Webpage

- https://www.mass.gov/guides/massachusetts-low-emission-vehicle-lev-program

CA Air Resources Board Regulations Webpage

- https://ww2.arb.ca.gov/rulemaking/2022/advanced-clean-cars-ii
- https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks

Massachusetts Department of Energy Resources

Funding Resources for EVs and EVSE

Overview of EV & EVSE Funding Opportunities

Electric Vehicles

Battery electric (BEV), plug-in hybrid (PHEV) and fuel cell electric vehicles (FCEVs).

MassEVIP Fleets

Rebates of up to $7,500 for BEVs and $5,000 for PHEVs.

MOR-EV Trucks

Rebates starting at $7,500 for medium- and heavy-duty BEVs and FCEVs for public fleets.

Coming soon! Direct pay federal tax incentives for public entities

EV Charging

Level 1, Level 2, and DC fast charging (DCFC).

MassEVIP Charging

60-100% of infrastructure and equipment costs for Level 1, Level 2, and DCFC public access and workplace/fleet charging.

LBE Fleet EVSE Deployment Grant

Up to 100% of infrastructure, equipment, and ongoing service costs for primarily Level 1 and Level 2 state fleet charging.

New Mass Save Programs

50-100% of infrastructure and equipment costs for public, workplace, and fleet Level 1, Level 2 and DCFC depending on location.

Electric Vehicle Funding Programs

MassEVIP Fleets (link)

- Rolling grant for municipalities, state agencies, and public higher education campuses
- PHEVs and BEVs with a purchase price $60,000 or less and gross vehicle weight of 10,000 pounds or less
- Vehicle must be retained for 3 years
- Maximum incentives for public fleet vehicle purchases and leases:
  - BEVs = $5,000-$7,500
  - PHEVs = $3,000-$5,000
- Funding must be approved prior to vehicle order

MOR-EV Trucks (link)

- Post-purchase rebate for individuals, corporations, and public entities
- BEVs and FCEVs with a sales price over $50,000 and gross vehicle weight over 8,500 pounds
- Vehicle must be retained for 4 years
- Rebate amounts vary by vehicle weight:
  - Class 2b-3 = $7,500-$15,000
  - Class 4-6 = $30,000-$60,000
  - Class 7-8 = $75,000-$90,000

NOTE: Various MOR-EV program changes coming soon; details to be announced

EV Charging Funding Programs

Charging Type	MassEVIP	LBE Grant	Mass Save
Public Access	✓		✓
Public (State) Fleets	✓	✓	✓
Workplace	✓		✓
Multi-Unit Dwellings (may include educational campuses)	✓		✓

REMINDER! All Level 1 and Level 2 charging stations sold and installed in the Commonwealth must meet the MA Appliance Efficiency Standards

EV Charging Funding Programs

Visit the LBE Clean Transportation page for tools and links to funding sources!

MassEVIP Charging (link)

- Public access grants
  - Up to 100% of equipment and installation costs at government-owned locations
- Workplace and fleet grants
  - At least 15 employees on site (workplace) or where fleet vehicles are garaged
  - Up to 60% of hardware and installation costs
- All programs: limited to $50,000 per street address

LBE Fleet EVSE Deployment Grant (link)

- Executive branch, public higher ed, and MBTA non-revenue fleet charging infrastructure
  - Up to 100% of costs associated with infrastructure and equipment; 3 years of prepaid networking and maintenance services; extended warranties; pre-wiring for future charging
- Maximum $100,000-$150,000 per state entity per fiscal year depending on fleet size

Utility Programs (National Grid; Eversource)

- Public/workplace and fleet charging programs
  - Up to 100% of equipment and infrastructure costs; sites located in certain Environmental Justice Communities eligible for greater cost coverage

NOTE: Certain third-party funding requirements impact how the utility programs interact with other available funding sources like MassEVIP (more info)

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Preparing for the Next Phase

What we know…

The transportation sector (including the state fleet) is expected to rapidly electrify in the coming years

Funding from LBE, MassEVIP, and the utilities are supporting installation of charging stations for public access, workplace, and/or fleets

DCFC is becoming increasingly available for public use, especially along highway corridors

Breakout Group Discussions: What We Don't Know

Given what's already happening, what else do we need to think about to be prepared for the future?

- We are interested in hearing your thoughts on several topics we know we must eventually address:

• Fleet domicile charging infrastructure • DCFC vs. Level 2 vs. Level 1 charging • Networked vs. nonnetworked charging • EVSE in context of master/capital planning	• Ongoing management and maintenance of stations • Fleet vs. public vs. workplace charging • Others?

- In your randomly assigned group, you will:
  1. Discuss the top 2-3 listed topics you would like to address
  2. Identify the key issues or challenges related to those topics
  3. Share any recommendations or thoughts you have on how we can address those challenges
  4. Tell us what you need (e.g., funding, management, guidance, etc.)

Report-Outs

- What were your group's top 2-3 priority areas?
- What are the key issues/challenges with those areas?
- What were 2-3 recommendations or needs identified by the group?

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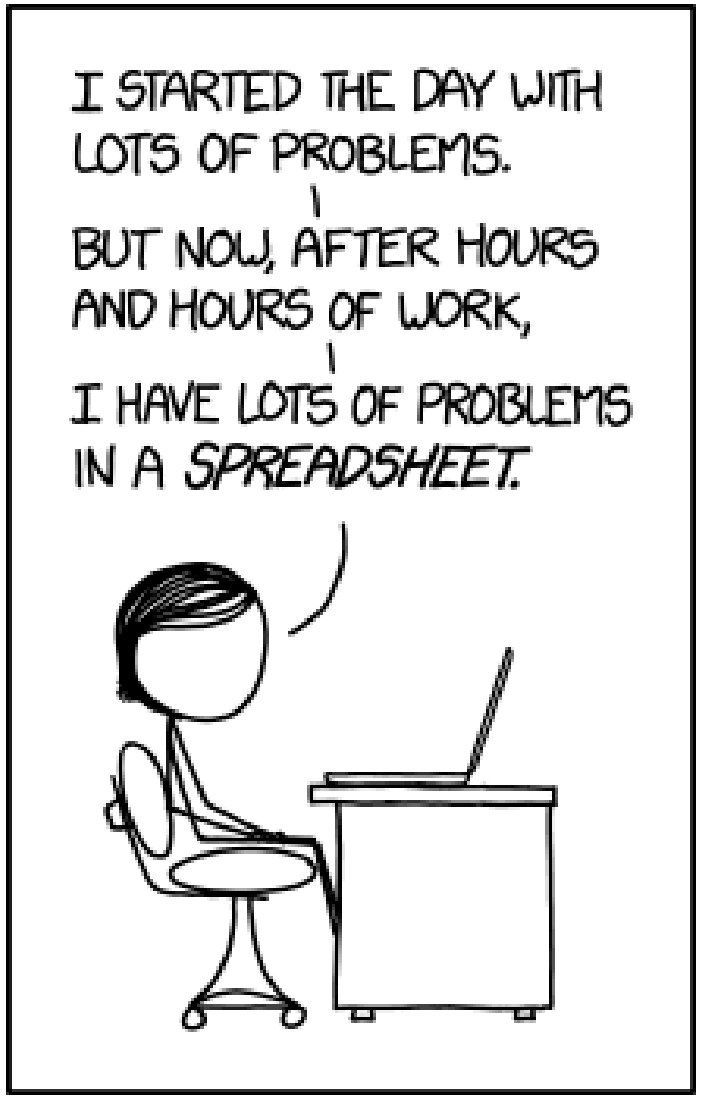
Next LBE Council Meeting

Save the Date!

Tuesday, July 11th

10am-12pm

Upcoming Tentative Meeting Dates:
Sept 12th
Nov 14th



Extra Slides

Breakout Group Reference Slide

We are interested in hearing your thoughts on a number of topics we know we must eventually address:

- Domicile charging infrastructure
- DCFC vs level 2 vs level 1
- Networked vs nonnetworked
- EVSE in context of master/capital planning
- Ongoing management and maintenance of stations
- Fleet vs public vs workplace charging
- Others?

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Guiding questions

- How do we electrify domicile vehicles and provide charging?
- When is DCFC most useful/valuable vs level 2s? Are level 1 stations ever a good idea?
- What are the pros and cons of networked vs nonnetworked charging stations?
- What innovative technologies or strategies should we be exploring?
- How are you planning for your fleet/facility? Is longer-term planning for fleet transition valuable?
- What policies, guidance, or resources are necessary to support public charging and/or workplace charging?
- What other questions do you still have around fleet electrification and EV charging?

Commission on Clean Energy Infrastructure Siting and Permitting

- Commission will make recommendations to reduce permitting timelines for clean energy projects and ensure clean energy benefits are distributed equitably
- EEA agencies will evaluate existing permitting processes and identify potential areas of improvement
- Commission will include agencies, municipalities, utilities, environmental justice communities, clean energy developers and other stakeholders

Source: Mass.gov

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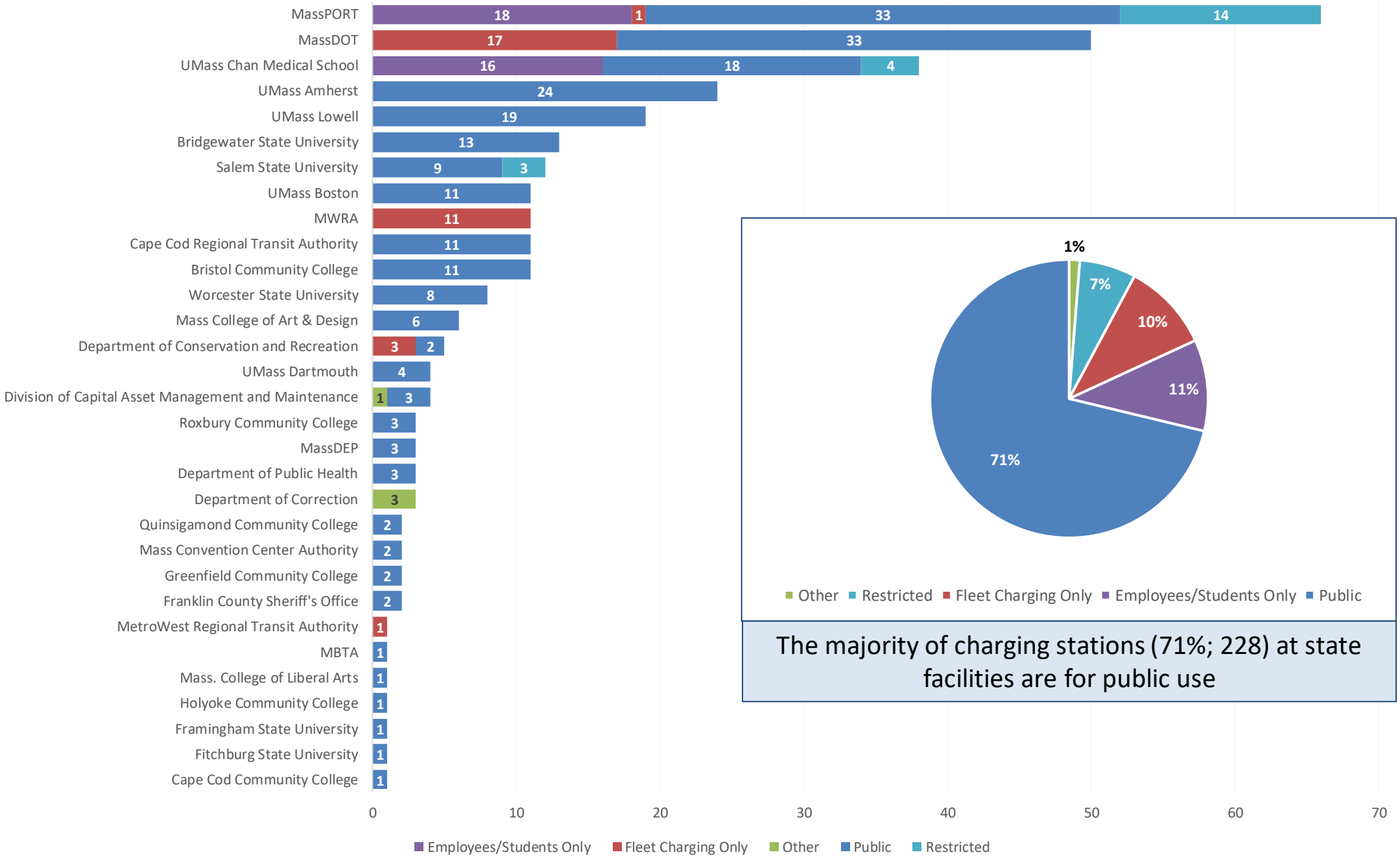
EV Charging Stations by Entity & Access Type



The majority of charging stations (71%; 228) at state facilities are for public use