Leading by Example Council Agenda
January 10th, 2023

- Welcome
- News and Updates
- LBE Portfolio Progress and Accomplishments
- Recent Commonwealth Climate Accomplishments
- LBE Portfolio Priorities for 2023

Massachusetts Department of Energy Resources

News and Updates

2022 LBE Recognition Award Winners

Municipal

City of Beverly

Ashburnham MLP

Individual

Liz Minnis, DCAMM

Shawn Luz, City of Framingham

State Entity

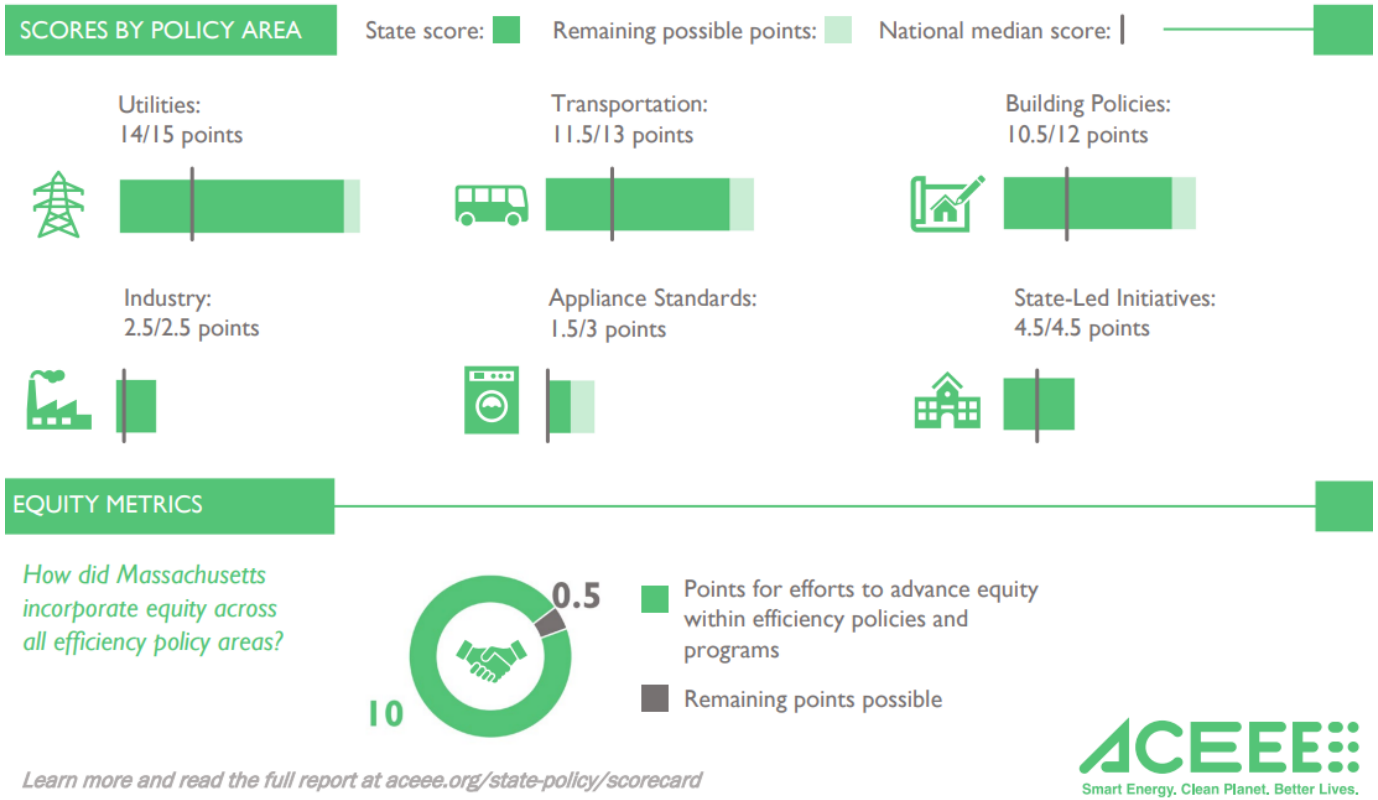
Cape Cod Community College

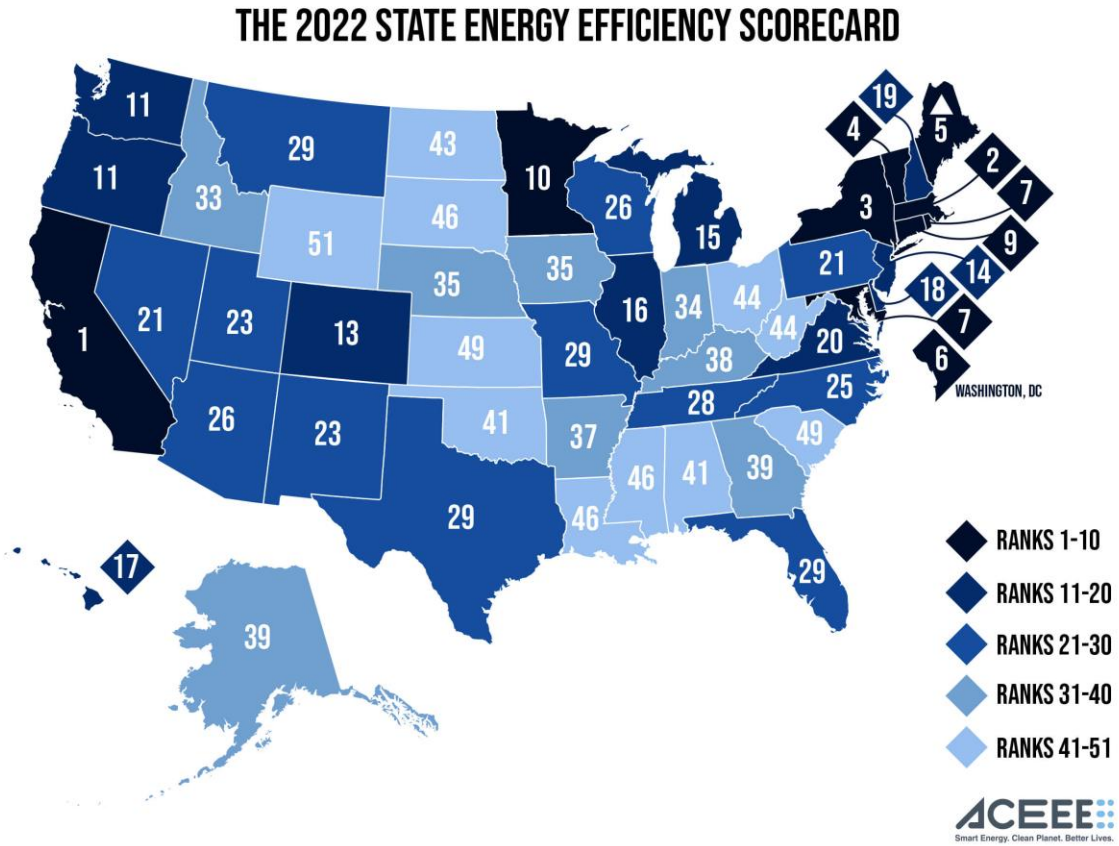
MassDOT Highway

Department of Developmental Services

ACEEE Scorecard: Massachusetts Maintains Second Place

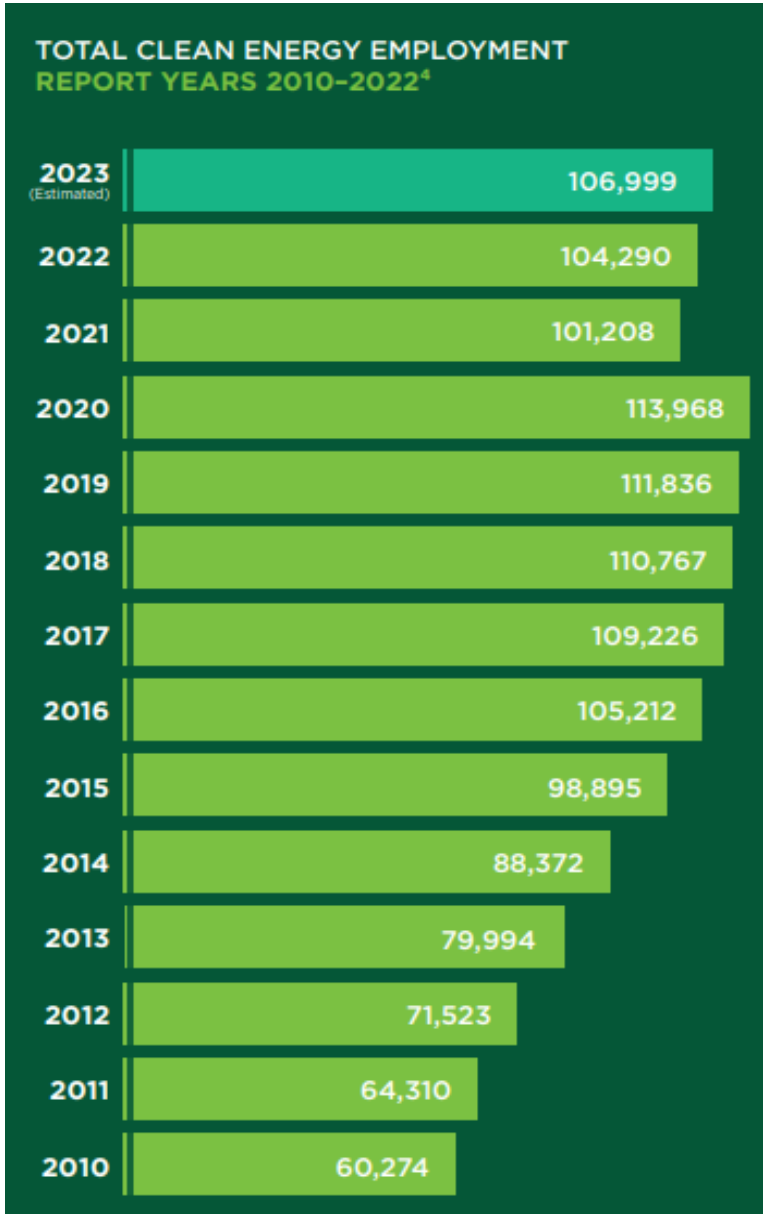
- MA was awarded 44.5/50 points, 2.5 points behind CA
- Maine was most improved
- Half of the top 10 states are in New England





2022 MA Clean Energy Industry Report

- MassCEC report shows growth of clean energy workforce
- MA is home 106,000+ clean energy workers
  - Up 63% since 2010
  - Represents 3% of all jobs in MA
- MA is home to 2% of U.S. population, has 4% of U.S. clean energy jobs



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Gov Healey Env and Energy Appointments and Priorities

Governor Healey Climate and Energy Priorities include:

- Double offshore wind and solar targets
- Quadruple energy storage deployment
- Electrify public transportation fleet and put a million EVs on road by 2030
- Commit at least 1% of state budget to environmental and energy agencies
- Triple budget of MassCEC
- Create a Green Bank to foster investment in resilient infrastructure

See Healey-Driscoll Priorities

Key Appointees:

- **EEA Secretary Rebecca Tepper**, former Chief of the Energy and Environment Bureau for AG, General Counsel to DPU, Director of MA Energy Facilities Siting Board, among others
- **NEW Climate Chief Position: Melissa Hoffer**, former EPA Deputy General Counsel, chief of AG Environmental Protection Division, CLF Healthy Communities and EJ Program Director, and more

Executive Order 604: Office of Climate Innovation and Resilience

- EO604 established Office and Climate Chief within the Office of the Governor, charged with advancing **climate innovation, mitigation, adaptation and resilience policies**
- Within 180 days, Chief will conduct comprehensive review and provide recommendations around staffing, policymaking, and resources of all Secretariats to support a whole-of-government approach to climate change

- EO604 also directs each Cabinet Secretary to appoint a Secretariat Climate Officer (SCO). Within each Secretariat, SCO charged with:
  - Managing implementation of executive department climate guidelines and directives
  - Developing agency-specific plans to advance policies established under EO604
  - Tracking, coordinating, and managing all activities concerning climate innovation, mitigation, adaptation, and resilience

See EO604 text here

US Renewable Energy surges past coal and nuclear

- Wind, solar, hydro **generated 20%+ of U.S. power** in 2022
- Wind + solar output were **up 18%** compared to 2021, up **58% compared to 2019**
- 25 GW of solar and wind installed annually from 2020-21
  - U.S. needs to install ~50 GW annually through 2024 to meet clean energy goals
  - ~930 GW of wind, solar, and battery projects are awaiting grid connections

Source: Scientific American

Biden-Harris Administration Announced Steps to Electrify and Cut Emissions from Federal Buildings

- Beginning 2025, new/renovated federal facilities required to reduce on-site emissions 90% (and achieve net zero emissions) by 2045
- Proposed rule-making to electrify all new buildings and those undergoing substantial renovations
- GSA will not use any IRA funds for fossil fuel equipment

Source: Energy.gov

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Commonwealth Climate: 2022 in Review

Recent Commonwealth Climate Accomplishments

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A Year of Climate Policy…

An Act Driving Clean Energy and Offshore Wind supports clean energy development, transportation electrification, and building decarbonization

$3.76 billion **Economic Development Bill** funds a host of initiatives, including EVs, charging stations, clean energy investments, green space, food security, and more

MA Climate Change Assessment released in December details how people, environments, and infrastructure will be affected by climate change

New **Appliance Efficiency Standards** went into effect January 1st, 2023

Clean Energy and Climate Plan for 2050 sets emissions limits and sector sub-limits

Commission on Clean Heat final report provides recommendations to decarbonize heat

…and Climate Investments

MassCEC awarded $22 million to initiate **pilot financing programing** aimed at decarbonization and reaching underserved communities

MassCEC awarded $24 million to expand **Accelerating Clean Transportation (ACT)** programs focused on innovation, equity, school buses, e-bikes, and vehicles-for-hire

DOER to commit up to $50 million for **LMI Housing Decarbonization Grant Program**

MassDEP will utilize $4 million for **electrification of Solid Waste Collection Vehicles**, including waste collection and recycling trucks

$180 million **OSW Ports Infrastructure Investment Challenge** will leverage investments to expand/develop port infrastructure in Salem, New Bedford, and Somerset

Offshore Wind on the Horizon

800MW Vineyard Wind*	• Construction has begun! • Power expected to begin exporting to the grid later this year
800MW Mayflower Wind	• Contracts approved by DPU; project proceeding with development and permitting • Commercial operation expected in 2027
1200MW Commonwealth Wind* and 400MW Mayflower Wind	• Contracts approved by DPU • Avangrid filed motion to dismiss contract, citing higher costs associated with supply chain, inflation, etc.
TBD MW – 2023 Solicitation	• MA EDCs have authority to procure another 2400MW of OSW • Under Section 83C of Green Communities Act, DOER required to issue next RFP by May 2023

**Vineyard and Commonwealth Wind are both projects of Avangrid*

Maine Onshore Wind: A Wind-Win Situation?

- Maine Public Utilities Commission selected 1,000 MW onshore wind project to help fulfill state's clean energy law
- 2022 MA climate law authorized DOER to coordinate with other states to support clean energy projects
- MA can potentially enter into long-term contracts for up to 40% of the project's electric and REC generation
- Next steps
  - ME PUC has until 1/15 to make initial determination on partnerships
  - If projects do not have sufficient contracting commitments by 2/28, DOER can back out

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New Appliance Efficiency Standards

Effective January 1, 2023

Any appliance covered by this law cannot be sold nor installed in MA unless it is listed on the State Appliance Standards Database (SASD) ApplianceStandards.org

Electric vehicle supply equipment

Computers and monitors

Certain lighting products

Plumbing fitting and fixtures, water coolers, electric spas, and spray sprinklers

Ventilating fans

Commercial kitchen hot-food holding cabinets, ovens, steam cookers, dishwashers, and fryers

- *An Act Creating a Next-Generation Roadmap for MA Climate Policy* included provision for appliance efficiency standards
- Low-cost market mechanism to drive water and energy savings by barring the statewide sale of less efficient products

Includes 15 product types

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New Appliance Efficiency Standards

Effective January 1, 2023

Electric vehicle supply equipment

For Level 1 and Level 2 EVSE…

- Must be State Appliance Standard Database (SASD) listed
- Meet ENERGY STAR Version 1.0 requirements

- Manufacturers: certify products for sale in MA
- Sellers and installers: ensure that products comply

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MOR-EV Program Updates

NEW Battery electric and fuel cell electric vehicles with a sales price of up to $55,000 purchased or leased as of November 10, 2022, may apply for an increased $3,500 rebate (see MOR-EV website for details)

Anticipated changes to MOR-EV coming in 2023-2024:

- Point-of-sale rebate option
- Low-income rebate adder
- Used EV program
- Trade-in rebate program

MOR-EV
Massachusetts Offers Rebates for Electric Vehicles

NEW Utility Make-Ready Programs

- DPU has approved funding to support EV Charging "make-ready" programs delivered by three utilities:
  - **Eversource Energy Phase II EV Program:** $188 million over 4 years
  - **National Grid Phase III EV Program:** $206 million over 4 years
  - **Unitil EV Program:** $998,000 over 5 years
- Eligible EV charging projects include public, workplace, fleet, municipal utility district, residential, and Environmental Justice Communities
- Some equipment costs may be covered under certain circumstances

Solid Waste Bans

- Effective Nov 1, 2022, textiles and mattresses are now banned from disposal
- Commercial organics ban now applies to institutions generating ½ ton+ of food waste per week

See RecyclingWorks for information and technical assistance. More info via LBE Council Meeting slides (Nov 2022, Nov 2021)

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Towards Our LBE Targets: 2022 in Review

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Year-in-Review: EO 594 Progress

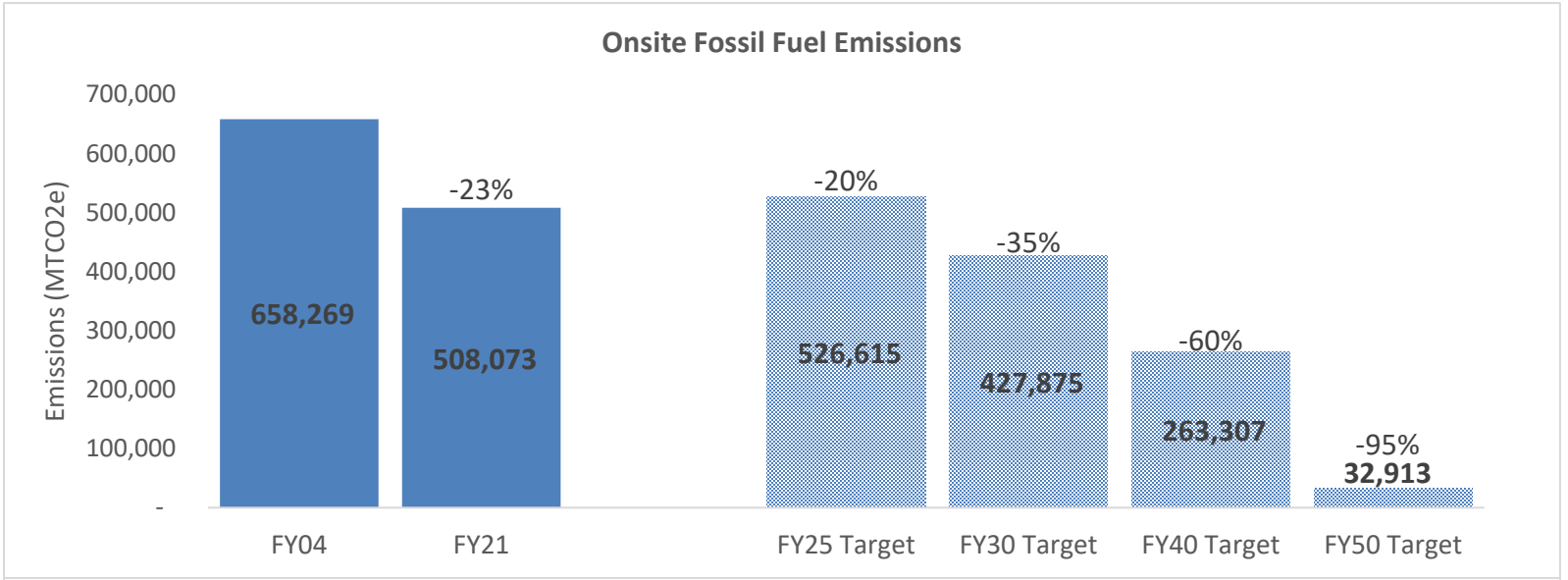
	MA Leading by Example Targets			
Objective	**2025**	**2030**	**2040**	**2050**
Reduce emissions from onsite fossil fuels*	-20%	-35%	-60%	-95%
Zero emission vehicles (ZEVs) in light-duty state fleet	5% of fleet (325 vehicles)	20% of fleet (1,625 vehicles)	75% of fleet (3,250 vehicles)	100% of fleet (6,500 vehicles)
Reduce fuel oil use*	-90%	-95%	TBD	TBD
Energy use intensity (site EUI) reduction*	-20%	-25%	TBD	TBD
EV charging stations at state facilities	350 stations	500 stations	TBD	TBD

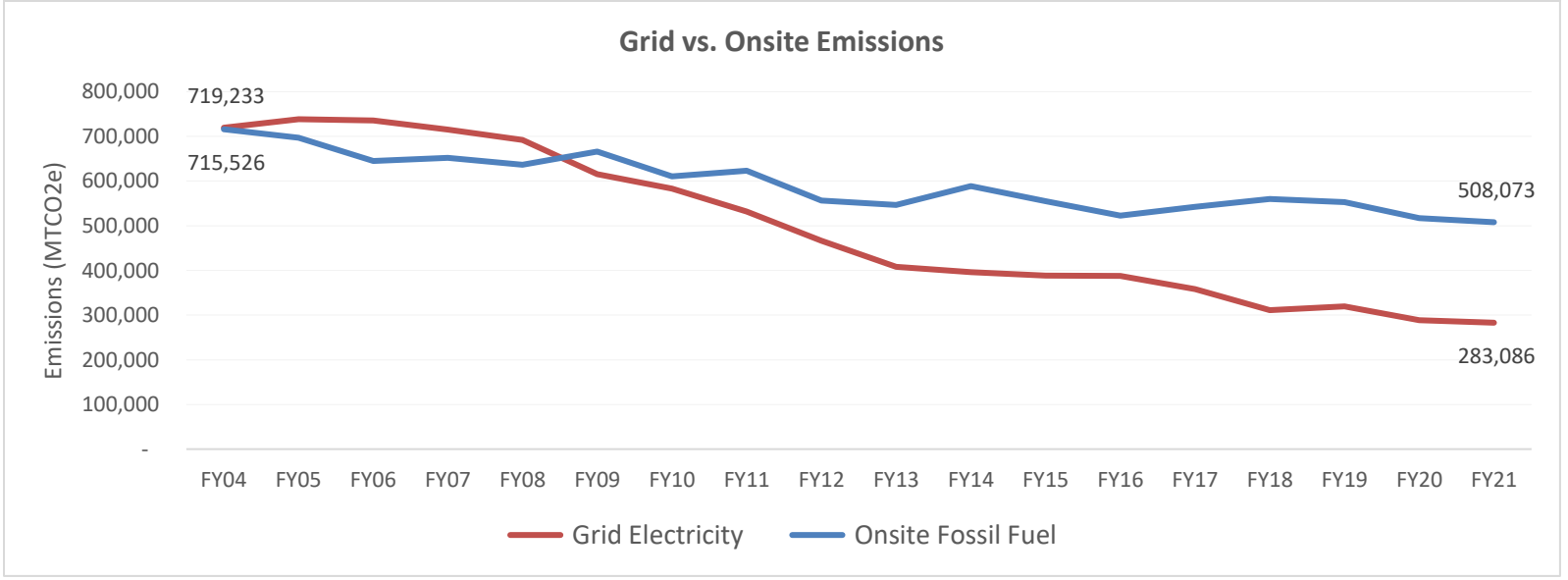
New light-duty vehicles: Starting in fiscal year 2023, all acquisitions of vehicles with a Gross Vehicle Weight Rating (GVWR) of 8,500 pounds or less must be ZEVs. Starting in fiscal year 2025, all acquisitions of vehicles with a GVWR of 14,000 pounds or less, must be ZEVs.

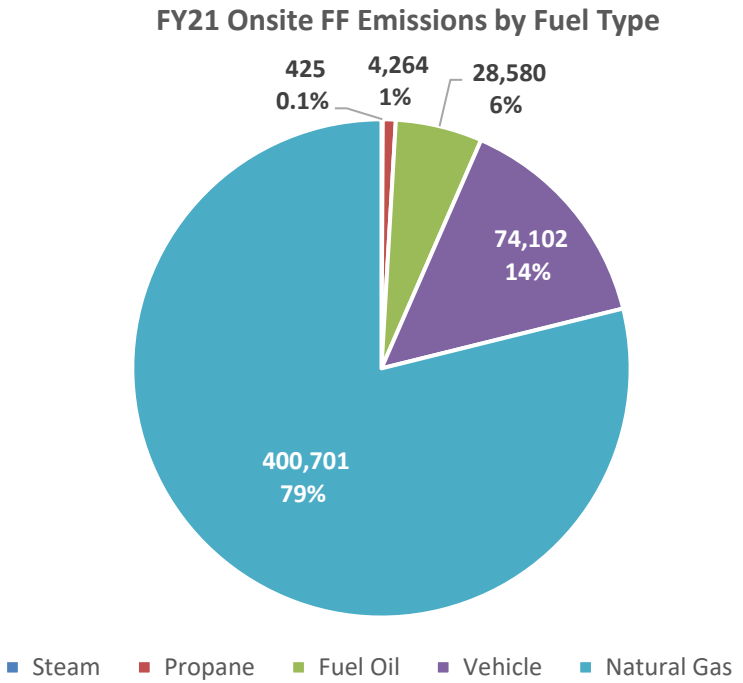
New heavy-duty vehicles: Starting in fiscal year 2030, all acquisitions of vehicles with a GVWR of more than 14,000 pounds must be ZEVs..

**Over 2004 baseline*

Onsite Fossil Fuel Emissions

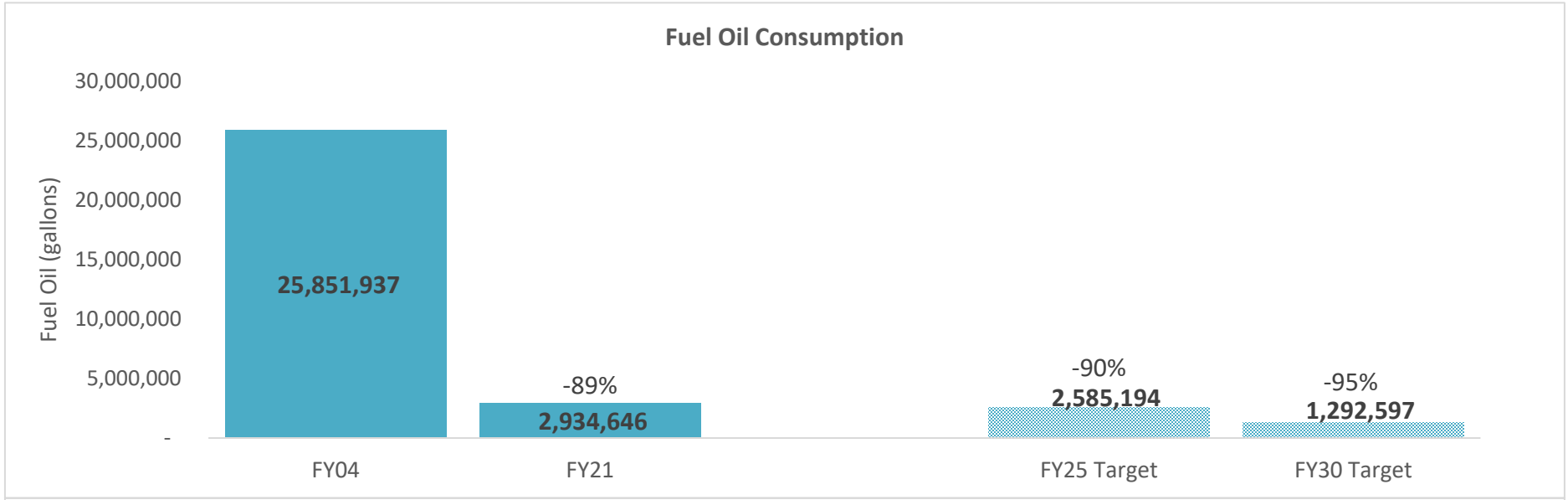


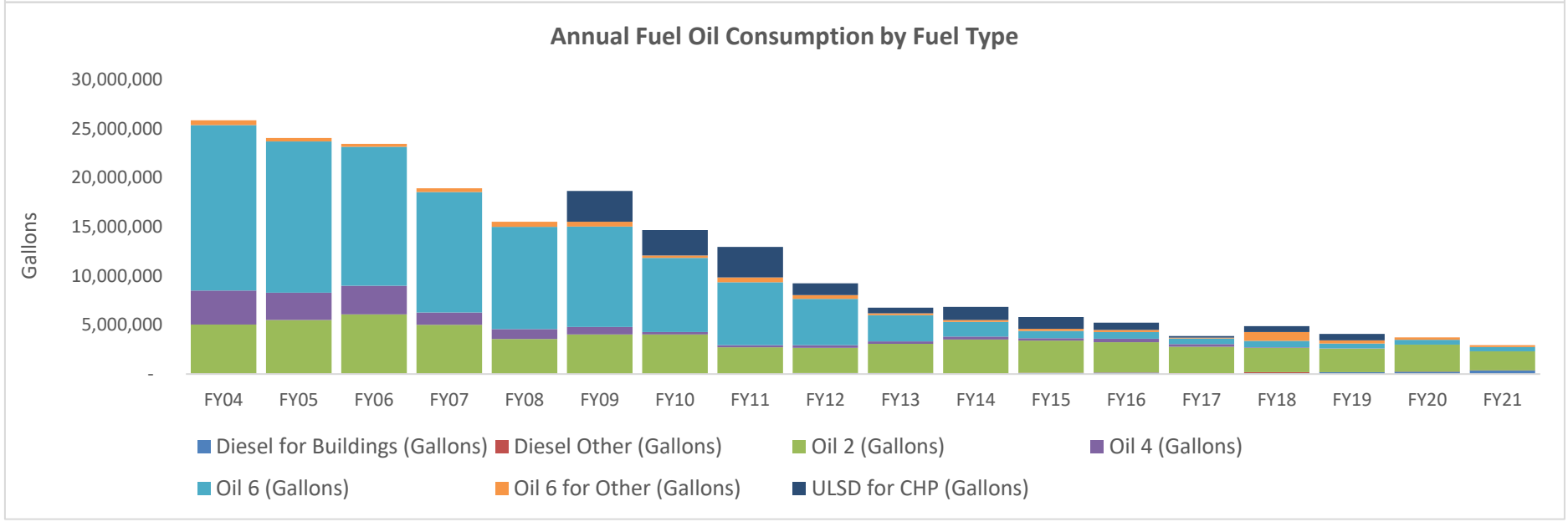




- Natural gas makes up majority of onsite emissions
- Grid electricity emissions continue to decline as grid becomes cleaner

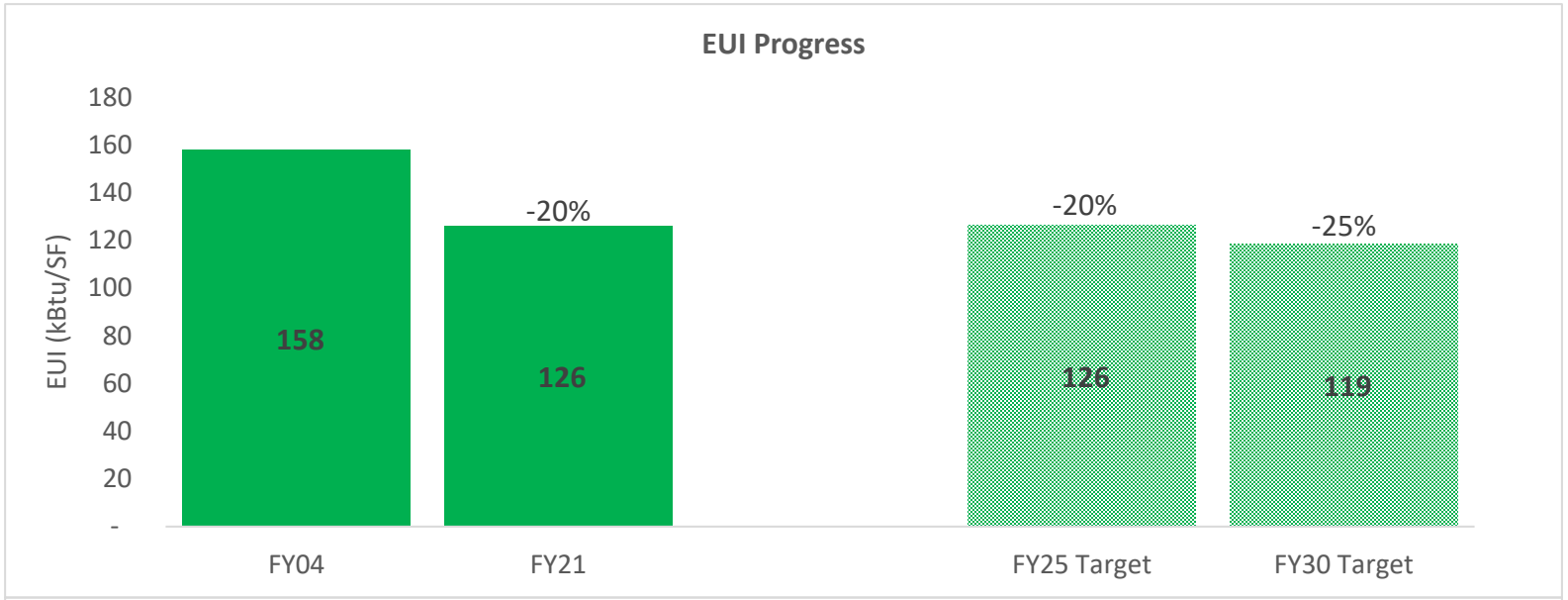
Fuel Oil Consumption

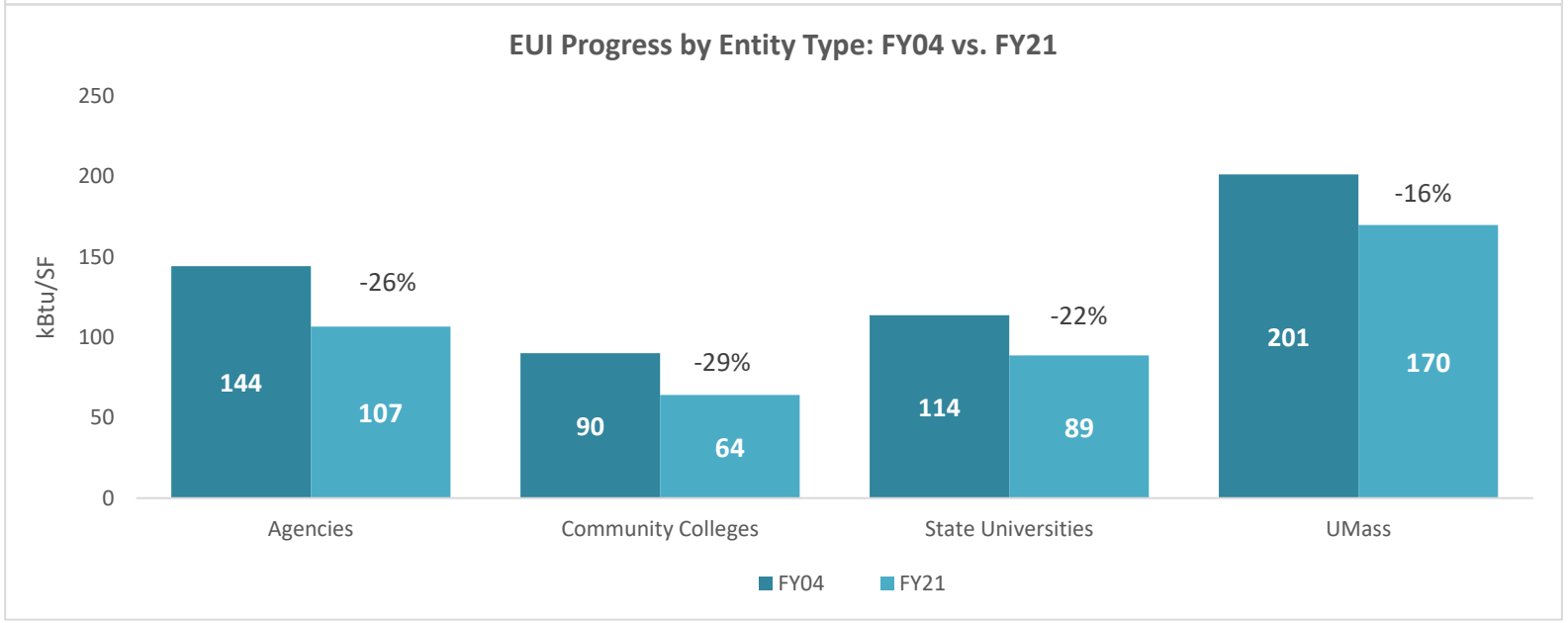




- Portfolio has eliminated Oil #4
- Mostly Oil #2 left in the portfolio for fuel oil usage

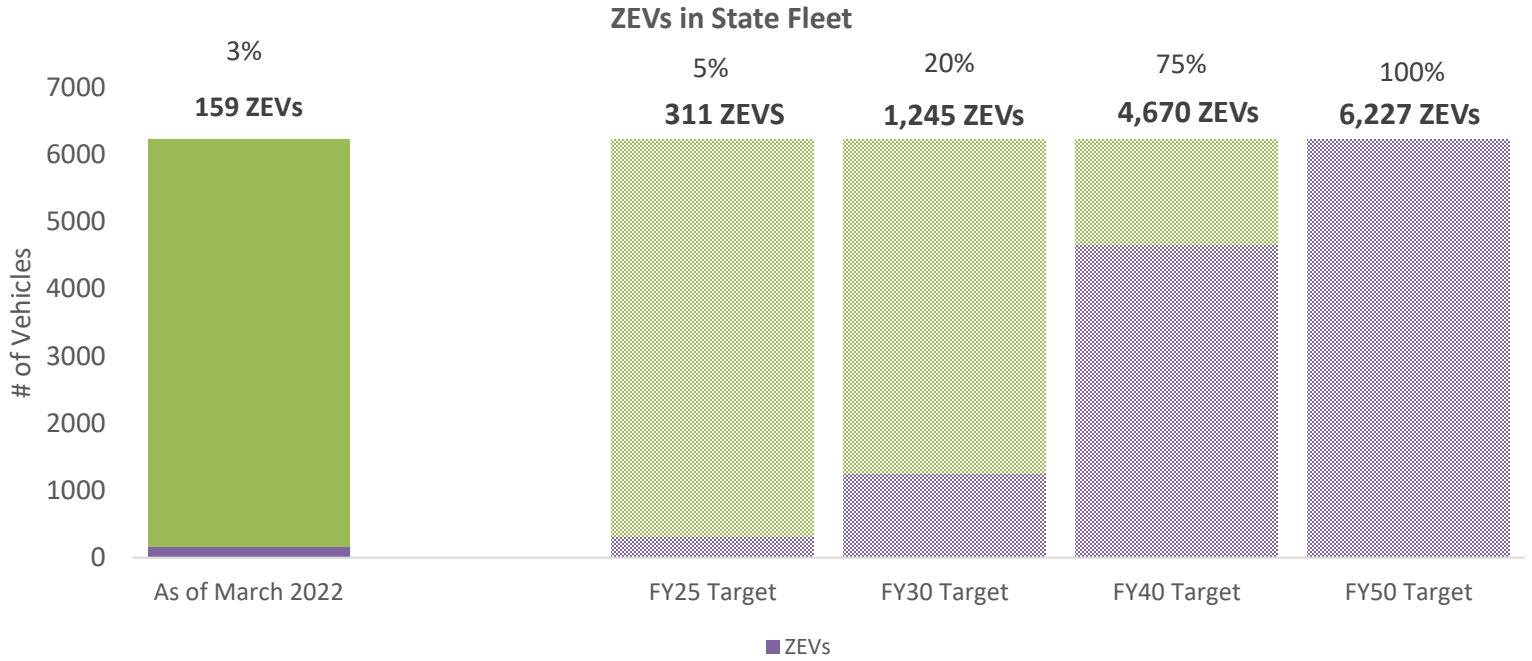
Energy Use Intensity (EUI)

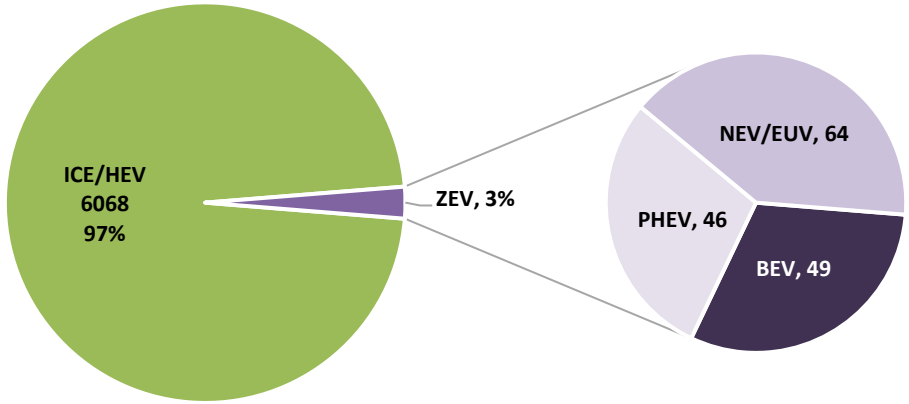




- As of FY21, LBE portfolio met FY25 target of 20% EUI reduction
- All entity types have seen EUI reductions

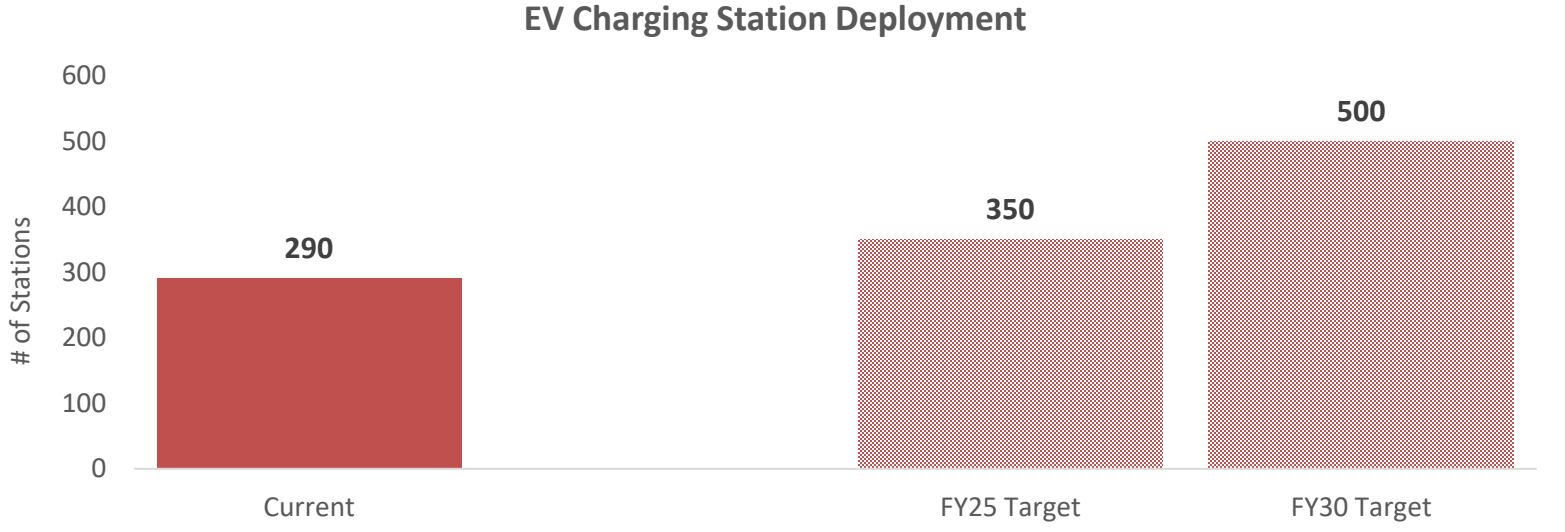
State Fleet Electrification

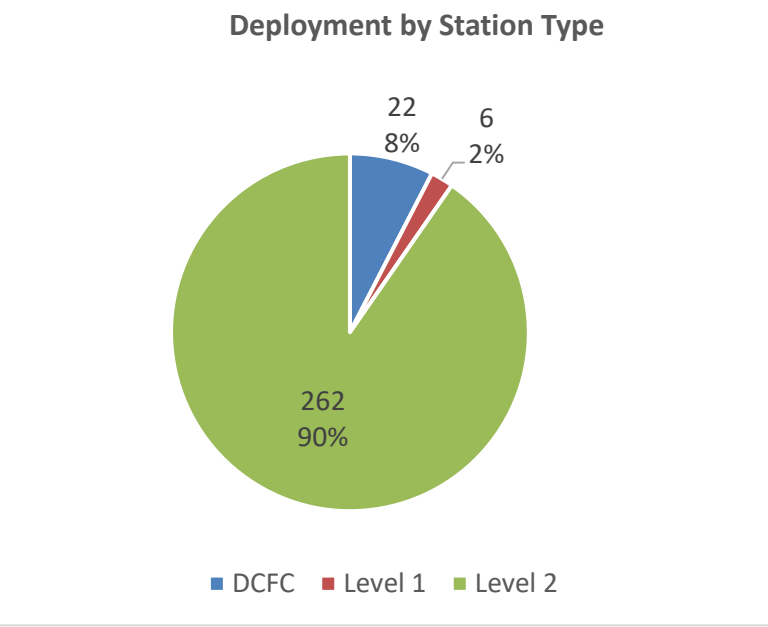


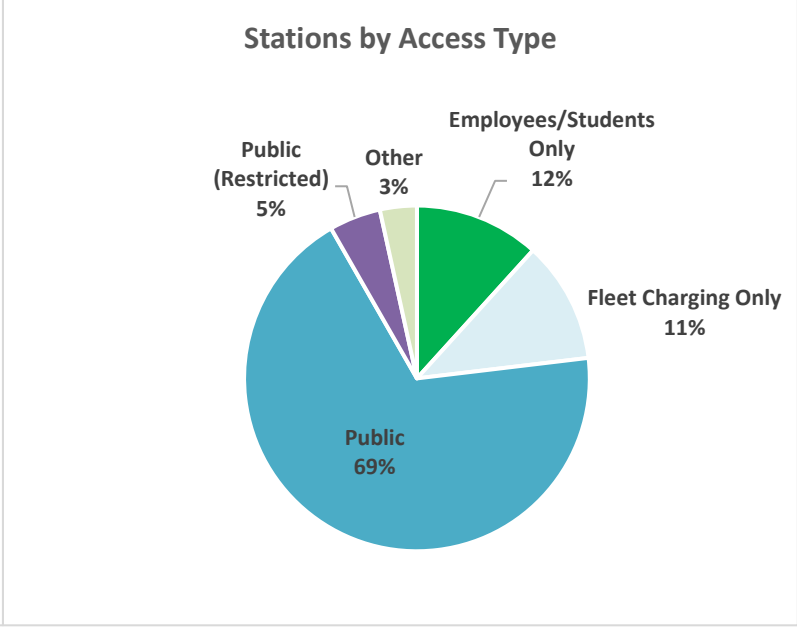


- **State fleet size:** ~6,200 vehicles
- ZEVs make up **3%** of state fleet (*as of March 2022*)

EV Charging Deployment







- Large majority of existing installed & operational stations are **Level 2 and for public use**

Updates to these graphics for FY22 coming!

Thank you to those who have submitted their FY22 Tracking Forms

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Onsite Solar Progress

Solar PV installed & operational in 2022

6.1 MW

Solar canopies in 2022

5.7 MW

Rooftop solar in 2022

0.4 MW

Cumulative solar PV installed & operational

34.8 MW

Decarbonization Efforts

- Twelve facilities/campuses completed or initiated decarbonization studies to chart a pathway to fossil fuel-free operations
- DCAMM new construction projects targeting all-electric (or mostly electric) buildings
- DCR completed portfolio-wide inventory of assets and began strategic planning for fossil fuel-free replacements
- DDS is working with DCAMM to electrify group homes across the Commonwealth
- MBTA constructing its first electric bus garage and charging depot in Quincy
- OVM established an EV-First Policy, requiring fleets to adhere to a EV>PHEV>Hybrid>most-efficient ICE vehicle hierarchy
- Fleet electrification analyses completed for 13 entities through Electrification Coalition DRVE tool, covering 1,586 vehicles

LBE Feasibility Study Grant

- Launched April 2022
- $150,000 awarded for two electrification and decarbonization studies
- Several potential grants in the queue for fleet EVSE planning, battery energy storage, and more

Fleet EV Charging Deployment

- EO guideline documents and supporting documents for EV acquisition and EVSE deployment released by LBE
- EO594 EV acquisition requirements for light-duty vehicles went into effect July 1, 2022
- Fleet EVSE deployment grant developed with input from OVM, vendors, and various partner agencies, launched November 2022

Sustainable Landscaping

- Pollinator seed checklist and best management practices for habitats released in March 2022
- November 2022 pollinator habitat summit highlighted strategies for reducing light pollution
- Ride and drive of battery-powered landscaping equipment hosted by LBE, DCR, and OSD in September 2022
- Additional events and updated BPLE-savings calculator coming soon!

Tools and Resources Developed for State Entities

- EO 594 guidelines: EV charging and sustainability
- EV models database
- Driver guide for state fleet EVs
- Template scope of services for procuring EVSE
- First time EV driver guide template
- Considerations to inform EVSE decision-making
- Guidance for publicly accessible EVSE
- Decarbonization studies' summary
- Pollinator seed checklist for state entities
- Pollinator meadow and garden best management practices
- *And more!*

LBE Tools & Resources webpage

Massachusetts Department of Energy Resources

Commonwealth Clean Energy Priorities

Overview of the Commission on Clean Heat and Clean Energy & Climate Plan for 2050

Executive Office of Energy & Environmental Affairs

Presentation to the LBE Council, January 10th 2023

Agenda

Commission on Clean Heat

- Formation and Process
- Summary of Recommendations

2050 Clean Energy and Climate Plan (CECP)

- Purpose as Stated by 2021 Climate Law
- Summary of Recommendations
- Implications for State Facilities
- Next Steps

Commission on Clean Heat

Commission on Clean Heat
Formation & Process

Formation

- Created via Executive Order 596 in Sept. 2021 to "to advise the Governor on the framework for long-term greenhouse gas emission reductions from heating fuels," consistent with the 2050 Roadmap and the limit/sublimits of the Global Warming Solutions Act
- 22 members from the fields of affordable housing, energy efficiency building design, healthcare, environmental advocacy, regional planning, heating systems & technology, real estate, and heating fuel distribution
- Chaired by the Undersecretary of Energy and Climate Solutions
- Supported by the Interagency Building Decarbonization Task Force

Process

- 20 full Commission meetings, as well as several smaller group meetings, held between January- December 2022
  - Phase 1: Preliminary recommendations for 2025/2030 CECP
  - Phase 2: In-depth deliberation on focused topics, and consensus building on final recommendations
- The final report was issued on Nov. 30th, and represents a consensus document, with 21 out of 22 Commissioners joining the consensus.

"Context" Recommendations

- **Net Zero Future:** To achieve Net Zero in 2050 in a manner that improves equity, public health, safety, and resilience while minimizing the overall costs of the transition, the Commonwealth's building sector must undergo a dramatic transformation across new and existing buildings involving energy efficiency, weatherization, and clean heating technologies.

- **Constraints and Contingencies:** The Commonwealth's success in decarbonizing the building sector will depend on the pace of progress in other sectors, in particular energy supply.

"Cross-Cutting" Recommendations

- **Resourcing the Transition:** Additional programs, resources, and reforms will be needed to support the market transformation that is required for meeting building sector sublimits in a manner that is as cost-efficient and equitable as possible.

- **Equity:** The Commission recommends the Commonwealth adopt a set of core principles and practices to inform the design of all building decarbonization program and policy initiatives, include robust community engagement and representation in decision-making, focus on implementation and outcomes, and deeply embed equity within program design.

- **Institutional Coordination and Alignment:** For the transition to a decarbonized buildings sector to move at the pace and scale necessary for achieving the building sector sublimits, the Commonwealth will need to improve coordination among the actors essential to achieving building emissions reductions and increase the efficiency and impact of its programs and investments.

Commission on Clean Heat

"Regulatory Frameworks for Long-Term GHG Emissions Reductions" Recommendations

- Implementation of a **Clean Heat Standard** as a regulatory approach to meet the sublimits for the building sector, focusing on electrification and energy efficiency measures.

- Coordinated **joint energy system planning** across Massachusetts' gas and electric utilities and municipal gas and electric companies, in conjunction with key stakeholders and communities, to ease the transition from gas to electric heating by identifying geographic priorities for investment in and/or strategic retirement of energy infrastructure.

- Development of an analysis and reporting structure for fossil fuel equipment metrics, as well as conducting an **analysis of the potential design and associated risks and benefits of a schedule for phasing out new fossil fuel heating** systems in the Commonwealth.

- Evaluation of opportunities for **addressing operating cost barriers** to the adoption of clean heating technologies, including programs or credits to help defray costs from electrification, as well as evaluation of cost-reflective rate structures to encourage conservation and reduce operating costs of electric heating systems.

"Accelerating Deployment of Energy Efficiency & Clean Heating Technology" Recommendations

- Continue to reform Mass Save and reconstitute it under a **Building Decarbonization Clearinghouse** to serve as a central point of contact and technical assistance provider for customers for all clean energy solutions -- including weatherization, heat pumps, energy efficiency measures, along with solar, storage, and EV charging.

- Establishing climate finance mechanisms through a **Climate Bank** to de-risk and mobilize private sector investments for buildings pursuing deep decarbonization measures.

- Accelerating strategies for **decarbonizing the affordable housing sector** in Massachusetts through convening key stakeholders, including representatives from multiple state agencies.

- Expansion of **workforce development** programming to address existing gaps in our decarbonization workforce as well as conduct research, develop best practice guidance, and set standards to fill knowledge gaps with respect to decarbonization of the building sector in Massachusetts.

"Accelerating Deployment of Energy Efficiency & Clean Heating Technology" Recommendations (Continued)

- Conducting a comprehensive **public outreach and awareness campaign** and implementing community-level engagement strategies to educate and build the necessary momentum for building electrification across the Commonwealth.

- **Expansion of the Green Communities and Leading by Example programs** to effectively utilize state, municipal and institutional building stock to showcase the benefits of decarbonization measures.

- Development of a statewide **building benchmarking and labeling program** to increase transparency on building emissions profiles and encourage building retrofits that improve the climate, health, and economic outcomes across Massachusetts' building stock.

2050 Clean Energy & Climate Plan (CECP)

Requirements of An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy ("2021 Climate Law")

- As required by the 2021 Climate Law, the **Clean Energy and Climate Plan (CECP)** acts as a "roadmap" for how the Commonwealth will achieve its greenhouse gas emissions reduction goals
- Statutory requirements in 2021 Climate Law:
  - **Economy-wide GHG Reduction**
    - Requires ≥50% greenhouse gas (GHG) emissions reduction in 2030; ≥ 75% in 2040; ≥85% and net zero in 2050
    - Also requires emissions limit for 2025, 2035, and 2045
  - **Sector-Specific GHG Reduction**
    - Requires EEA Secretary to set sublimits for electric power, transportation, commercial and industrial heating and cooling, residential heating and cooling, industrial processes, natural gas distribution and service, and "any other sector or source the secretary may designate" as components of each emissions limit
  - **Natural and Working Lands (NWL)**
    - Codifies NWL definition
    - Requires EEA to track NWL carbon flux and set goals for reducing emissions and increasing carbon sequestration
    - Requires development of NWL plan within each CECP
  - **Progress Tracking**
    - Requires EEA to set numeric benchmarks and track emissions reduction products, solutions, and improvements used to achieve statewide emissions limits and sublimits

2050 CECP *KEY BENCHMARKS*

Achievement of the Commonwealth's greenhouse gas emissions limit of at least 85% below the 1990 baseline level and net-zero emissions in 2050

TRANSPORTATION

97%
of light-duty vehicles (5 million) electrified

93%
of medium- and heavy-duty vehicles (over 350,000) electrified or non-emitting

NON-ENERGY AND INDUSTRIAL

52%
of industrial energy use electrified

90%
reduction in solid waste disposal

BUILDINGS

80%
of homes (over 2.8 million) heated and cooled by electric heat pumps (including those with on-site fuel backups)

87%
of commercial space is heated by either electricity or alternative fuels

NATURAL AND WORKING LANDS

40%
of lands and waters in MA permanently conserved

64,400 acres
of new riparian and urban tree cover

ELECTRIC POWER

2.5-fold
increase in electric load compared to 2020

97%
of electricity consumed is from clean and renewable sources

JOB AND HEALTH BENEFITS

65,000
additional full-time jobs created from the clean energy transition

Up to **$4.7 billion**
in health benefits

Key Policy Takeaways – Sectors (1/2)

- **Transportation**
  - Implement advanced clean cars and truck standards to increase the number of new ZEVs sales
  - Install public charging infrastructure at scale to support anticipated EV fleet
  - Develop long-term transportation plan to increase use of public transportation, invest in multimodal transportation
  - Explore the electrification of public transit
  - Expand EV incentives and create incentives to retire old internal combustion engine (ICE) vehicles
  - Require smart charging in all EV incentives
  - Adopt fuel standards to promote the use of alternative fuels in hard-to-electrify segments of transportation

- **Buildings**
  - Develop a Clean Heat Standard
  - Establish uniform building performance reporting for all building types
  - Evaluate models for and develop a Clean Heat Clearinghouse
  - Establish climate finance mechanisms to accelerate decarbonization financing
  - Facilitate joint decarbonization planning between electric and natural gas utilities
  - Develop a public education and outreach Climate Campaign that centers environmental justice and equity

Key Policy Takeaways – Sectors (2/2)

- **Power**
  - Develop a Forward Clean Energy Market (FCEM) to support deployment of large-scale clean energy projects
  - Support offshore wind (OSW) development via advancing floating technologies, securing long-term lease areas, and developing transmission
  - Work with regional partners, ISO-NE, and FERC to reform regional transmission planning
  - Advance distribution infrastructure to accommodate demand management and load flexibility
- **Non-Energy & Industrial**
  - Promote energy efficiency and electrification in industrial sector
  - Reduce use of hydrofluorocarbons (HFCs) in line with federal regulation
  - Determine whether changes are needed to the Gas System Enhancement Plan (GSEP) to continue to reduce methane leaks while decarbonizing the natural gas system
  - Implement ongoing waste reduction and diversion recommendations from the ongoing Solid Waste Master Plans
- **Natural and Working Lands (NWL)**
  - Expand NWL conservation with technical assistance, grant support, and increased public and private funding
  - Incentivize and equip landowners to practice climate-smart forestry and soils management
  - Develop emissions accounting methodology for land clearing for development projects
  - Explore incorporating embodied carbon standards into the evaluation of new state facilities

Key Policy Takeaways – Cross-Sector (1/3)

- **Equity**
  - Develop tracking metrics and set goals to commit clean energy and climate investments to disadvantaged communities and environmental justice populations.
  - Launch a Climate Campaign to raise climate awareness across the Commonwealth
  - Seek to develop a holistic approach for siting energy infrastructure
  - Expand deployment of air monitoring network in environmental justice communities
  - Work with public health professionals to assess options to improve air quality, particularly in EJ neighborhoods

- **Workforce Development**
  - Increase coordination with labor unions to assist in climate-critical training and retraining
  - Seek to establish clean energy as a statewide priority industry sector, with increased education/career programs and explore the benefits of creating a dedicated career cluster
  - Develop a plan for a “Climate Service Corps” to drive awareness, adoption, and the pipeline of workers for climate-critical solutions
  - Provide ongoing energy occupation training, including support for minority and women-owned small business enterprises, through Equity Workforce Development Programming

Key Policy Takeaways – Cross-Sector (2/3)

- **Land-Use**
  - Develop a holistic, long-term land use strategy to support implementation of the 2050 Clean Energy and Climate Plan
- **Innovation**
  - Assess the performance of in-state technology transfer programs and facilitate the exchange of best practices for universities across MA
- **Climate Leadership**
  - Ramp up the Leading by Example program to promote the rapid decarbonization of state buildings and facilities
  - Increase coordination across municipal and regional entities on Net Zero planning, capacity building, and implementation
  - Identify capital projects that receive state funding and work with state funding agencies to explore establishing application criteria that incorporate decarbonization goals

Key Policy Takeaways – Cross-Sector (3/3)

- **Future of Fuels**
  - Consider whether changes are needed to the statewide GHG emissions inventory conventions, guiding principles, and/or accounting methodologies for combustion emissions from conventional and advanced biofuels, hydrogen, and synthetic fuels, potentially including emissions impacts that occur outside the state (e.g., emissions and sequestration associated with out-of-state biofuel production)
  - Determine how to optimize the standards that are used to qualify fuels for programs that encourage clean(er) fuel use (e.g., Clean Heat Standard)
  - Support innovation by funding alternative fuel research and development and pilot programs. Coordinate with other states to amplify impacts, avoid stressing regional or national feedstocks or natural and working lands, and direct alternative fuels to high-value applications

- **Carbon Sequestration**
  - Develop a Net Zero emissions accounting framework in coordination with other jurisdictions and stakeholders
  - Establish a policy framework to guide the procurement of additional carbon sequestration in coordination with other jurisdictions and stakeholders
  - Develop (or identify) specific mechanism(s) and infrastructure for carbon sequestration procurement and exchange

Implications for State Facilities

- The Commonwealth plans to reduce Commercial Buildings GHG emissions by 47% below 1990 levels in 2030 and 90% in 2050. This relies on:
  - Widespread deployment of envelope efficiency and electric heat pump installations, made possible through incentives, standards, technical assistance, financial resources, and educational opportunities
  - Retirement of old HVAC equipment when it reaches its end of life; replacement with heat pumps
- Large building-decarbonization initiatives like the Clean Heat Clearinghouse, the Clean Heat Standard, and performance reporting are starting to be reviewed by the responsible agencies. There will be opportunity to share your input.
- The Commonwealth plans to reduce Transportation GHG emissions by 34% below 1990 levels in 2030 and 86% in 2050. This relies on:
  - Ongoing implementation of vehicle emissions standards
  - Standards and incentives to phase out ICE vehicles accelerate EV adoption (MOR-EV & MOR-EV Truck programs)
  - Zoning, commuter, and walking/biking programs to promote alternatives to personal travel
- There is an increased focus on rapidly electrifying the Commonwealth's buildings' heating systems and organizations' transportation fleets. The state has also committed to explore incorporating embodied carbon standards into the evaluation of new state facilities, and to explore application criteria that more closely aligns state decarbonization goals with funding for state-aided buildings.

Next Steps

- Review Appendix A & Appendix B of the 2050 CECP: they probably address many of your questions regarding policy specifics and stakeholder engagement

- Track progress on the CECP Dashboard: https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics

- Email gwsa@mass.gov with questions

- Stay tuned for public engagement around the Clean Heat Clearinghouse, development of a Clean Heat Standard, and other initiatives of interest to the LBE Council.

MA Stretch Code Update & New Specialized Code

DOER Overview

January 9, 2023

Paul Ormond

DOER
Massachusetts Department of Energy Resources

Base, Stretch, and Specialized – 3 Options

Base Code (IECC 2021)

- New construction in towns & cities not a green community
- **52 communities**

Expected from BBRS: **July 2023**

Stretch Code (2023 update)

- New construction in towns & cities that are a green or stretch community
- **299 communities**

Residential : Jan 2023
Commercial: July 2023

Specialized Code ("Net-Zero")

- New Construction in towns & cities that vote to opt-in to this code
- **Effective date:** Typically 6-11 months after Town/City vote

Timeline: Stretch code update

Jan 1, 2023

- **Residential Low-rise update**

July 1, 2023

- **Commercial and Multi-family update**

July 1, 2024

- **Residential HERS 42/45 phase-in**

Stretch code updates in 2023

HERS rating levels lowered – July 2024

STRETCH CODE - COMMERCIAL

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Key Changes to Commercial Stretch Code

Current Stretch Code		**New Stretch Code**
Site energy reduction		Heating and cooling demand reduction
10% reduction	Replaced with	up to 90% reductions
Buildings over 100,000-sf No add'tns, alt'ns		all building sizes Includes add'tns, alt'ns

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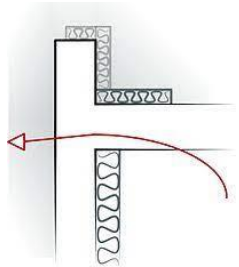
New Provisions for Demand Reduction

Quality envelop + air-leakage testing

+

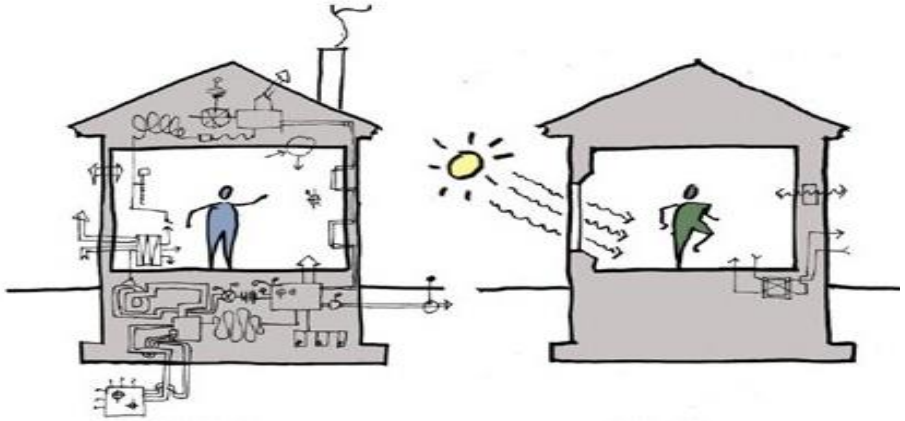
Ventilation energy recovery

+



Mitigating thermal bridges

Result: Better Buildings



The old way *The new way*

- Less equipment
- Improved durability
- Easier electrification
- More comfort
- Enhanced resilience

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Improved Life Cycle Cost

Our 2021 study team (below) found that reducing energy demand:

- Lowered LCC for all building types
- Lowered first cost for some building types

https://www.mass.gov/lists/stretch-energy-code-development-support-documentation

Demand reduction means less equipment and equipment elimination

CONSIGLI Est. 1905 BRA+ BURO HAPPOLD Steven Winter Associates, Inc. nbi

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What about the grid?

Our 2021 study team (below) found the following:

- The same or lower peak electric use for most building types
- Modest peak electric increases in residential
- Across Massachusetts: about 5% increase in peak electric
- Key is demand reduction, which is key priority in new code

https://www.mass.gov/lists/stretch-energy-code-development-support-documentation

What happens to the grid when we "electrify everything"

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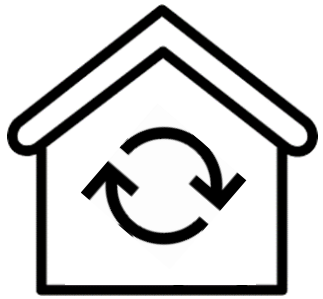
Thermal Energy Demand Intensity (TEDI)

Stretch code now directly regulates heating and cooling demand for office, muni buildings, schools, and residential buildings:

Heating TEDI

*Total annual energy **delivered to** the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)*



Cooling TEDI

*Total annual energy **removed from** the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)*

Important: even though they have the same units, TEDI is not the same as energy use intensity (EUI) TEDI is demand while EUI is consumption

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TEDI Limits – by Building Size and Type

Building type	Heating TEDI limit (kBtu/sf-yr)	Cooling TEDI limit (kBtu/sf-yr)
K-12 school	2.2 - 2.4	12 -20
Office, fire & police station, library, post office, town hall	1.5 - 2.5	21 - 23
Multi-family (including dorms)	2.8 – 3.2	15 - 22

The <u>same models</u> currently used for stretch code compliance also produce TEDI information

IES

EnergyPlus

eQUEST

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Other Key Modifications

Envelope backstop

Add'l stringency

Tenant spaces

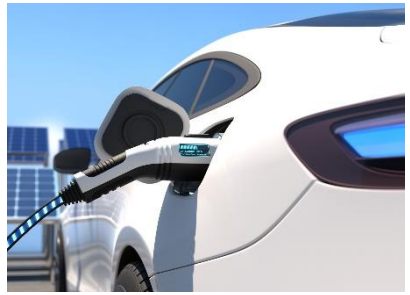
Treated like new construction

Electrification of space heating

Highly ventilated: partial
Highly glazed: full

Mixed-use

Treat each use independently



EV ready parking

Wire 20% of new Business & Residential spaces
Wire 10% of spaces for other uses

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Additions, Alterations, Change of Use

Additions and alterations are explicitly exempted from the current stretch code.
Starting in July 2023, the new stretch code will require:

Scenario	Stretch Code Requirement
Additions up to 100% of existing building size; or, up to 20,000-sf	Follow stretch code prescriptively
Additions which exceed either of above	Treat addition like new construction
Alteration of existing building	Altered portions: follow stretch code prescriptively Unaltered portions: no updates required
Change of use	Follow stretch code prescriptively

Specialized Code
Net zero in 2050

Specialized Code Multi-Family Passive House

- **Application:** R-use buildings which includes dormitories
- **January 2023**: Passive House required for 5 stories or less, if over 12,000 sf
- 6+ Stories choose TEDI or HERS 42/45 or ASHRAE App. G

- **January 2024**: Passive House required for all Residential over 12,000 sf

Specialized Code - Commercial

Commercial Building Types (except Multi-family)

- All-Electric
  - All Stretch code efficiency requirements
- Passive House
  - Passive House & Stretch code requirements
  - Electrification-ready (pre-wiring)
- Gas or other fossil fuel
  - All stretch code efficiency requirements
  - Electrification-ready (pre-wiring)
  - Solar on-site where feasible

Solar PV

- Required:
  - Using Fossil fuels
  - Using Net Zero path
- Optional:
  - All-electric building

- Exceptions for shaded sites can reduce min. size

Next Steps & Resources

Stay in touch

Sign up for DOER energy code email updates:
https://app.e2ma.net/app2/audience/signup/1965182/1356542/

Code language, case studies, detailed technical information here:
https://www.mass.gov/info-details/stretch-energy-code-development-2022

Contact your local Green Communities Coordinator

https://www.mass.gov/service-details/contact-gc-coordinator

Energy Code Training (free via Mass Save®)

- https://www.masssave.com/en/learn/partners/energy-code-training-and-events

Contractor Training

- https://www.masssave.com/en/saving/residential-rebates/passive-house-training

Questions?

Contact DOER:

Stretchcode@mass.gov

Paul Ormond

Ian Finlayson

Massachusetts Department of Energy Resources

New Year's Resolutions

2023 Priorities for the LBE Portfolio

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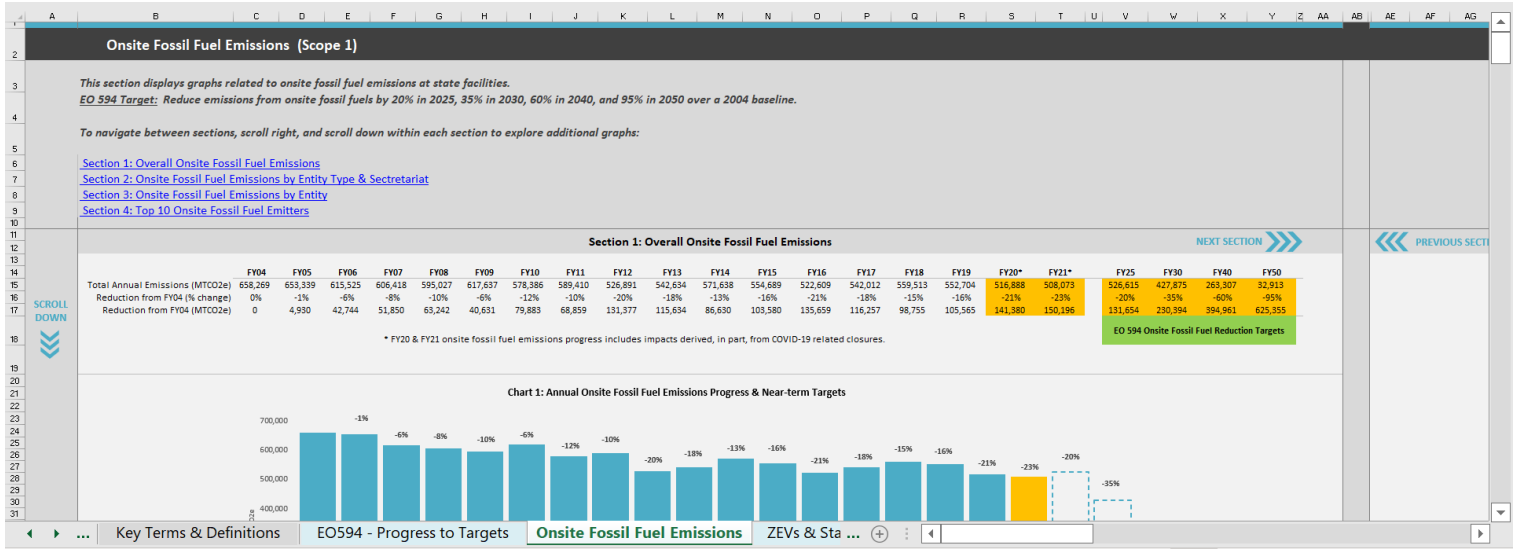
2023 LBE Program Goals

- Rapidly deploy fleet EVSE infrastructure
- Electrify fleet vehicles and landscaping equipment
- Accelerate renewable thermal conversions
- Increase deployment of onsite renewable resources and storage
- Bolster data transparency *(LBE progress dashboard coming soon!)*
- Enhance tech. assistance & resources aligned with new climate goals

Progress Dashboard Preview



Onsite Fossil Fuel Emissions (Scope 1)

This section displays graphs related to onsite fossil fuel emissions at state facilities.
EO 594 Target: Reduce emissions from onsite fossil fuels by 20% in 2025, 35% in 2030, 60% in 2040, and 95% in 2050 over a 2004 baseline.

To navigate between sections, scroll right, and scroll down within each section to explore additional graphs:

Section 1: Overall Onsite Fossil Fuel Emissions
Section 2: Onsite Fossil Fuel Emissions by Entity Type & Sectretariat
Section 3: Onsite Fossil Fuel Emissions by Entity
Section 4: Top 10 Onsite Fossil Fuel Emitters

Section 1: Overall Onsite Fossil Fuel Emissions

NEXT SECTION

PREVIOUS SECTI

SCROLL DOWN

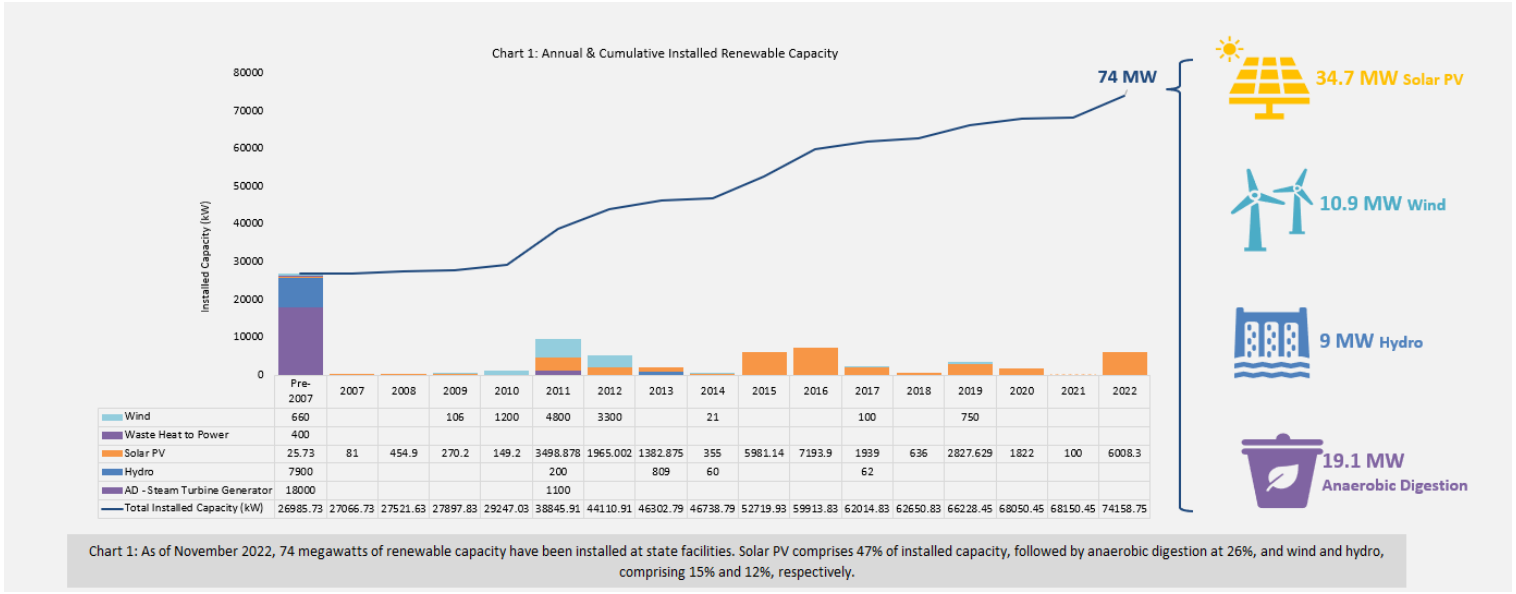
	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20*	FY21*	FY25	FY30	FY40	FY50
Total Annual Emissions (MTCO2e)	658,269	653,339	615,525	606,418	595,027	617,637	578,386	589,410	526,891	542,634	571,638	554,689	522,609	542,012	559,513	552,704	516,888	508,073	526,615	427,875	263,307	32,913
Reduction from FY04 (% change)	0%	-1%	-6%	-8%	-10%	-6%	-12%	-10%	-20%	-18%	-13%	-16%	-21%	-18%	-15%	-16%	-21%	-23%	-20%	-35%	-60%	-95%
Reduction from FY04 (MTCO2e)	0	4,930	42,744	51,850	63,242	40,631	79,883	68,859	131,377	115,634	86,630	103,580	135,659	116,257	98,755	105,565	141,380	150,196	131,654	230,394	394,961	625,355

EO 594 Onsite Fossil Fuel Reduction Targets

* FY20 & FY21 onsite fossil fuel emissions progress includes impacts derived, in part, from COVID-19 related closures.

Chart 1: Annual Onsite Fossil Fuel Emissions Progress & Near-term Targets

Key Terms & Definitions | EO594 - Progress to Targets | Onsite Fossil Fuel Emissions | ZEVs & Sta ...



	Pre-2007	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Wind	660			106	1200	4800	3300		21			100		750			
Waste Heat to Power	400																
Solar PV	25.73	81	454.9	270.2	149.2	3498.878	1965.002	1382.875	355	5981.14	7193.9	1939	636	2827.629	1822	100	6008.3
Hydro	7900					200		809	60			62					
AD - Steam Turbine Generator	18000					1100											
Total Installed Capacity (kW)	26985.73	27066.73	27521.63	27897.83	29247.03	38845.91	44110.91	46302.79	46738.79	52719.93	59913.83	62014.83	62650.83	66228.45	68050.45	68150.45	74158.75

Chart 1: As of November 2022, 74 megawatts of renewable capacity have been installed at state facilities. Solar PV comprises 47% of installed capacity, followed by anaerobic digestion at 26%, and wind and hydro, comprising 15% and 12%, respectively.

Includes data at portfolio-level and entity-level for:

- ↑ Progress to EO594 Targets
- Onsite Fossil Fuel Emissions
- Fuel Consumption
- Energy Use Intensity
- ZEVs & State Fleet
- EV Charging Stations
- LEED Certified Buildings
- Installed Renewables
- Sustainable Landscaping
- $ LBE Grants

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LBE Partner Priorities

DCAMM decarbonization planning and projects

OSD environmental purchasing program

OVM fleet electrification

OSD's Environmentally Preferable Products Procurement Program Goals for FY23

OPERATIONAL SERVICES DIVISION

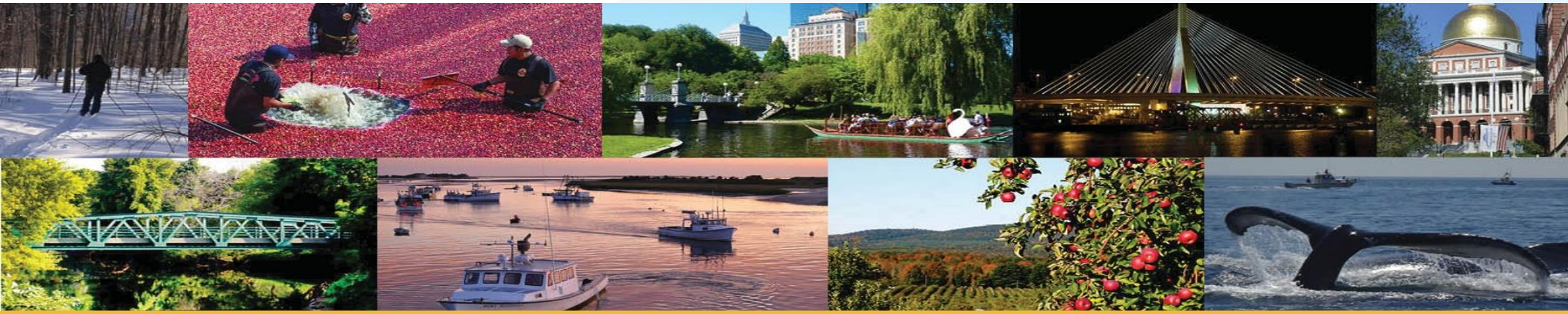
- More EPP's in statewide contracts:
  - FAC100 Building Maintenance Repair and Operations
  - FAC103 Landscaping Services, Tree Trimming, Snow Removal and Related Services
  - FAC104 Landscaping Products, Parks and Recreation Equipment and Related Products, Supplies and Service
  - GRO36 and 37: Dairy and Baked Goods
- Vendor compliance with Appliance Efficiency Standards
- Per- and poly-fluoroalkyl substances (PFAS)-Free Buying Guide
- Finalizing FY22 Annual Report – and figuring out ways to increase any of the metrics
- Explore updating EO515 and including climate reporting by our vendors (Scope 1-3).
- Update our Vendor Report Management system with more EPP requirements.

FY22 EPP Annual Report Metrics – preliminary results	FY22
Estimated EPP spending from Statewide Contracts	$333M
Estimated annual savings, primarily from energy efficient purchasing choices	$3.038M
Estimated lifetime savings, primarily from energy efficient purchasing options	$18.5M
Reduction in lifetime metric tons of carbon dioxide equivalent (MTCO2e) , primarily from purchasing energy efficient products, those containing post-consumer recycled content, or materials diverted from disposal	197,352
Estimated tons of waste diverted from disposal to recycling	31,272

OPERATIONAL SERVICES DIVISION

The Office of Vehicle Management

Vincent Micozzi



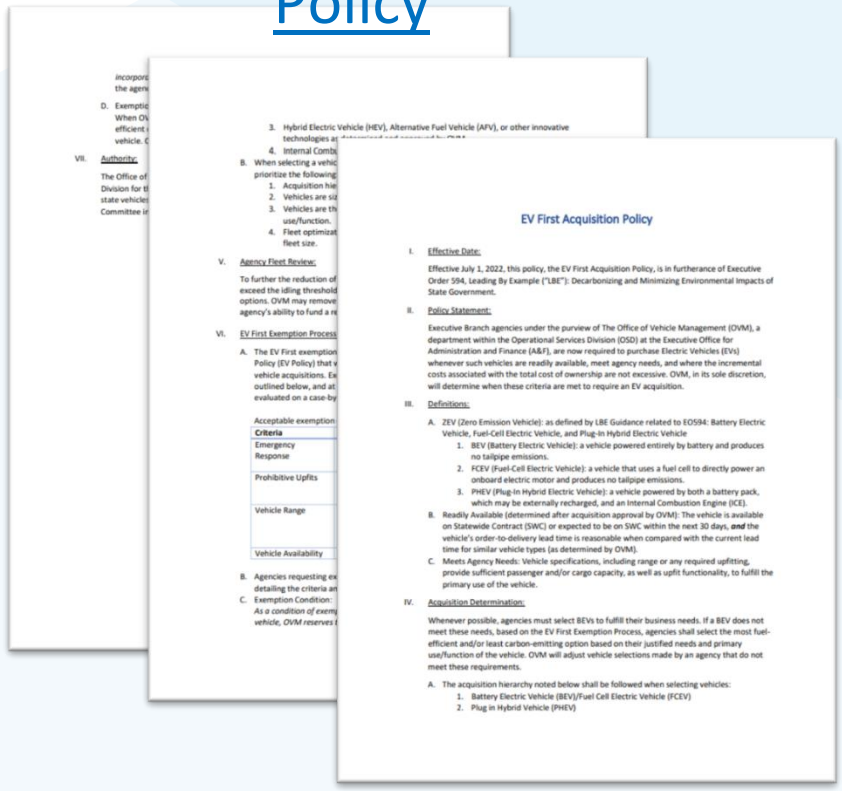
Electric Vehicle First Acquisition Policy

Released 7/1/2022

OPERATIONAL SERVICES DIVISION

- In support of Executive Order 594 the Operational Services Division established the EV First Acquisition Policy
- Ensures all Executive Branch Agencies prioritize the most fuel-efficient option to meet the primary job function.
- Outlines a vehicle acquisition hierarchy.
  1. Battery Electric Vehicle / Fuel Cell Electric Vehicle
  2. Plug in Hybrid Vehicle
  3. Hybrid Electric Vehicle / Alternative Fuel Vehicle (AFV)
  4. Internal Combustion Engine Vehicle that is the most efficient in its class
- Clearly defines exemption criteria and process.

Electric Vehicle First Acquisition Policy



Market Challenges & Innovative Solutions

OPERATIONAL SERVICES DIVISION

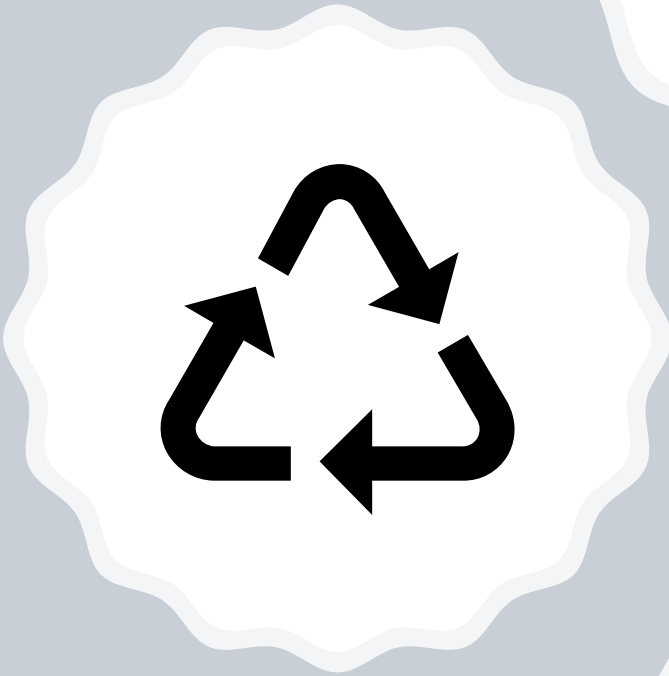
> Manufacturing bottlenecks and increased demand have negatively impacted agency's ability to acquire new vehicles.

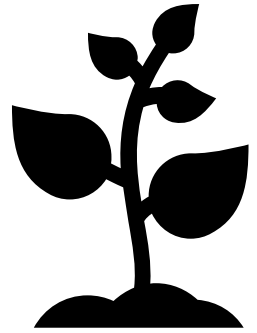
> To support agencies in their fleet electrification OVM created an inventory of Zero Emission Vehicles.

> Benefits
  - Helps agencies comply with EO594 and EV First Policy
  - Lead times reduced up to 90%
  - Models built with safety features as standard options, where available
  - OVM has ISA with DEP to apply MassEVIP grant funds to initial acquisition cost

Vehicle	Drive Train	Type	Range in Miles	Quantity Ordered
Ford Mustang Mach-E SUV	RWD	BEV	247	5
Ford Mustang Mach-E SUV	AWD	BEV	224	15
Ford F150 Lightning Pro Pickup	4WD	BEV	230	15
Ford F150 Lightning Pro Extended Range Pickup	4WD	BEV	300	5
Ford E-Transit Cargo Van	RWD	BEV	126	5
Chrysler Pacifica L Minivan	FWD	PHEV	488/32	20
Chevrolet Bolt LT Sedan	FWD	BEV	259	5
Chevrolet Bolt LT SUV	FWD	BEV	247	5

Discussion: what are your top three sustainability priorities for the year?





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In one or two words, what are your top sustainability priorities for the year?

ⓘ Start presenting to display the poll results on this slide.

Next LBE Council Meeting

Save the Date!

Tuesday, March 14th

10am-12pm

Upcoming Tentative Meeting Dates:
May 9th
July 11th