GWSA Implementation Advisory Committee (IAC) Meeting

Executive Office of Energy & Environmental Affairs

April 30th, 2025

Agenda

1. Welcome
   - Review of Meeting Minutes
2. Key Findings and Takeaways from the Forest Carbon Study
3. M/HD Vehicle Electrification and EVICC Updates
4. Informing the 2035 CECP Process
5. IAC Work Group Updates
6. Public Comments

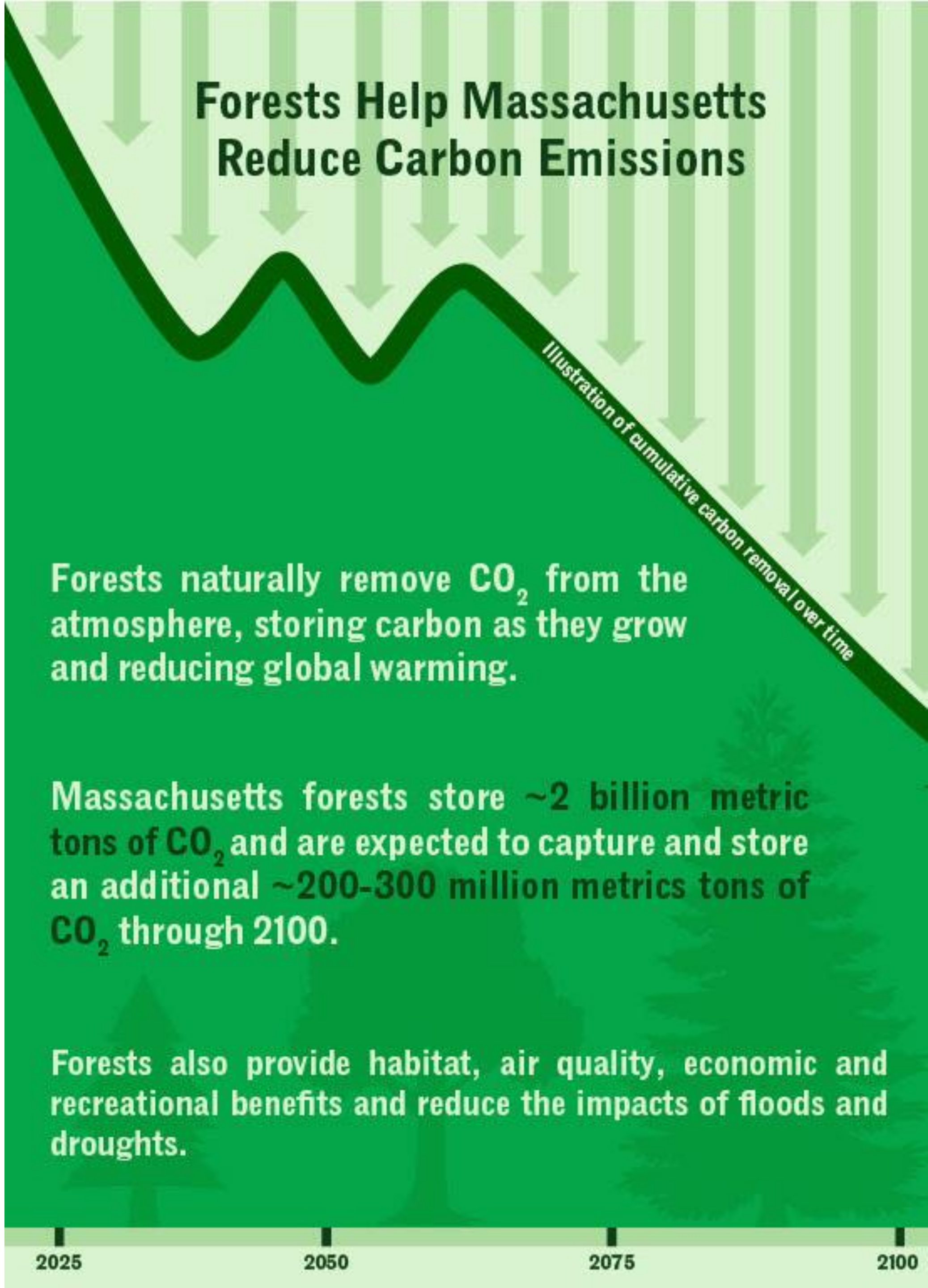
Commonwealth of Massachusetts

Executive Office of
Energy and Environmental Affairs

Forest Carbon Study:

The Impact of Alternative Land-use Scenarios on Terrestrial Carbon Storage and Sequestration in MA

April 30, 2025



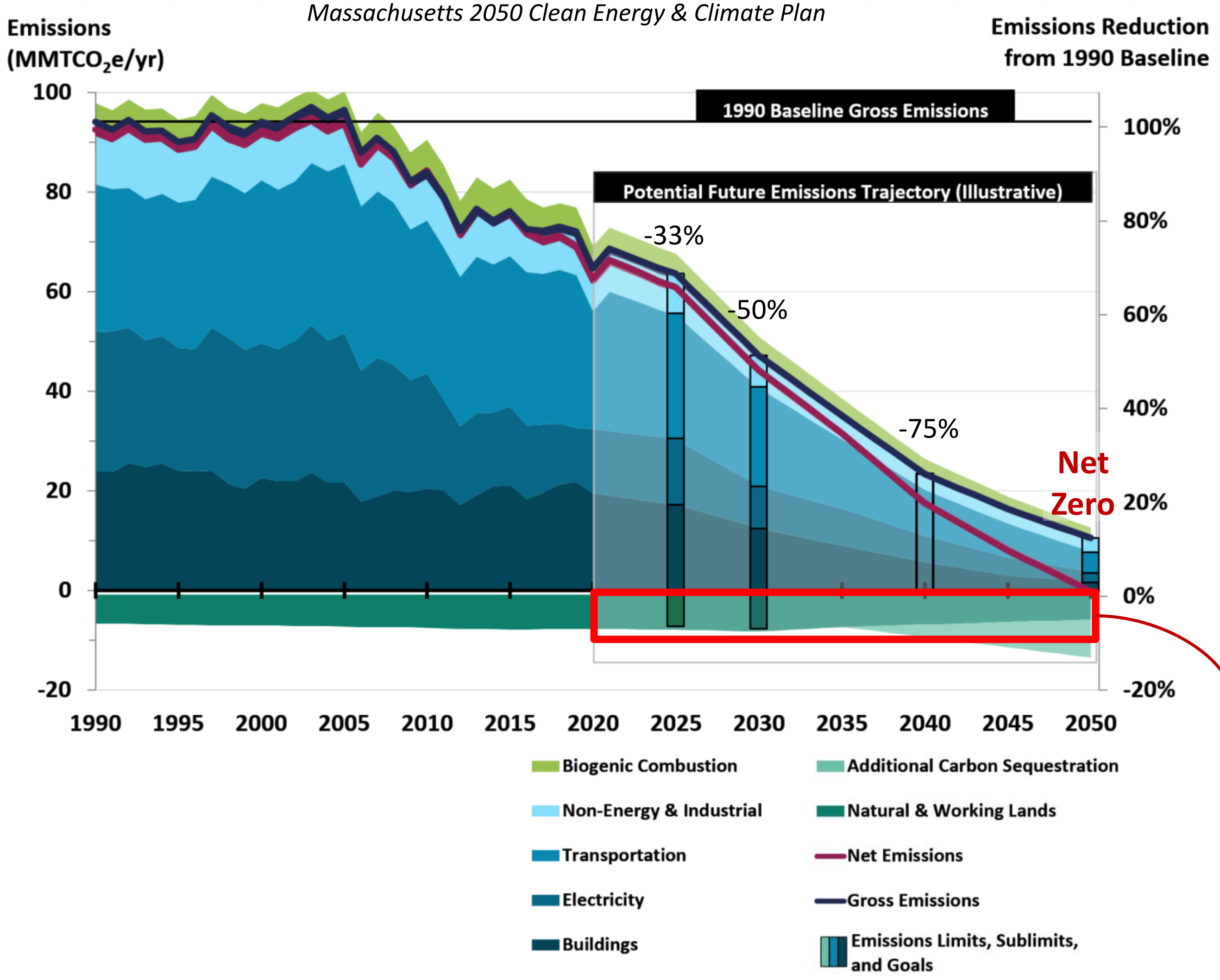
Study Overview & Key Findings

Dunbar Carpenter, Manager of Land Carbon Science and Analysis

Background – The Role of Natural & Working Lands in Achieving Net Zero Emissions

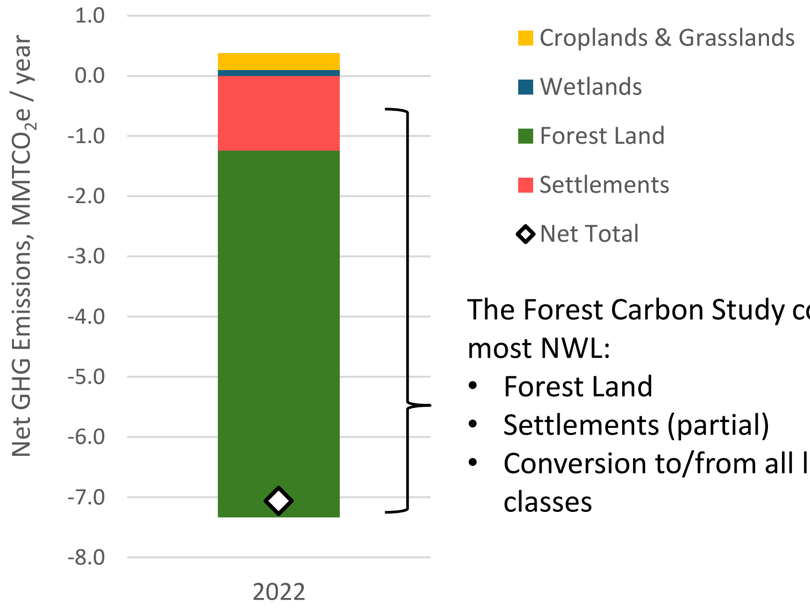
Past and Future Statewide Greenhouse Gas Emissions

Massachusetts 2050 Clean Energy & Climate Plan



Current Natural & Working Lands (NWL) Greenhouse Gas Emissions

Massachusetts NWL GHG Inventory



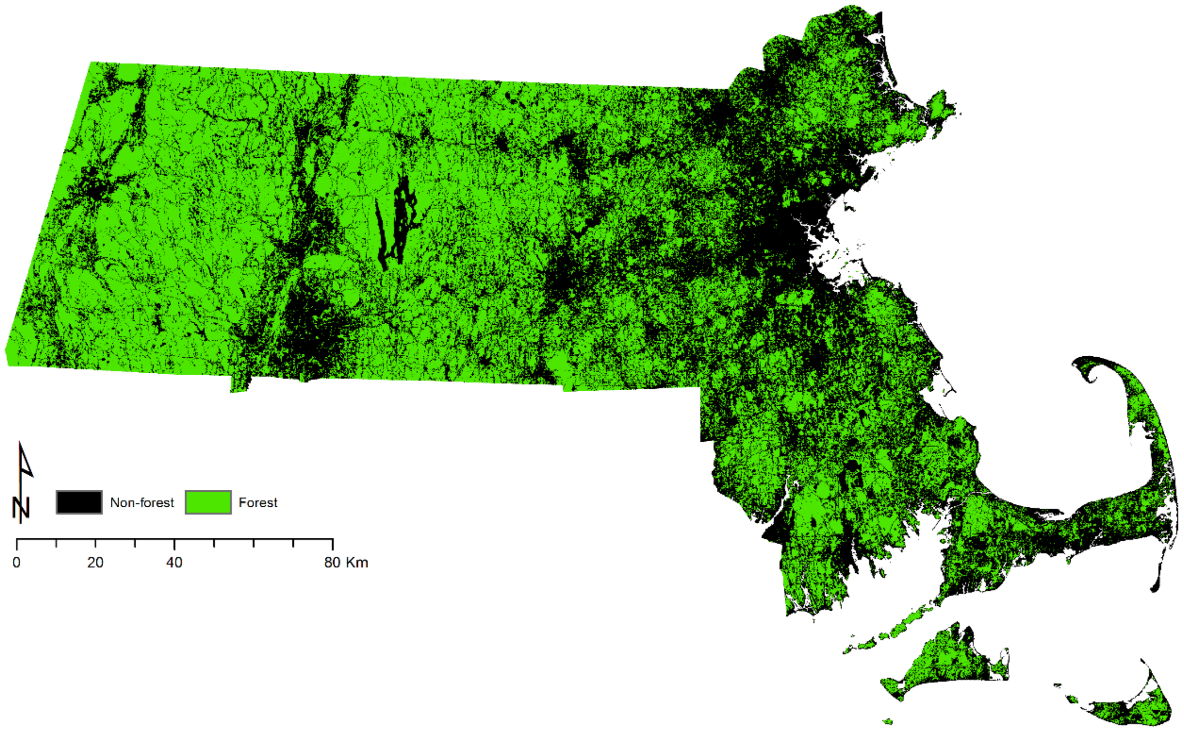
The Forest Carbon Study covers most NWL:

- Forest Land
- Settlements (partial)
- Conversion to/from all land classes

Study Motivation: To better characterize *future* NWL emissions and the potential role of NWL in achieving Net Zero

Background – Study Goals and Approach

Study Goal: To better quantify future carbon sequestration and storage potential of Massachusetts forests and NWL, including trends, risks, and opportunities, in the context other land use objectives.



- **Scenario-based modeling approach:** Simulate alternative forest and land use scenarios with different combinations of drivers and strategies to assess carbon and other outcomes.
- **Alternative future scenarios:**
  - Based on scientific understanding of Massachusetts forests and land use, CECP NWL strategies (Protect, Manage, Restore, Utilize), and input from stakeholders and EEA agencies and leadership.
  - Reflect outcomes of social, economic, environmental, and policy factors on drivers of forest and land use change, based on well-informed assumptions.
  - Illustrative, representing alternative futures intended for learning, not specific policies under consideration.
- **Modeling:** Simulates the effect of drivers/strategies on biophysical systems (land cover, ecosystems, carbon), given scenario assumptions and parameters.

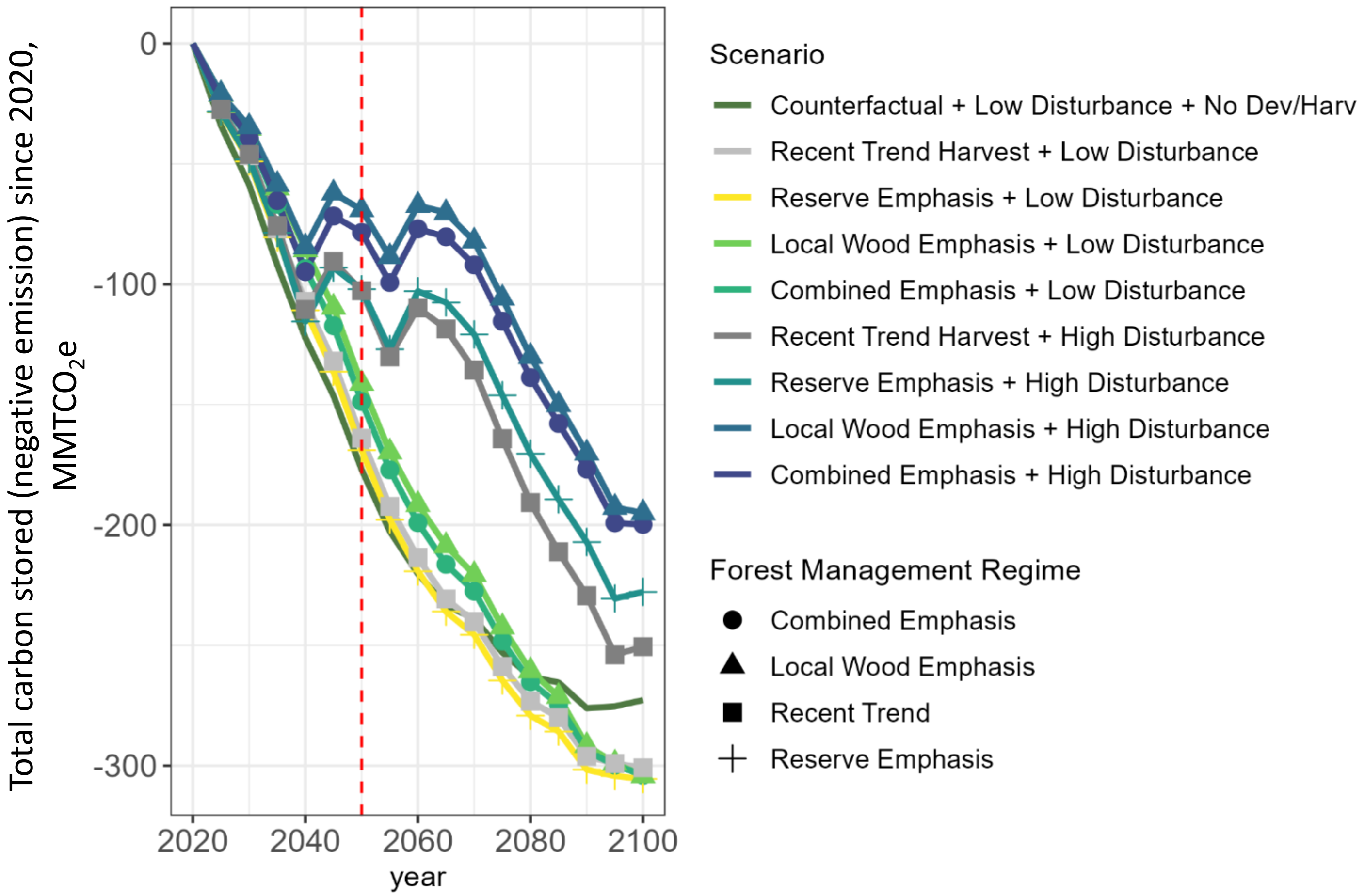
Background – Study Scope

	Forest Carbon Study (2025)	Land Sector Report (2020)
Timeframe	80 years (2020-2100) and 30 year (2020-2050)	30 years (2020-2050)
Environmental Drivers	**Forest Ecosystem Dynamics:** growth, mortality, regeneration	(same)
	Climate Change: projected temperature, precipitation, CO_2 (RCP 8.5, CCSM4)	Historic and projected temperature, precipitation, CO_2 (RCP 8.5, HADGE)
	Natural Disturbances: Hurricanes, forest insect pests, generic disturbances (incl. climate-intensified)	Generic disturbances
Human Drivers & Strategies	**Forest Management:** Climate-oriented forestry, expanded forest reserves, increased local wood production	Recent and improved forest harvesting practices; constant area and volume
	Wood Utilization: Improved wood utilization, salvage	Recent trends
	NWL Conversion: building development, solar development; low-, moderate-/recent trends-, and high-impact siting	Generic development; recent trends, sprawl
	Reforestation & Tree-Planting: varying levels	N/A
Carbon Pools	• Live trees (above- & below-ground) • Dead wood • Harvested wood/products	• Live trees (above- & below-ground) • Harvested wood/products • Soils (partial)
Primary Outputs	• Cumulative carbon sequestration/emissions (changes in pools) • Annual carbon sequestration/emissions rate (5-yr increments) • Indicators of forest ecosystem resilience and health	• Cumulative carbon sequestration/emissions (changes in pools)

Results – Future Forest Carbon Storage Trajectories

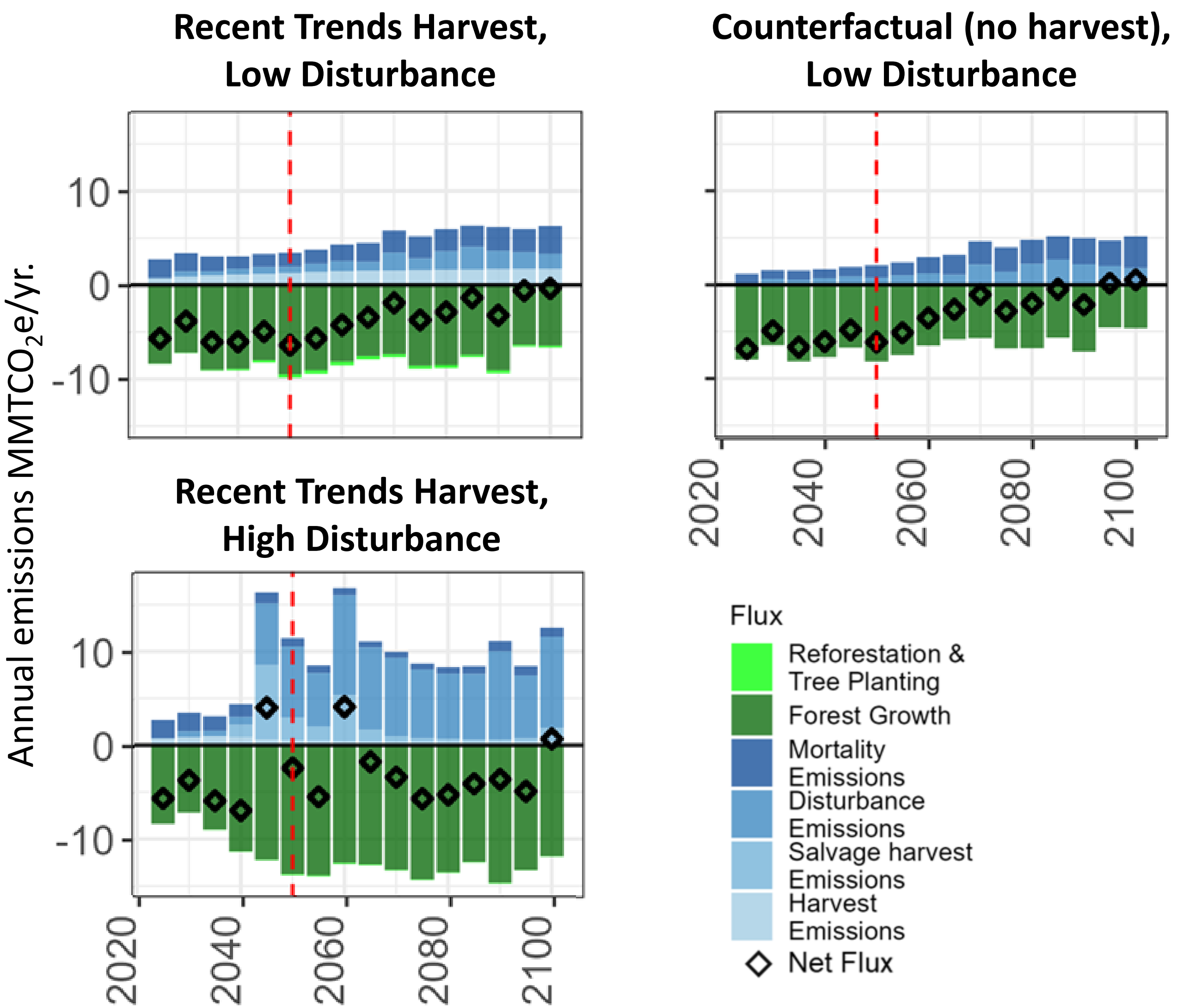
- **Massachusetts forests will continue accumulating carbon through 2100.**
- **The state's carbon storage trajectory will be driven primarily by net forest growth, and secondarily by major hurricanes** which can cause temporary losses of stored carbon storage (i.e., net emissions).
- **Alternative approaches to forest management can also influence future carbon storage, but these effects are smaller and more context-dependent**; land conversion (not shown) has a similarly sized effect.

Cumulative carbon stored in forests & wood products, 2020-2100 (excluding land conversion)



Results – Future Forest Carbon Sequestration Rates

- **In low disturbance scenarios, the net carbon sequestration rates is expected to remain relatively steady through mid-century, then decline later in the century** due to declining growth, increased mortality, and disturbance emissions.
- **In high disturbance scenarios, the net carbon sequestration rate becomes much more variable, including periods of net emissions following major hurricanes,** though remains stronger later in the century.
- **Other factors** – management/harvesting, reforestation/tree-planting, NWL/forest loss (not shown) – **have more modest influence on carbon sequestration rates.**

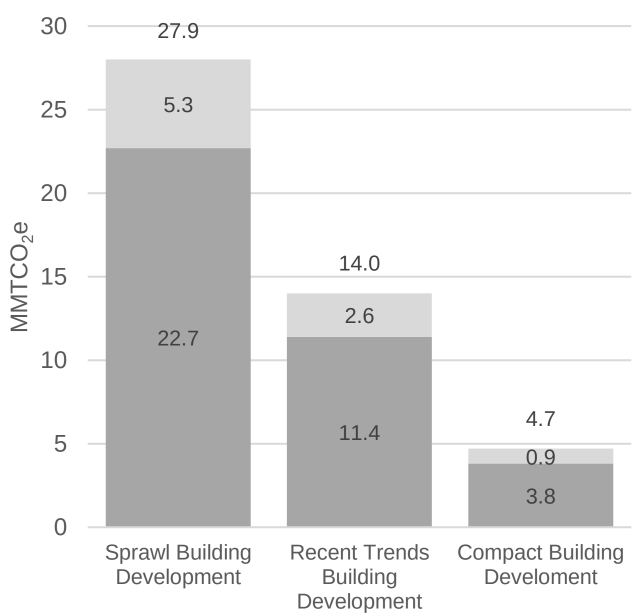


Results – Emissions from Development-Driven NWL Conversion

- **Building Development:** Emissions could be 0.5-0.9 $MMTCO_2e$/yr., but most of this could be avoided with more compact development patterns (<0.2 $MMTCO_2e$/yr.)

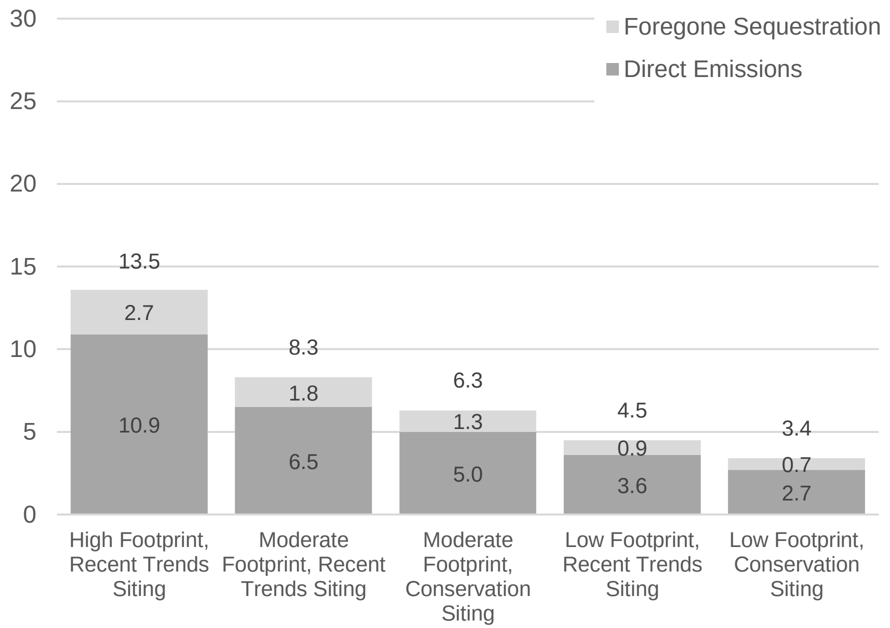
- **Solar Development:** Emissions could be 0.3-0.5 $MMTCO_2e$/yr., but most of this could also be largely avoided with improved siting and more efficient land use (~0.1 $MMTCO_2e$/yr.)

Total Emissions and Foregone Sequestration from Building Development, 2020-2050



NWL Area Converted	204K acres,	102K acres	34K acres
Change in MA Developed Area	+15.9%	+7.9%	+2.6%
Change in NWL Development Rate (from 2000-2020 ref. period)	2x	1x	1/3

Total Emissions and Foregone Sequestration from Solar Development, 2020-2050



NWL Area:	100K acres	36K acres	36K acres	25K acres	25K acres
% Solar Capacity on NWL	67%	50%	50%	33%	33%
Land use Intensity on NWL	6.8 acres/ MW_{AC}	6.8 → 3.6 acres/MW_{AC}	6.8 → 3.6 acres/MW_{AC}	3.6 acres/MW_{AC}	3.6 acres/MW_{AC}

All solar development scenarios achieve the 27 GW of anticipated in-state solar capacity needs in 2050.

Overview of Key Findings

- **Conversion of NWL to developed uses could increase emissions moderately in the coming decades, but most of these emissions could be avoided with less land-consumptive development patterns, while still meeting clean energy and building development needs.**
- **Different harvesting levels and approaches to forest management do not generally lead to large differences in carbon sequestration in Massachusetts relative to other factors.**
  - Need to consider annual carbon sequestration rates v. long-term cumulative carbon storage, out-of-state leakage, and non-carbon ecosystem services.
  - Active forest management can improve indicators of forest resilience and climate adaptability, including landscape-scale tree species and structural diversity and regeneration of important tree species.
- **Other forest and land use strategies have more limited carbon sequestration potential:**
  - Reforestation and tree planting.
  - Improved utilization of wood generated by harvesting, disturbances, and land clearing in durable products.
- **Massachusetts' forests are expected to continue serving as a long-term net sink of atmospheric carbon over the course of the 21st Century, but this forest carbon sink is vulnerable to natural and human disturbances.**
  - Net carbon sequestration rate could remain relatively steady through mid-century (best case).
  - Hurricanes pose the largest risk to forest carbon, leading to high variability in the sequestration rate and potential for temporary weakening or reversal the state's forests carbon sink.

Key Takeaways & Next Steps

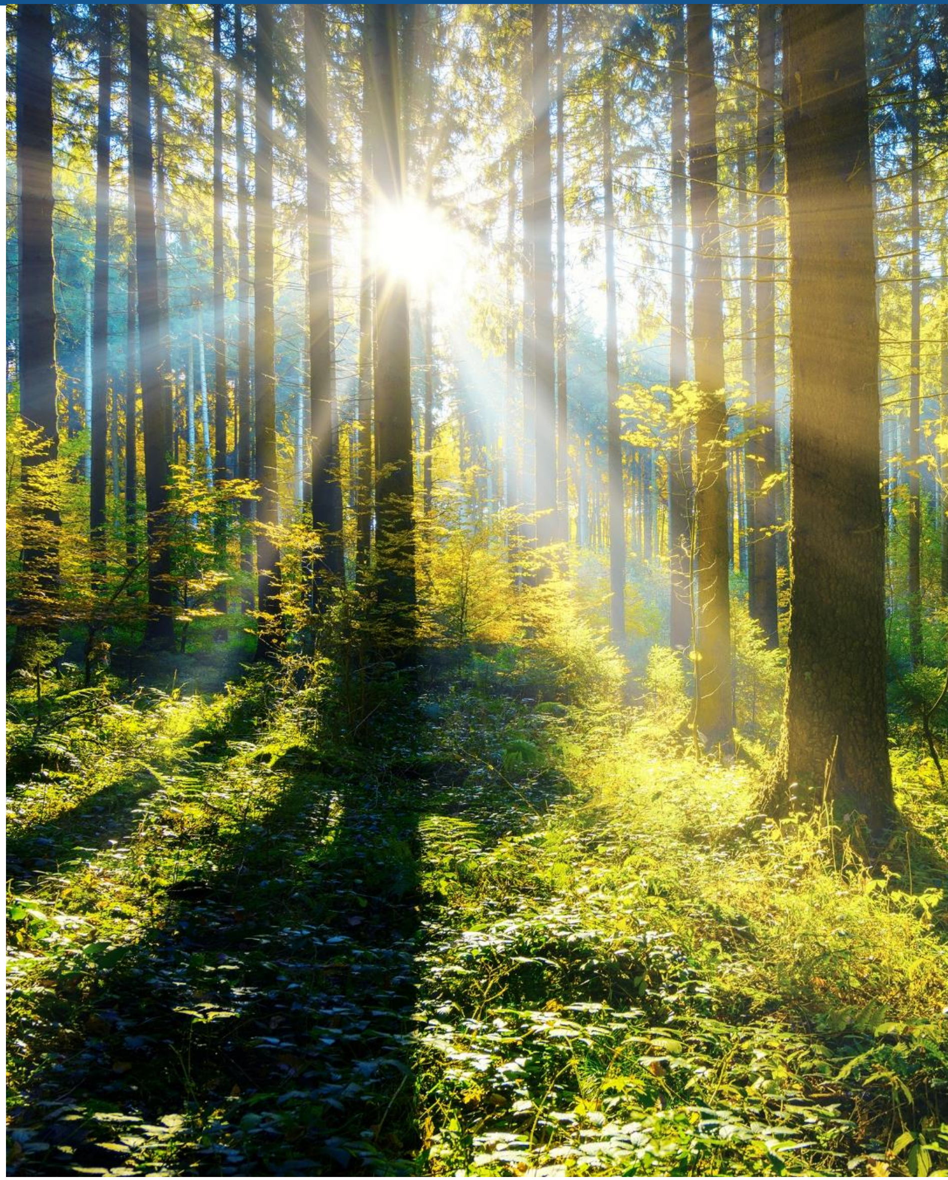
Hong-Hanh Chu, Policy Advisor for Carbon Sequestration & Storage

Key Take-Aways: Land Use

- **Minimizing deforestation is critical for “holding the line” on forest carbon sequestration.** Continued permanent forest loss will make achievement of net zero emissions in 2050 even harder.
- **Utilizing cleared trees in durable wood products can help reduce direct emissions from land clearing and provide a local source of wood products.**
- **The study demonstrates the physical potential to meet the land use needs of solar and building development while minimizing impacts to forest carbon and other ecosystem services.** Realizing this potential will require purposeful and strategic planning, policies, permitting, and incentives.

Key Take-Aways: Forest Management

- **Climate-oriented silvicultural practices and improved wood utilization can help mitigate the short-term carbon emissions from timber harvest while providing a local source of wood products.**
- **Different approaches to forest management are unlikely to significantly increase the level of carbon sequestration by MA forests.**
- **Best to manage forests holistically for long term health, biodiversity, and climate resilience.**
  - The study's landscape-level outputs/results should not dictate site-specific management or conservation decisions.



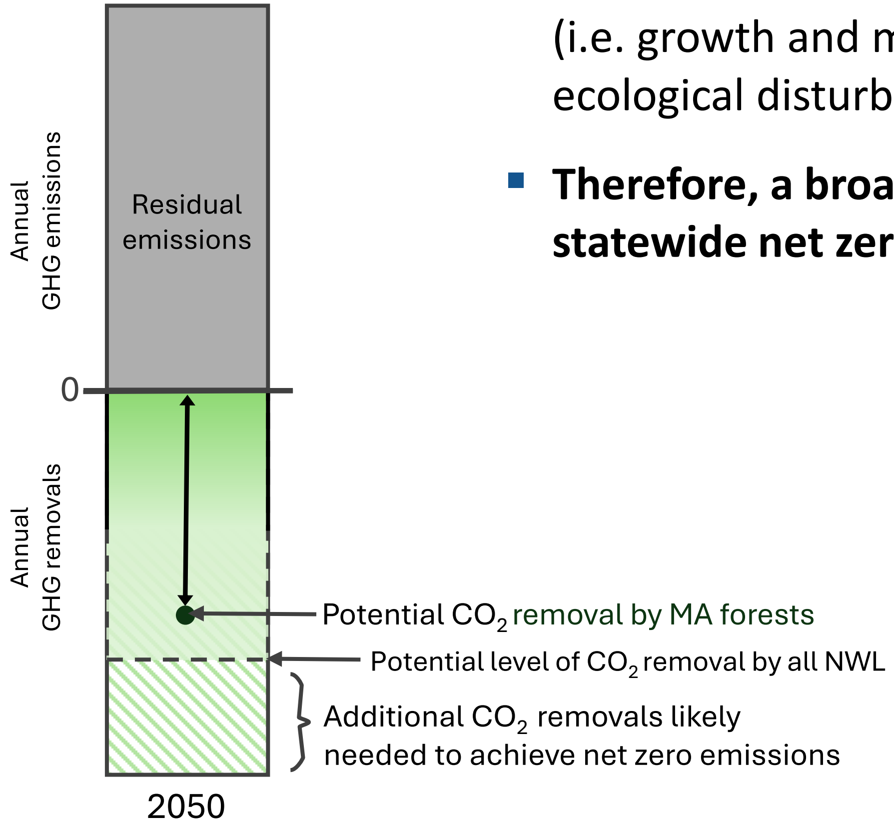
Key Take-Aways: Forest Management

- **The findings generally support the recommendations from the Forests as Climate Solutions Initiative, including:**
  - Expanding forest reserves (passive management) on some lands protects existing carbon storage;
  - Climate-oriented active forest management can help balance carbon sequestration, climate resilience, biodiversity, forest health, and other management objectives;
  - Keeping forested land as forests is important for maintaining carbon storage and sequestration, among other benefits.

Key Take-Aways: Reforestation & Tree Planting

- **Reforestation and tree planting are long term investments,** providing more carbon storage and sequestration (and other benefits) overtime as the planted trees grow.
- **Important to scale up reforestation and tree planting now to reap their benefits sooner.** Also important is appropriate stewardship to ensure vigor and climate resilience as the planted trees age.
- However, **additional strategies are needed to complement reforestation and tree planting** as they have limited potential due to land availability to significantly increase the statewide carbon sequestration level.

Key Take-Aways: Supplemental Strategies



- Forests play an important role in balancing residual GHG emissions in 2050, but **an increase in the statewide level of forest carbon sequestration is unlikely** due to natural forest processes (i.e. growth and mortality), competing land use, substantial hurricane risks, and other ecological disturbances.
- **Therefore, a broad range of strategies is needed to offset residual emissions and achieve statewide net zero emissions in 2050:**

1. In-state natural and working lands (NWL) and hybrid carbon dioxide removal (e.g. biomass burial, coastal waters, biochar)
2. In-state engineered carbon dioxide removal options
3. Out-of-state carbon dioxide removal (NWL-based, marine-based, engineered, hybrid)
4. Further GHG emissions reductions, including waste-based advanced biofuels and other low/zero carbon fuels for hard to decarbonize sectors

EEA's Next Steps

- **Advance Massachusetts' Integrated Land Use Strategy (previously Holistic Land Use Strategy/Plan), in coordination with other Secretariats, to prioritize optimal locations for clean energy infrastructure, housing, economic development and land conservation.**
  - Recent progress: Project management team convened, workplan completed and shared with secretariats; energy infrastructure site suitability methodology drafted; land use planner hired; RFP for consultant support.
- **Seek additional and consistent funding to:**
  - Scale up reforestation and tree planting and stewardship, focusing on riparian and urban areas for multiple benefits.
  - Continue enhanced land conservation through implementation of Forests As Climate Solutions Initiative, Resilient Lands Initiative, and Executive Order 618 on Biodiversity Conservation.
  - Continue incentives for climate-oriented forest management and improved wood utilization through implementation of Forests As Climate Solutions Initiative.
- **Continue to explore additional NWL opportunities, carbon dioxide removal technologies, and potentially out-of-state carbon sequestration to achieve Net Zero in 2050.**
- **Revisit existing NWL-related goals and consider developing new goals for the next Clean Energy and Climate Plan.**

2025 M/HD Vehicle Electrification and EVICC Updates

Summary: Massachusetts Programs Supporting M/HD Electrification

Massachusetts offers rebates, fleet planning, and infrastructure support to advance medium- and heavy-duty vehicle electrification across sectors.

- **Mass Fleet Advisor:** Free fleet electrification planning assistance focused on MDHD fleets
- **MOR-EV Trucks:** $7.5k to $90k rebates for Class 2b through 8 electric trucks
- **MassEVIP Fleets:** Grants for public fleet EV acquisition and fleet EV charging stations
- **Utility EV Programs:** Support for EV charging from Eversource, National Grid, some MLPs
- **MassCEC/EVICC:** $38M to advance EV charging solutions including MDHD infrastructure
- **LBE:** Fleet EVSE Deployment Grant for state fleet EV charging infrastructure
- **Advanced Clean Trucks Rule:** DEP grants relief for manufacturers unable to meet MY 25 & 26 sales requirements. Additional information available: Massachusetts Announces Flexibilities for Clean Trucks Requirements | Mass.gov

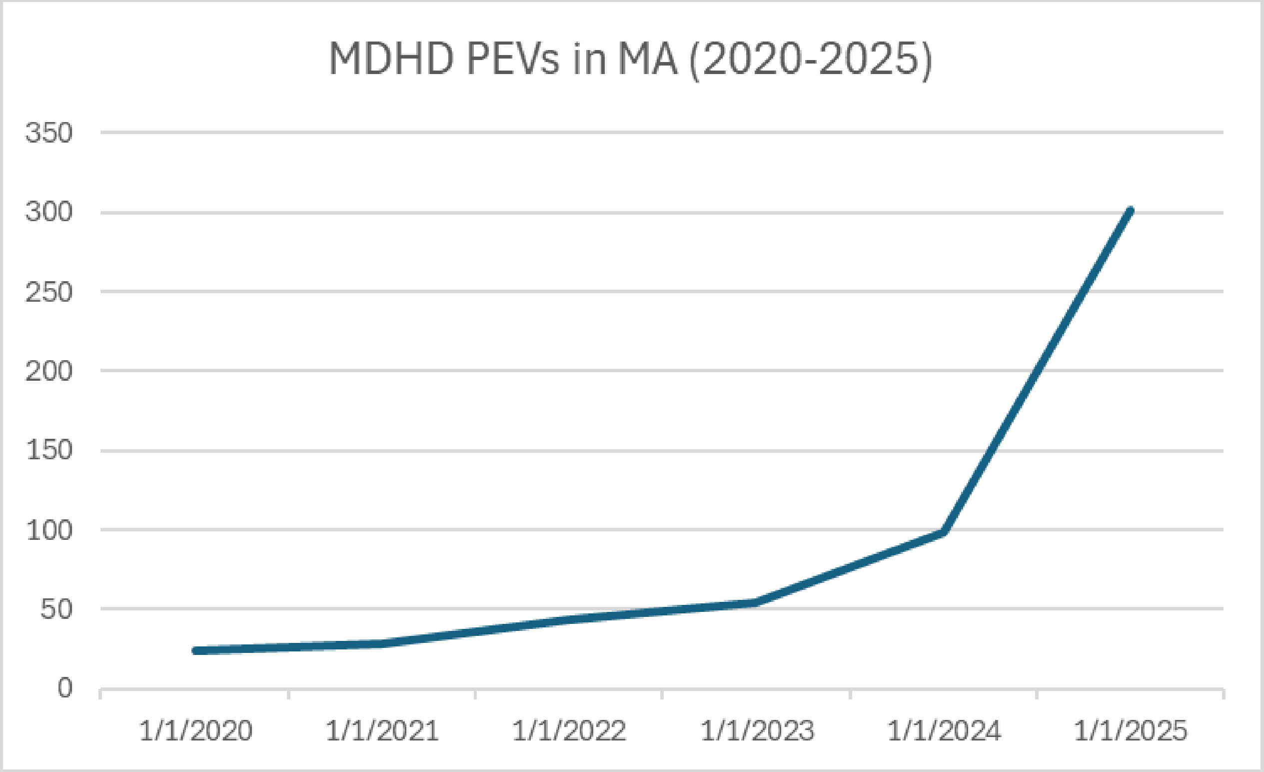
M/HD Vehicle Electrification in MA "by the numbers"

Vehicles

- M/HD Class 3-8 EVs (BEV + PHEV):* **391**
- MOR-EV Trucks rebates issued:**
  - Medium- and heavy-duty BEV: **30**
  - BEV Pick Up Trucks/Van (Class 2B): **827**

*as of 4/1/25

**as of 1/1/25



Source: Massachusetts Vehicle Census

MassVehicleCensus | GeoDOT Homepage DEV

First EVICC Assessment

- Key takeaways from the first EVICC Assessment included:
  - Additional EV charging infrastructure is needed to meet the Commonwealth’s 2030 climate goals
  - Customer charging experience needs improvement
  - Massachusetts should prioritize charger access for “garage orphans,” renters, and rural communities
  - A lack of grid capacity poses challenges to deploying the needed amount of EV chargers
  - The State should better promote its EV charger incentive programs and availability of EV charging

- Actions EVICC or EVICC members have taken to address these takeaway are included in the Appendix

- The Second EVICC Assessment is due on August 11, 2025

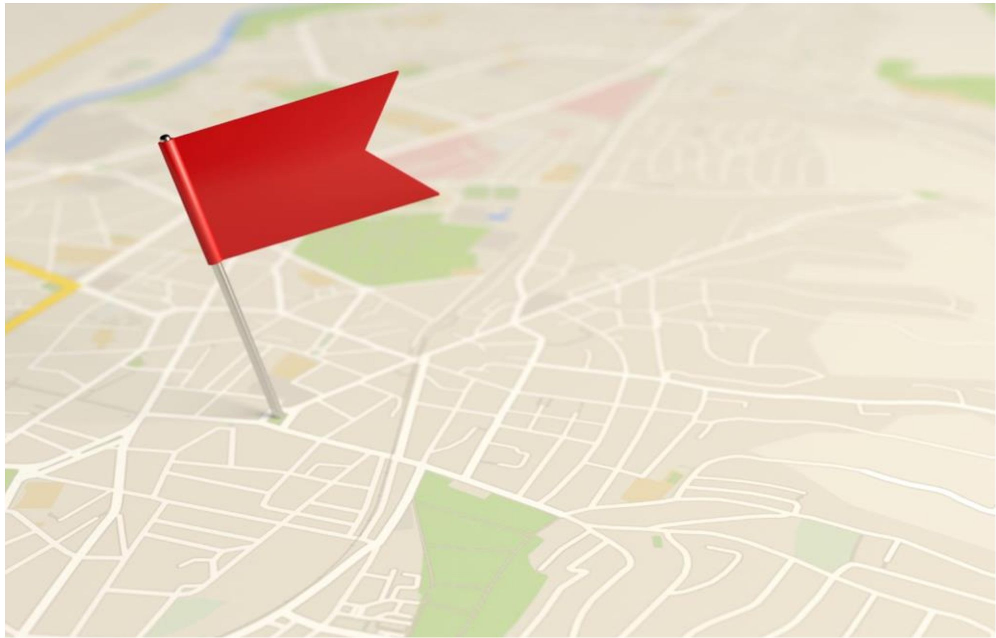

Commonwealth of Massachusetts

Electric Vehicle Infrastructure Coordinating Council

Initial Assessment to the General Court
August 11, 2023

Second Assessment Objectives

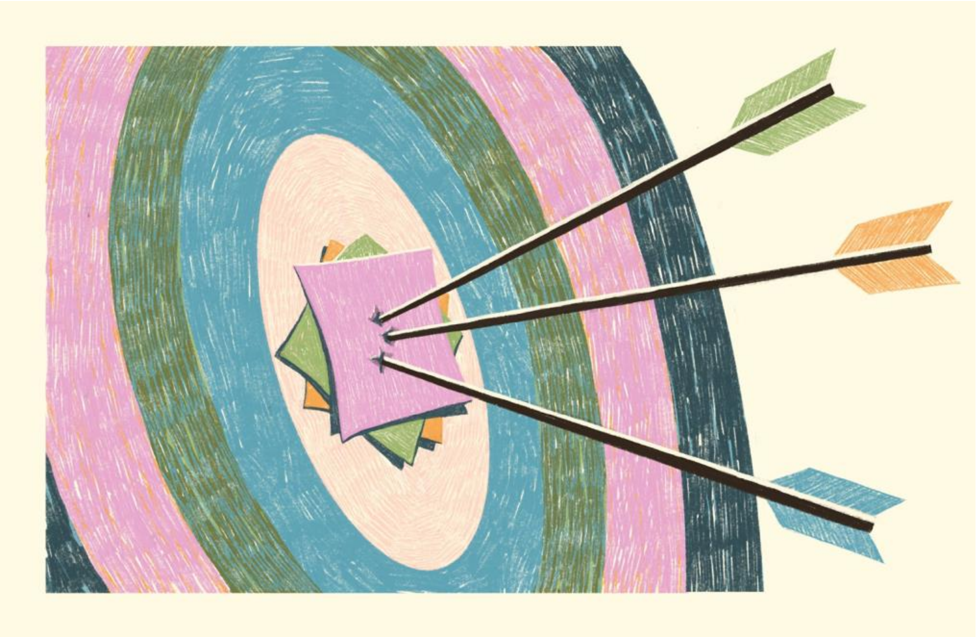
- The Second Assessment will provide **a clear roadmap** for how Massachusetts plans to deploy the necessary EV charging infrastructure to meet the state's climate goals and other policy objectives **through 2035**



- The Second Assessment will build on the work of the First Assessment to provide more granular analysis and recommendations, as time, resources, and data availability allow

Second Assessment Objectives (cont.)

- **The Assessment will provide this roadmap by clearly laying out:**
  - The *current state* of EV charging in Massachusetts;
  - The likely *endpoint* to meet the Commonwealth's policy goals; and,
  - *EVICC's recommendations on how* to get from here to the desired endpoint.



- **Each recommendation will identify:**
  - Which *state agency* or *agencies* will support / lead implementation; and,
  - The role of *local/regional governments*, *private companies*, and *electric utilities*.

- **The Assessment will also highlight:**
  - The interrelation with the state's Clean Energy and Climate Plan (CECP) for 2025 and 2030; and,
  - The role of EVICC in coordinating recommendation implementation.

Overview of Second Assessment Outline

1. Executive Summary: Clearly conveys plan to meet 2030/2035 EV charger needs and EVICC's recommendations
2. Purpose and Context: EVICC background; policy background; and development of Second Assessment
3. Current EV Charging Programs and Initiatives
4. EV Charger Deployment
5. Electric Grid Impacts and Managed Charging
6. Consumer Charging Experience
7. EV Charging Technology and Business Model Innovation
8. Summary/Conclusion
9. Appendices

- EV charger needs projections methodology
- One-page summary of existing state EV programs by program type
- Educational materials for EV charging customers and EV charger site hosts
- EJ Community Siting Guide
- Summary status of recommendations from First Assessment
- Information on non-infrastructure EV programs and initiatives (e.g., MOR-EV, Accelerating Clean Transportation (ACT) School Bus, state employee domicile EV policy, etc.)

Early Technical Analysis Results

EV Charger Deployment Overview

- Evaluation of the type and location of EV chargers needed to meet state's goals through 2035
  - Focus on multi-family dwellings with on-street parking, EJ communities, and medium duty/heavy-duty EVs
  - Compare the pace of EV charger deployment since last assessment to state's goals

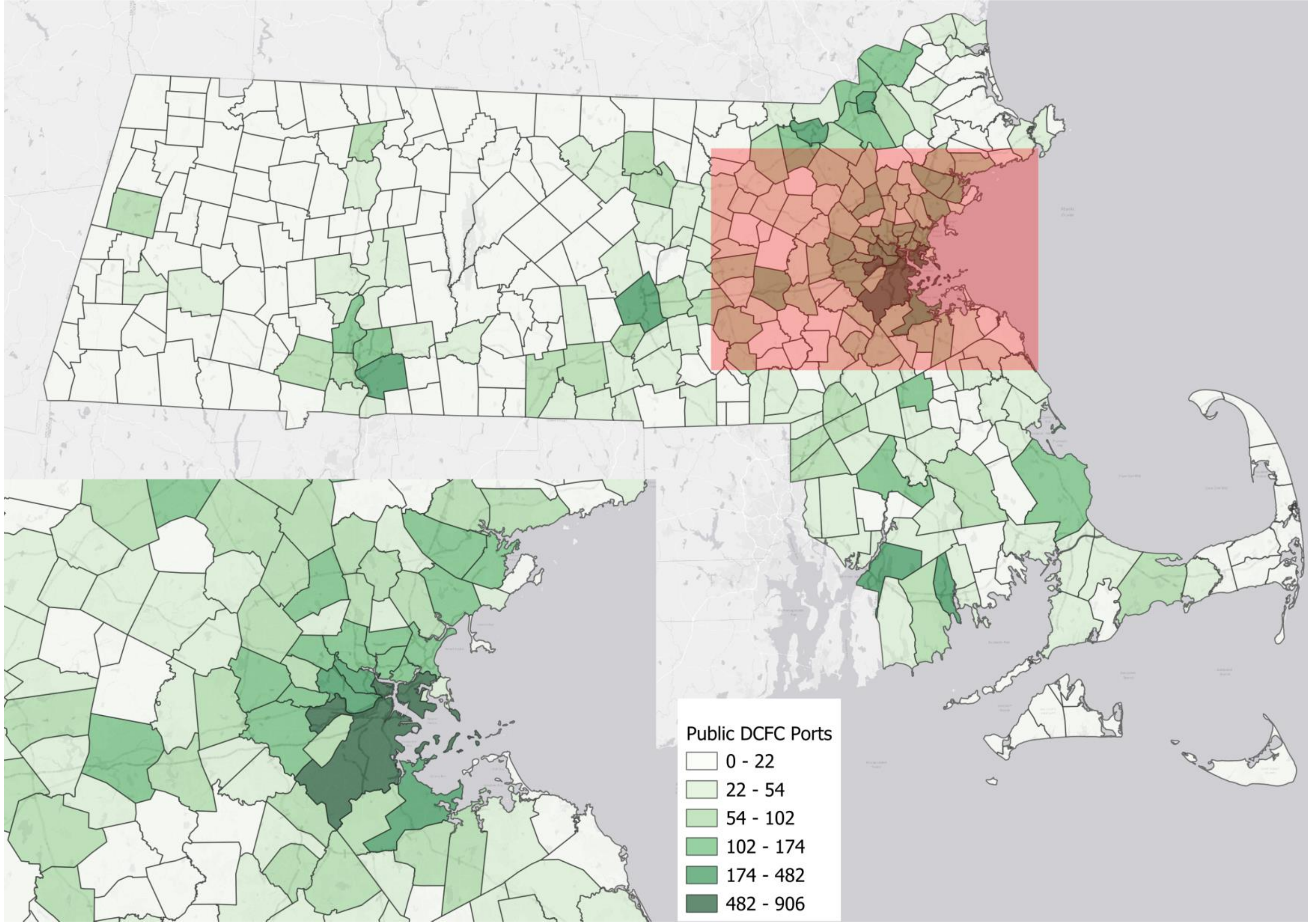
- Location and type of EV charger needs are informed by:
  - Projected traffic patterns and volumes
  - Demographic data (population, employment, etc.)
  - Vehicle sales and electrification forecasts
  - Housing characteristics (single-family homes vs. multi-family homes with on-street parking)
  - Existing chargers and EV registrations
  - Locations of food amenities, stores, and restrooms for public chargers
  - Trucking depots and rest stops

- Additional information on the methodology is include in the Appendix

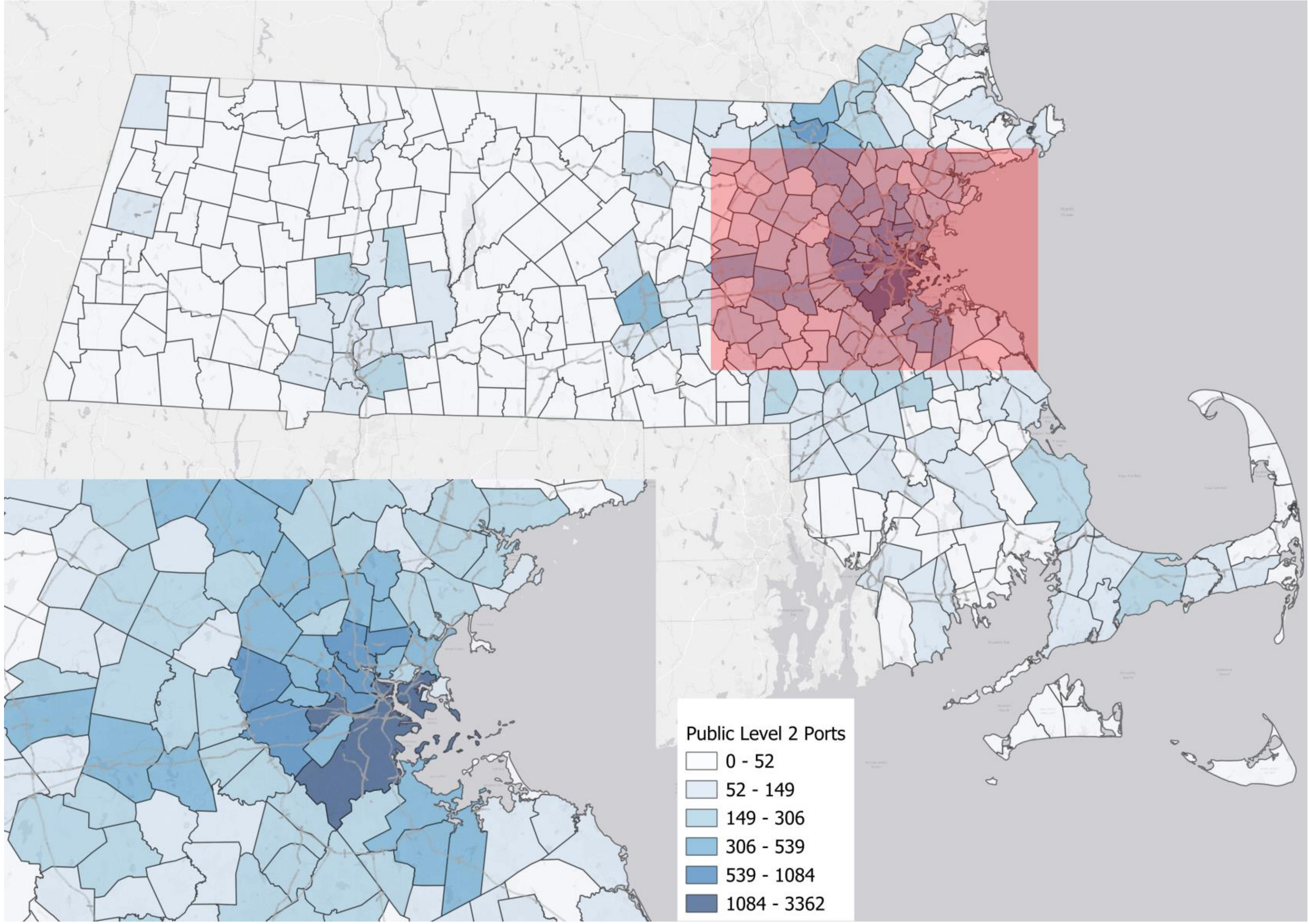
- The following slides show **preliminary results for Public EV Charging (DCFC & L2)**
- **Additional preliminary results details available on the EVICC website.**

Synapse Energy Economics, Inc.

Public DCFC Projections 2035 (Statewide)



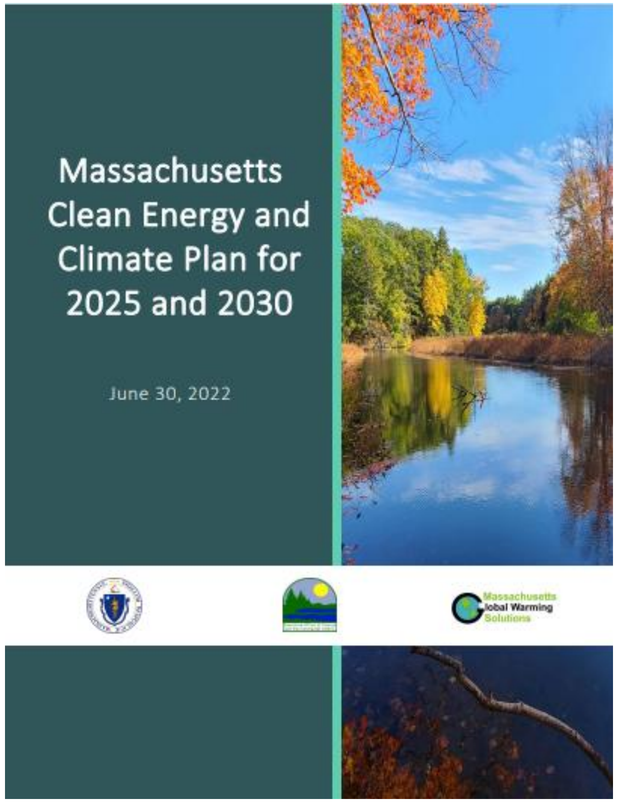
Public Level 2 Projections 2035 (Statewide)

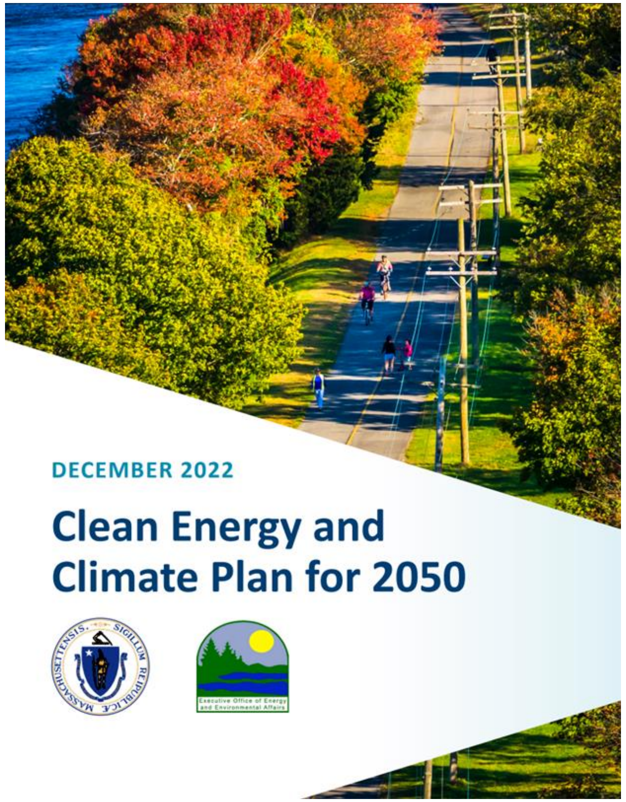


Informing the 2035 CECP Process

2035 Work Planning Process

- Developing a Work Plan in 2025
  - Goals and Visions
  - Timeline and deliverable
  - Role of IAC and other stakeholders
  - Public Engagement and EJ
  - Policy development
  - Modeling
  - Integrating Planning Efforts





IAC Work Group Updates

Public Comments

Appendix

First Assessment Takeaways and Actions

- Additional EV charging infrastructure is needed to meet the Commonwealth's climate goals
  - Massachusetts has a suite of incentive and other programs to support EV charger deployment
- Customer charging experience needs improvement
  - Massachusetts Division of Standards is developing regulations to inspect and test EV chargers for accuracy; Massachusetts Executive Office of Energy and Environmental Affairs (EEA) will develop reliability regulations
- Massachusetts should prioritize charger access for "garage orphans," renters, and rural communities
  - Massachusetts Clean Energy Center (MassCEC) created a program to assist municipalities with curbside charging
  - "Right to Charge" legislation passed for condo owners (Sections 85 and 86 of 2024 Climate Act)
  - EEA Office of Environmental Justice and Equity created siting guide for Environmental Justice communities
- A lack of grid capacity poses challenges to deploying the needed amount of EV chargers
  - EVICC is working with a consultant to complete an analysis of fast chargers for multi-unit buildings and long-distance trips, and associated grid impact
- The State should better promote its EV charger inventive programs and availability of EV charging
  - MassCEC launched new, one-stop webpage for state EV programs and information
  - The presence of EV chargers can now be advertised on state highway signs

Charging Demand for Public Chargers

Public Charging (Level 2)

- Grid-level allocation using Caret EVI Planner software, prioritizing areas with:
  - High business density (amenities for charging dwell time), off-street parking for multi-family housing out to 2 miles, and projected traffic patterns.
- Existing L2 charger density factored in to prevent oversaturation.

Public Charging (DCFC)

- Multi-Family Housing Demand:
  - Town-level allocation based on the proportion of multi-family units in each town, grid-level placement prioritizes high-density multi-family areas with limited home charging access, and proximity to existing DCFCs.
- Long-Distance Travel Demand:
  - Town-level DCFC allocation based on share of highway/interstate exits with high long-distance trip frequency, chargers placed within 1 mile of highway exits, favoring locations with limited existing DCFC coverage, and proximity to existing DCFCs.