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June 25, 2025

REQUEST FOR COMMENT ON THE DRAFT EVICC SECOND ASSESSMENT

The Electric Vehicle Infrastructure Coordinating Council (EVICC) is proud to release its draft Second Assessment, which provides a detailed look at the current state of electric vehicle (EV) charging in Massachusetts, estimates of EV charging needs in 2030 and 2035 in accordance with the state's climate goals, and strategic actions to achieve an equitable, interconnected, accessible, and reliable EV charging network in Massachusetts.

EVICC is a unique initiative that brings together state agencies, legislators, and stakeholders to plan and coordinate the Commonwealth's charging efforts. EVICC is required to report on recommended strategies for developing a robust network of EV charging infrastructure through a formal assessment to the General Court every two years. The First Assessment, issued in August 2023, provided a foundation for the state's EV charging strategy. Since then, this strategy has been implemented through a range of programs, initiatives and legislative changes. The Second Assessment highlights this progress and explores ways to accelerate charger deployment in the **areas of greatest need**, enhance energy **affordability**, and **give Massachusetts drivers confidence** in switching to EVs.

The Second Assessment was developed based on input provided by stakeholders and EVICC members during public meetings and at public hearings held in New Bedford, Worcester, Holyoke, and Boston during March and April 2025.[1] The resulting draft was a collaborative effort between EVICC member organizations, EVICC consultants, and Executive Office of Energy and Environmental Affairs (EEA) staff.

The Second Assessment is open to public comment until **July 11, 2025**. You are invited to fill out **this survey** or submit written comments **via email**. Written comments should include the name and affiliation of the commenter(s) and responses to the survey questions, which are located on the next page. All feedback will be carefully considered for the final Second Assessment due to the General Court by August 11, 2025.

Sincerely,

Joshua Ryor, EVICC Chair
Assistant Secretary of Energy, EEA

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[1] See Second Assessment public hearing **slide deck**. The Holyoke and Boston public hearings were hybrid.

Stakeholder Engagement Questions – Public Comment Period

You are invited to fill out **this survey** or submit written comments **via email**. Written comments should include the name and affiliation of the commenter(s) and responses to the survey questions.

Chapter Questions

The following questions are structured around each chapter of the draft Second Assessment.

- **Ch 3**: What are the most impactful ways to improve or enhance coordination between existing EV charging incentive programs?
- **Ch 4**: Does the charger deployment prioritization framework presented in Chapter 4 align with your understanding of future charging needs?
    - Should any segments be prioritized differently?
    - Are there any gaps in charging needs that you feel were not identified?
    - Are there additional barriers or considerations you feel are not included for Environmental Justice (EJ) communities, rural areas, medium- and heavy-duty vehicles, or multi-unit dwellings without EV charging?
- **Ch 5**: How can the state and utilities ensure that electric grid impacts, including costs, are minimized?
    - What types of customers and program designs are most important / impactful?
    - How should active and passive managed charging be paired with whole home TOUs to ensure grid impacts are mitigated?
    - What other programs or initiatives should be paired with these offerings to ensure that EVs are also utilized as grid assets?
- **Ch 6**: What are the most impactful long-term measures to improve customer charging experience?
    - Among other potential long-term measures, how would you rate "plug and charge"[2] in its ability to improve the customer charging experience?
    - What can the state do to help unlock "plug and charge" for all charging companies and networks?
    - What can the state do to unlock other long-term measures to improve customer experience?
- **Ch 7**: What are the most impactful ways to unlock additional private funding and to ensure the long-term sustainability of EV charging business models?
    - How impactful is the Charging-as-a-Service model in unlocking private investment and sustainable businesses models for EV charging?
    - What can the state do to help make Charging-as-a-Service more accessible?
    - What can the state do to unlock other long-term measures to unlock private investment?

Recommendations Questions

Chapter 8 of the Second Assessment summarizes EVICC's recommendations for addressing EV charging needs across the Commonwealth. The following questions focus on those recommendations.

- Which of these recommendations are the most important? Are there any stakeholders you think should be involved in carrying out those recommendations?
- Would you change the wording of any of the recommendations? Which one and why?
- Are there recommendations that are missing from this list? What are they? Why should they be added?

General Comments

- Is there any other feedback you would like to share related to the draft Second Assessment?

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[2] "Plug and charge" is a technology that allows automatic authentication and payment when plugging an EV into a compatible charging station.

Commonwealth of Massachusetts

Electric Vehicle Infrastructure Coordinating Council

Second Assessment to the General Court

June 2025

Council Membership

Assistant Secretary of Energy Joshua Ryor (EVICC Chair)

Executive Office of Energy and Environmental Affairs

Senator Mike Barrett

Chair, Joint Committee on Telecommunications, Utilities and Energy

Commissioner David Rodrigues

Division of Standards

Commissioner Staci Rubin

Department of Public Utilities

Aurora Edington

Department of Energy Resources

Hank Webster

Department of Environmental Protection

Chris Aiello

Department of Transportation

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Chair, Joint Committee on Telecommunications, Utilities and Energy

Acknowledgements

EVICC Leadership Team

EVICC is made possible by the time, effort, and skill of the EVICC Leadership Team and contributions from EVICC member organizations and the public.

The EVICC Leadership Team is comprised of the EVICC Chair and the following Executive Office of Energy and Environmental Affairs (EEA) staff and consultants:

- Katie Gronendyke, Clean Energy Policy Advisor
- Mark Scribner, Policy Advisor for Transportation Decarbonization
- Yuna L. Choi, Associate General Counsel
- Sarah McDaniel, Deputy General Counsel
- Elisa Guerrero, Planning Communities
- Ann Steedly, Planning Communities
- Nicole Voudren, Better Together Brain Trust

EVICC's work is also aided immeasurably by a number of EVICC member organization staff including, but not limited to: Alazad Iqbal, Andrew Paul, Audrey Horst, Alison Felix, Betsy Isenstein, Devan DiLibero, Elijah Sinclair, Eric Friedman, Katherin Weber, Mark Rabinski, Morgan Bowler, Nahlia Yefet, Rhys Webb, Scott Seigal, Sharon Weber, Tina Chin, Vyshnavi Kosigi, and Zach Jenkins.

Assessment Writing Support

Creating the Second Assessment was a collaborative effort, with input from various state agencies. The updated analysis on the current state of charger deployment and projected charging needs was completed by Synapse Energy Economics, the Center for Sustainable Energy and Resource Systems Group (RSG). Additional writing and coordination assistance came from Planning Communities and Better Together Brain Trust (BT2). The EVICC and Technical Committee provided input on key topics throughout the development of the Second Assessment. Contributing state agencies and partners included:

- Executive Office of Energy and Environmental Affairs
- Department of Environmental Protection
- Department of Public Utilities
- Massachusetts Department of Transportation
- Massachusetts Clean Energy Center
- Department of Energy Resources
- EEA Office of Environmental Justice and Equity

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Executive Summary

Background

In 2022, as part of An Act Driving Clean Energy and Offshore Wind (2022 Climate Act), the General Court of Massachusetts established the Electric Vehicle Infrastructure Coordinating Council (EVICC) as a first-of-its-kind initiative to centralize and coordinate the Commonwealth's electric vehicle (EV) charging efforts. EVICC was created in recognition of the vital role that EV charging plays in Massachusetts' transition to a clean energy economy.

Massachusetts' primary clean energy transition planning documents, the Clean Energy and Climate Plans (CECPs) for 2025/2030 and 2050, establish economy-wide limits and sector-specific sublimits for reducing greenhouse gas emissions. For the transportation sector, an emissions sublimit of 34% below 1990 levels was set for 2030, and 86% for 2050. To achieve these sublimits, Massachusetts must transition nearly all vehicles to zero-emissions (i.e., battery EVs, plug-in hybrid vehicles, and fuel cell vehicles) by 2050. In the near term, the Commonwealth will need 200,000 EVs, both battery electric and plug-in hybrid vehicles, on the road by 2025 and 900,000 light-duty EVs on the road by 2030 to achieve this sublimit.

A robust network of available and reliable EV chargers is vital to ensuring this level of EV adoption, as a robust EV charging network empower consumers to feel comfortable in making the switch. Unfortunately, despite the steady expansion of EV charging networks, limited availability of chargers is still perceived as one of the biggest barriers to EV adoption. A recent survey by J.D. Power and Associates found that the top three factors cited by active vehicle shoppers as a barrier to EV adoption were related to charging infrastructure.[1]

Thus, EVICC's role in developing a comprehensive plan to build an equitable, interconnected, accessible, and reliable EV charging network throughout Massachusetts, in partnership with government actors, private industry, and the public, is vital to the achievement of the state's climate requirements.

[1] Autoweek Staff, "J.D. Power Finds Charging Access Biggest Deterrent to EV Adoption," Autoweek, February 28, 2025, https://www.autoweek.com/news/a63965563/ev-charging-access-jd-power-study/.
Auto Remarketing Staff, "J.D. Power Report: Public Charging Still the Biggest Issue Stopping EV Adoption," Auto Remarketing, February 28, 2025, https://www.autoremarketing.com/ar/analysis/j-d-power-report-public-charging-still-the-biggest-issue-stopping-ev-adoption/.

Assessment Overview

The publication of the Second EVICC Assessment comes at a challenging time for EV charging deployment nationwide due to federal policy changes, as well as market and cost uncertainties. The future of California's rules phasing out of the sale of new gasoline-only vehicles, which Massachusetts and several other states have adopted, are at risk of elimination (See Chapter 2 for more on the California rules) and the United States Congress is considering removing tax incentives for EV and EV charging.[2]

Massachusetts remains a national leader in deploying EV charging, ranking 4th amongst all states in public EV chargers per capita. Massachusetts has also made considerable progress in deploying charging since the Initial EVICC Assessment, with public EV charging increasing over 50 percent since August 2023. However, this Assessment also finds that the current pace of EV charger deployment needs to triple in order to support the numbers of EVs that the CECPs project are needed by 2030 to meet Massachusetts' emissions reduction limits.

Given the current headwinds and the need to increase the pace of deployment, the Second EVICC Assessment lays out several actions to enable Massachusetts to continue to build a robust EV charging network that meets the Commonwealth's needs.

In general, these actions will require the Commonwealth to:

- **Be more strategic** in employing public funds, leveraging private funding, and utilizing the electric grid by prioritizing high-impact charging opportunities and minimizing grid costs;
- **Increase the efficiency** of current charger incentive program offerings and remove common barriers to charger deployment;
- **Be proactive** in planning for future EV charging, grid infrastructure, and future funding sources; and,
- **Significantly improve** the EV charging experience for drivers.

Together, these improvements will **enhance affordability**, accelerate charger deployment in the **areas of greatest need**, and **give Massachusetts drivers confidence** in making the switch to EVs. These strategic actions, organized into eight focus areas, can be found later in the Executive Summary and in Chapter 8.

[2]Notably, however, Massachusetts continues to have access to funding from multiple federal programs, including nearly $50 million from the National Electric Vehicle Infrastructure (NEVI) Formula Program to deploy EV chargers along primary travel corridors and $1.2 million from the Charging and Fueling Infrastructure (CFI) Grant Program to deploy EV chargers at state parks and other Department of Conservation and Recreation facilities (See Chapter 3 for more on NEVI and CFI).

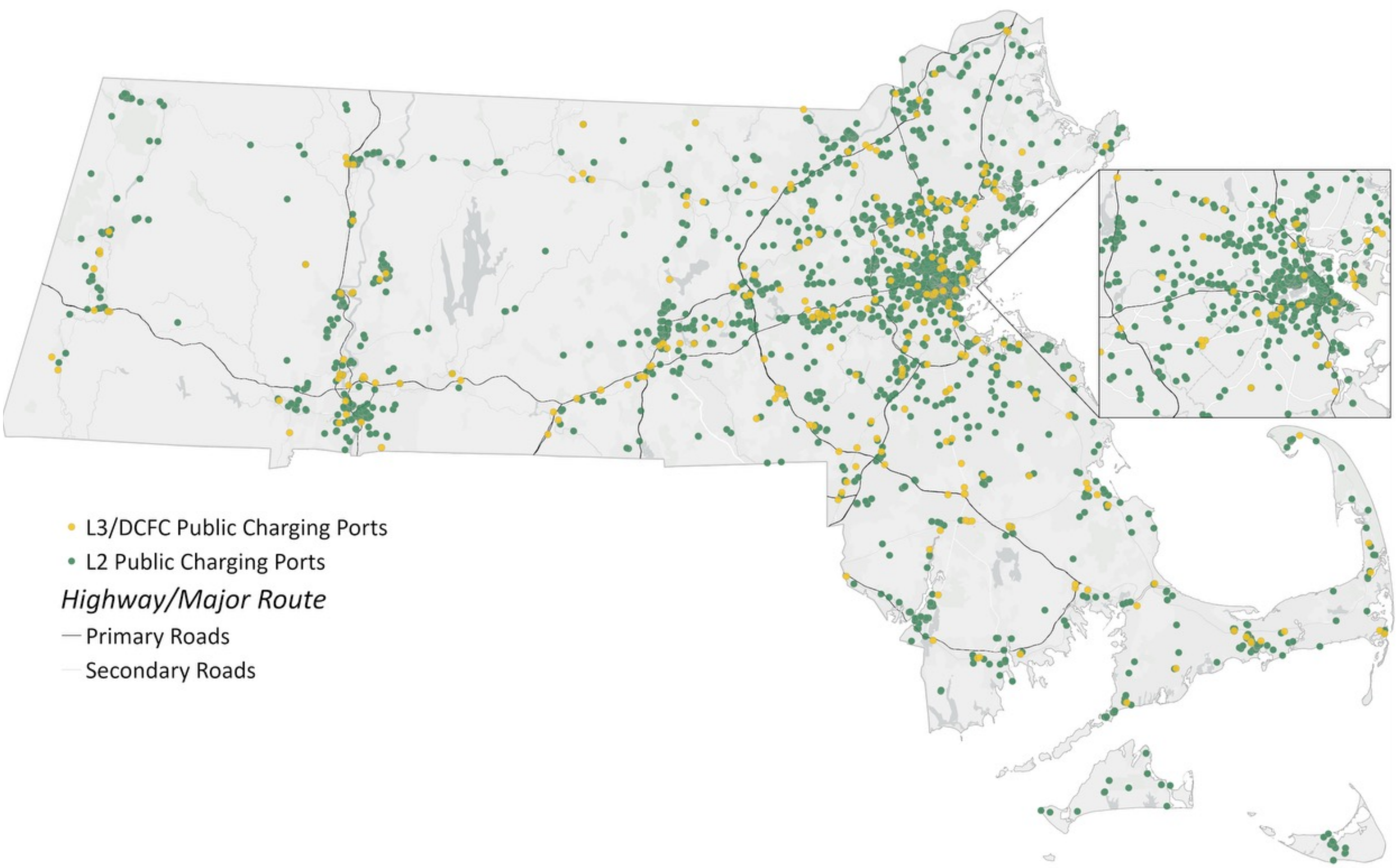
Where we are – current charging station deployment in Massachusetts

Public Charging

As of May 2025, there were 9,413 publicly accessible charging ports operating in Massachusetts, with over 8,000 Level 2 charger ports and over 1,200 fast charging ports. The overall distribution of publicly accessible charging stations in Massachusetts is shown in Figure 1.1.

Massachusetts deployed nearly 50% more publicly accessible EV charging ports in 2024 than in 2023,[3] with a 169% increase year-over-year in publicly accessible fast charging port deployments (382 versus 142). If 2024 deployment rates continue, the number of publicly accessible fast charger and Level 2 ports deployed in Massachusetts at the end of 2025 will closely mirror the 2025 CECP EV charger benchmarks (i.e., 1,300 publicly accessible fast chargers and 9,500 publicly accessible Level 2 chargers).[4]

Figure 1.1. — Publicly accessible charging stations in Massachusetts



[3]Approximately 1,400 total publicly accessible charging ports were installed in Massachusetts in 2023, composed of 142 fast charging ports and 1,248 Level 2 ports. Approximately 2,000 total publicly accessible charging ports were installed in Massachusetts in 2024, composed of 382 fast charging ports and 1,653 Level 2 ports.

[4]The CECP EV benchmark for 2025 for all publicly accessible and workplace charging is 15,000. Applying the ratio of publicly accessible fast chargers from the 2030 projections in this Assessment to the 2025 benchmark of 15,000, yields an estimate of roughly 1,300 fast chargers and 9,500 Level 2 chargers. 1,075 publicly accessible fast chargers and 1,727 publicly accessible Level 2 chargers were deployed as of January 1, 2025. 382 public fast chargers and 1,653 public Level 2 chargers were deployed last year. If the 2024 pace of deployment continues, more than 1,400 public fast chargers and 9,300 public Level 2 chargers will be deployed by January 1, 2026.

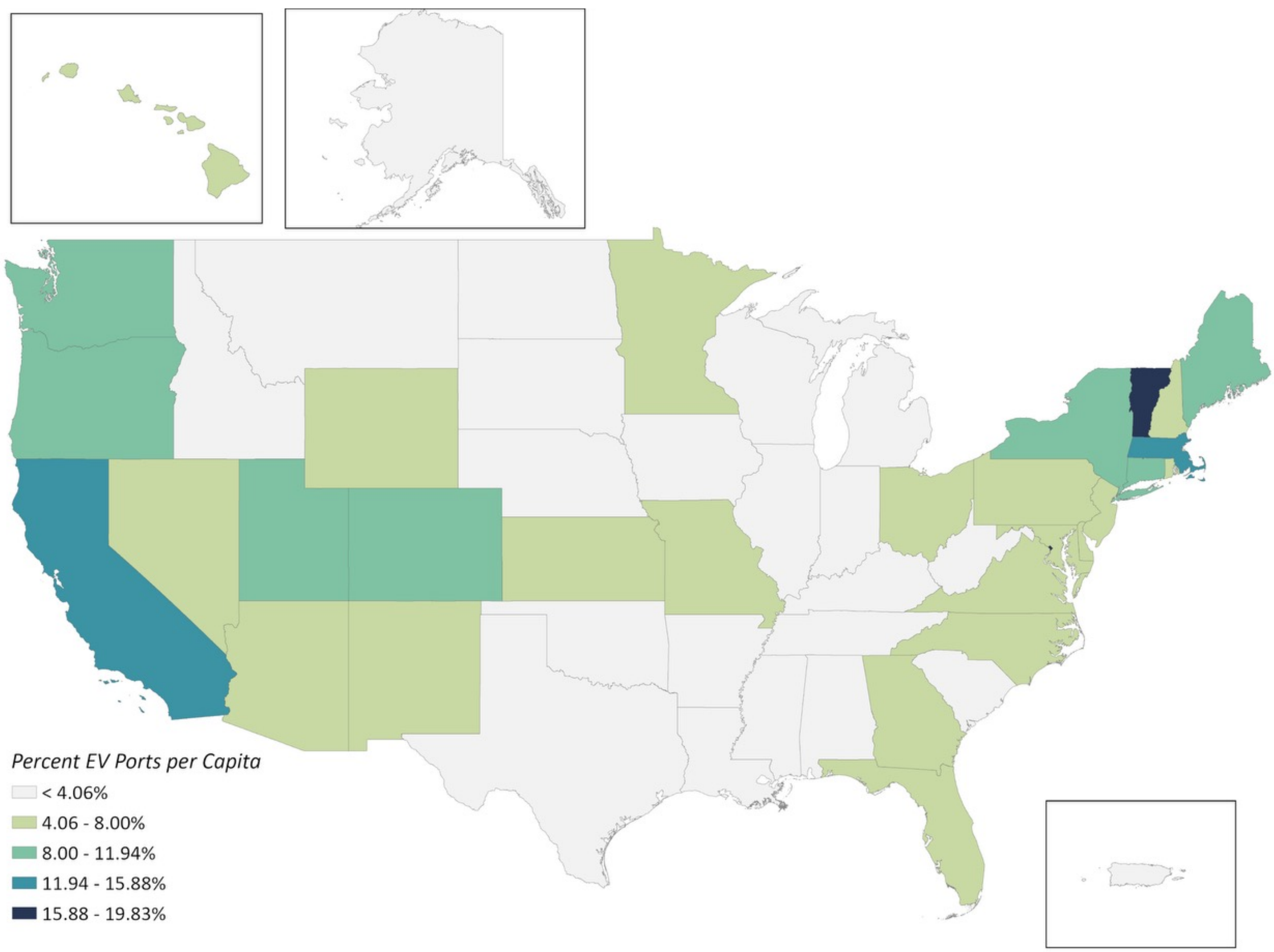
Other Charging Infrastructure

Massachusetts has also deployed 14,229 charging ports in single- and multi-unit dwellings and for use at workplaces and by fleets through state-funded programs. The state does not currently have reliable data on the number of charging stations that are not funded by state programs or reported through the U.S. Department of Energy's Alternative Fuels Data Center, so it is likely that many residential, workplace, and fleet charging ports have been deployed that are not captured in these totals.

Peer Jurisdiction Comparison

Massachusetts ranks 4th in terms of EV charging ports per capita compared to other states across the country, behind Vermont, Washington D.C., and California. Figure 1.2 shows EV chargers per capita across all states.

Figure 1.2. Public charging ports per capita by state



Where we are – current charging station deployment in Massachusetts

Massachusetts' existing EV charging infrastructure incentive programs have been incredibly successful to date and often serve as examples across the country. Massachusetts has programs in place or under development to support nearly every aspect of EV charging, including programs that (i) support EV charger deployment, both at scale and in targeted use cases, (ii) test and scale novel business and technology models to unlock further private funding, and (iii) provide tailored customer support to reduce soft costs and address barriers, along with (iv) other programs and initiatives to reduce the electric grid impacts of EV charging and proactively plan for future grid infrastructure to accommodate EVs. Table 1.2 provides a comprehensive summary of state-funded programs and other efforts grouped by the above categories.

The majority of public charging stations in Massachusetts have benefited from these programs. Table 1.1 shows that approximately 67.9% of all public charging ports have received funding from these programs and federal programs, indicating the important role incentive funding has played in deploying EV charging infrastructure in Massachusetts to date.[5]

"State-funded programs" is used in this Assessment to refer to programs administered by a state agency or the state's investor-owned utilities, Eversource, National Grid, and Unitil (also known as electric distribution companies or EDCs). The primary sources of funding for these programs are revenue allocated from the state budget or revenue collected from charges assessed to EDC customers.

Table 1.2. Summary of EV Charger Programs in Massachusetts

Program	Public Charging Ports Funded	% of Total Public Chargers in MA
MassEVIP	2,681	28.48%
Eversource	1,996	21.20%
National Grid	1,706	18.12%
National Electric Vehicle Infrastructure (NEVI) Formula Grant Program / Charging and Fueling Infrastructure (CFI) Grant Program	8	0.08%
TOTAL	**6,391**	**67.90%**

[5]Some Municipal Light Plants (MLPs) also offer charging incentives, which are not included in this data.

Table 1.2. Summary of EV charger programs in Massachusetts[6]

Concerns	Charger Types	Use Case	Incentive / Grant	Program Administrator[7]
Scaling Deployment				
MassEVIP	Level 1 or 2	Public access, multi-unit dwellings, workplaces, and fleets	Y	MassDEP
Investor-Owned Utility Programs	Level 2 or fast charging	Public access, multi-unit dwellings, workplaces, and fleets	Y	National Grid, Eversource, and Unitil
Targeted Deployment				
Range anxiety				
National Electric Vehicle Infrastructure (NEVI) Formula Program	Fast charging	Major transit corridors	Y	MassDOT
Service Plazas	Fast charging	Major transit corridors	N - contractual obligations of minimum EV chargers for plaza operator(s)	MassDOT
Specific Use Cases				
Investor-Owned Utility Programs	Level 2	Single-family residential to address Level 2 cost barriers	Y	National Grid, Eversource, and Unitil
Green Communities	Level 2	Municipal charging	Y	DOER
Leading by Example Division (LBE) / Division of Capital Asset Management and Maintenance (DCAMM)	Level 2	State charging	Y	DOER/ANF
Charging and Fueling Infrastructure (CFI) Grant Program	Grant dependent (typically Level 2 or fast charging)	Grant dependent (e.g., state parks, MBTA park-and-rides, etc.)	Y	Grant dependent (e.g., DCR, MBTA, etc.)

[6]The information contained in Table 1.2 is simplified for clarity. Future availability and design of the programs listed in this table will vary based on factors specific to each program including, but not limited to, the availability of funding and regulatory authorization. The existing MassCEC programs are limited in time, scope, and funding and are scheduled to sunset after MassCEC issues guides to scaling each EV charging application. Chapter 3 and Appendices 2 through 6 provide additional details on the programs included in Table 1.2.

[7]MassDEP = Massachusetts Department of Environmental Protection, MassDOT = Massachusetts Department of Transportation, DOER = Massachusetts Department of Energy Resources, ANF = Massachusetts Executive Office of Administration and Finance, DCR = Massachusetts Department of Conservation and Recreation, MBTA = Massachusetts Bay Transportation Authority, and MassCEC = Massachusetts Clean Energy Center

Concerns	Charger Types	Use Case	Incentive / Grant	Program Administrator[11]
Proving + Scaling New Models				
Creating Replicable Models				
On-Street Charging Solutions	Level 2	Residential charging for EV drivers without off-street charging	Y	MassCEC
Ride Clean Mass: Transportation Network Company (TNC) Charging Hubs Program	Level 2 or fast charging	Charging for rideshare drivers	Y	MassCEC
Vehicle-to-Everything	Level 2	Utilizing EVs as a grid resources	Y	MassCEC
Mobile Charging for Medium- and Heavy-Duty (MHD) Vehicles	Level 2 or fast charging	Novel charging solution for MHD fleets to address common barriers	Y	MassCEC
Accelerating Clean Transportation for All Round 2 (ACT4All 2)	Level 2	Multiple equity focused novel applications / business models (See Chapter 3 for more details)	Y	MassCEC
Support Services				
Utility Fleet Advisory Services Program	N/A	Public fleets in Eversource and National Grid territory	N - provides technical assistance to help overcome common barriers	National Grid and Eversource
Mass Fleet Advisor	N/A	Private fleets in Eversource and National Grid territory, all fleets elsewhere	N - provides technical assistance to help overcome common barriers	MassCEC
Other Programs + Initiatives				
National Grid's Off-Peak Rebate Program (Minimizing Grid Impacts)	Level 2	Residential and fleet EVs	Y - monthly rebate for charging during certain hours	National Grid
Eversource and Unitil's Proposed Managed Charging Program (Minimizing Grid Impacts)	Level 2	Residential EVs	Currently under review in D.P.U. 24-195 and 24-197 (If approved, would provide monthly rebates for charging during certain hours)	Eversource and Unitil
Section 103 Process	Process authorized in Section 103 of the 2024 Climate Act to work with the investor-owned utilities to identify potential grid upgrades to accommodate future EV charging.			

Where we need to go - Estimates of EV charging infrastructure to meet 2030, 2035 CECP EV adoption

The Second EVICC Assessment finds that approximately 46,000 and 102,000 publicly accessible charger ports would be needed in 2030 and 2035, respectively, to support the CECP EV benchmarks.[8] In 2030, the number of publicly accessible chargers is expected to be split between 5,500 fast charging ports and 40,000 Level 2 ports. The projection for 2035 is 10,500 fast charging ports and 92,000 Level 2 ports.

In total, this report estimates that approximately 800,000 public and private chargers in 2030 and 1.55 million public and private chargers in 2035 would support the state's targets for EVs on the road in 2030 and 2035, respectively, as a result, the state's transportation sector sublimit (See footnote 8).

Table 1.3 provides a summary of the estimated number of EV charging ports in 2030 and 2035 that would support the CECP EV benchmarks, with the notable addition since the Initial EVICC Assessment of an estimate of chargers needed to support medium- and heavy-duty EVs.

Table 1.3. Estimated EV chargers by category and charger type for 2030 and 2035 CECP vehicle projections[9]

Category	Charger Type	Port Count		2035 EV/Port Ratio	Source
		2030	2035		
Single-Family	Level 1	216,000	373,000	5.4	EV Pro Lite
	Level 2	482,000	945,000	2.1	EV Pro Lite
Multi-Family	Level 1	8,000	18,000	22.5	EV Pro Lite
	Level 2	18,000	45,000	8.9	EV Pro Lite
Workplace	Level 2	18,000	47,000	51.7	EV Pro Lite
Public	Level 2	40,000	92,000	26.4	Observed ratios
	DC fast charger[10]	5,500	10,500	230.4	Observed and modeled ratios
Medium- and Heavy-Duty	Level 2	6,500	17,000	1.9	Modeled ratios
	DC fast charger	800	2,500	13.9	Modeled ratios
Total		**794,800**	**1,550,000**		

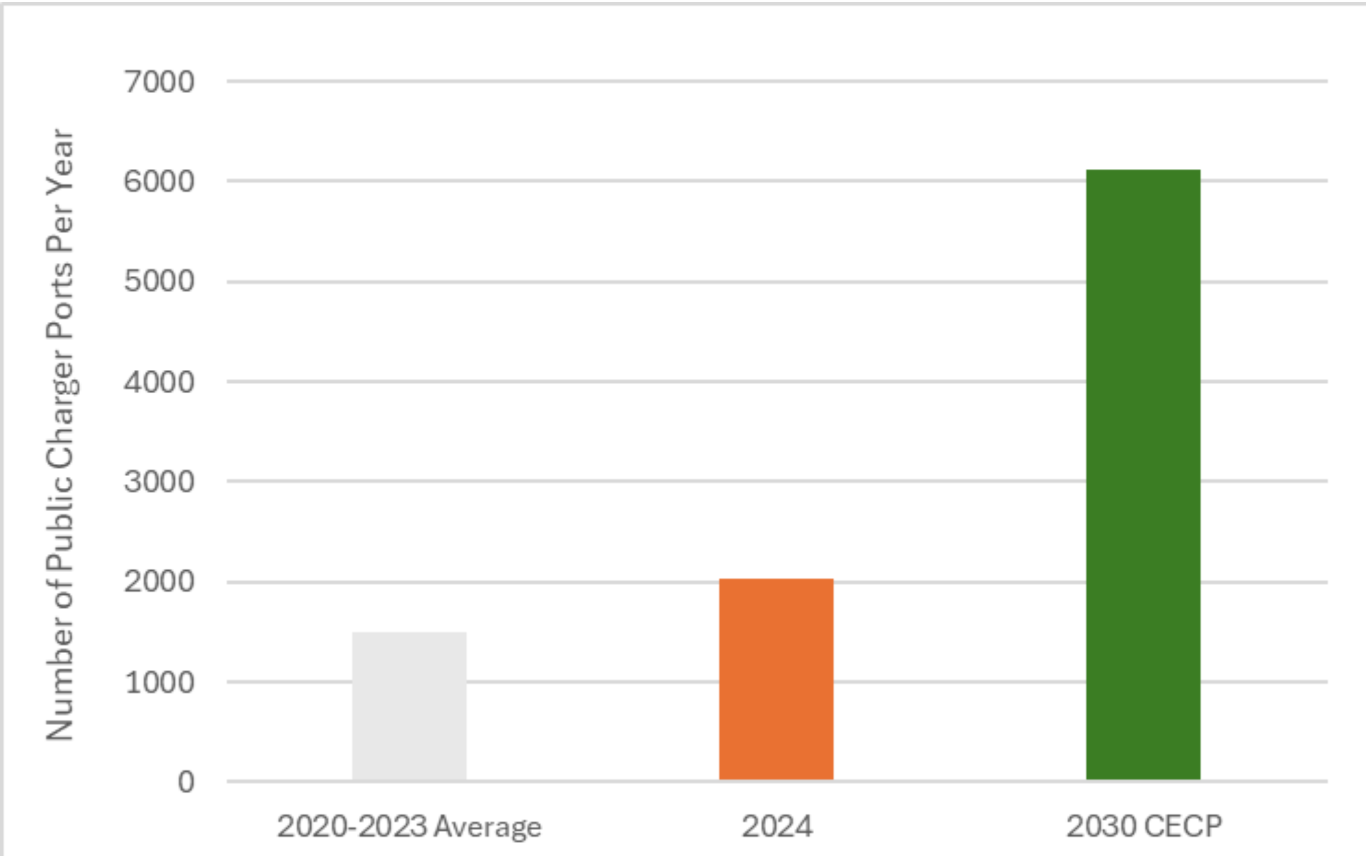
[8] These estimates depend on a variety of factors that may change over time and, therefore, should not be interpreted as the precise number of EV chargers necessary to enable achievement of the CECP EV benchmarks. Rather, these numbers provide a general indication of the direction, pace, and scale of EV charger deployment needed if the CECP EV vehicle adoption benchmarks are realized.

[9] The analysis provided in this report was conducted by the technical consultants to EVICC, Synapse Energy Economics, the Center for Sustainable Energy (CSE), and Resource Systems Group (RSG).

[10] In 2030, this Assessment estimates that 45 percent of DC fast chargers will serve multi-family housing and 55 percent will serve long-distance travel. In 2035, this Assessment estimates that 57 percent of DC fast chargers will serve multi-family housing and 43 percent will serve long-distance travel.

Achieving these deployment levels would require deployment of over 6,000 charging ports annually through 2030.[11] In 2024, Massachusetts deployed roughly 2,000 EV charging ports. Massachusetts would need to triple the current rate of EV charger deployment through 2030 to achieve the benchmarks set in the CECP, as shown in Figure 1.3.

Figure 1.3. Historical, annual public EV charger deployment versus annual deployment needed to meet 2050 CECP.



[6] 6,200 charging ports per year is an average over the six-year period and should not be interpreted as the benchmark in any one year as annual deployment rates are likely to increase over time.

Where we need to go – priority deployment areas

More important than the forecast of future EV charging infrastructure are the state's priorities and strategy for building EV charging infrastructure. Clear priorities and a coordinated strategy to effectuate those priorities will ensure that public funding is optimized and progress towards a robust EV charging network continues regardless of federal policy and market uncertainty or future EV adoption rate.

This Assessment calls for state-funded programs to focus on EV charging opportunities that have the highest value for Massachusetts drivers and where state-funded programs can have the greatest impact. In general, this means targeting high value public and fleet charging opportunities (See Chapter 4). The administrators of state-funded programs should also consider whether, if, and how they can support multiple high value use cases through a single program offering (e.g., fast charging along major corridors should also find ways to deploy chargers in areas that would also support charging for residents of multi-unit housing without off-street parking). State-funded efforts should also seek to ensure an equitable buildout of EV infrastructure across the Commonwealth, particularly in areas or for customers that have historically had limited access to EV charging infrastructure (i.e., rural communities, communities with Environmental Justice populations, tenants of multi-unit dwellings without off-street parking, and MHD vehicles).

The Second Assessment recommends that existing state and utility programs and initiatives continue to support the deployment of high-value EV charging opportunities for fleets, where they are housed, on common routes, and along travel corridors, and light-duty passenger EVs, including at or near where EV drivers live and in places that address range anxiety, among other high-value opportunities.

The Second Assessment also recommends that the following gaps in the EV charging network and existing program offerings be prioritized moving forward:[12]

- Ensuring a baseline of **DC fast charging along secondary travel corridors**;
- **Scaling on-street charging throughout the Commonwealth** by leveraging the lessons learned from the MassCEC On-Street Charging Solutions program; and,
- **Deploying MHD fleet charging at or near where fleet vehicles are housed**, both for individual fleets and at depots to serve multiple fleets.

[12]Importantly, these priorities serve as guideposts for future actions and should not be applied retroactively. Moreover, it will take time for new and existing programs to align with these priorities and careful consideration of how best to align with these priorities to ensure effective implementation.

Where we need to go – electric grid implications of EV charging

Increased deployment of EVs and EV charging infrastructure increase electricity demand, impacting distribution and transmission grids. Building new electric grid infrastructure is expensive; thus, understanding the drivers of potential electric grid upgrades, ways to mitigate those upgrades, and alternative solutions if an upgrade cannot be avoided will be vital to ensuring that transportation electrification is as cost-effective as possible.

The Second EVICC Assessment models four different scenarios to estimate the potential peak electricity demand of EV charging infrastructure deployment in 2030 and 2035 using EV adoption levels from the CECP. The four scenarios use the same projections of EV charging infrastructure in 2030 and 2035, but vary the degree to which consumers manage their EV charging to mitigate grid constraints (See Chapter 5 for more information). A summary of the outputs of the four scenarios is provided in Table 1.4.

Table 1.4. 2030 and 2035 demand from EVs during peak hours

Year	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential (MW)
2030	1,547	1,035	1,440	241
2035	4,001	2,699	3,255	477

Both Tables 1.4 and 1.5 represent high-level analysis that lacks the benefits of the utilities' technical and more nuanced understanding of their electric distribution systems. The results provided in the tables should be used as a starting point to engage with the utilities and stakeholders on subsequent processes to better understand the potential electric distribution system impacts of transportation electrification (See the "Section 103 Process" discussion in Appendix 8).

Table 1.5. Overloaded Distribution Feeders in 2030 and 2035

Year	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential[14] (MW)
2030 count	289	200	266	41
% of Total Feeders*	11%	8%	10%	2%
2035 count	613	466	537	97
% of Total Feeders*	23%	18%	20%	4%

** Total feeders = 2,634*

[13]Scenario 1 assumes that EVs do not participate in managed charging programs. Scenario 2 assumes that EVs are charged as evenly as possible, creating a flat load curve. Scenario 3 assumes that future EVs utilize managed charging programs to the same degree as EV drivers using data and participation rates from the EDC in 2024. Scenario 4 explores the outcome of fully managed flexible load.

[14]Scenario 4 is not practically possible, but serves to highlight the value of managed charging efforts.

Where we need to go – Improving the driver experience

Positive consumer experience with EV charging infrastructure is key for all stakeholders. A successful EV charging network experience considers complementary stakeholder needs:

- For drivers, an accessible, reliable, and seamless charging process enhances satisfaction and encourages EV adoption. Complicated interfaces or unreliable services can deter potential users.
- For station owners, positive user experiences attract repeat customers and build brand loyalty, potentially increasing revenue.
- For policymakers, ensuring accessible and user-friendly charging supports adoption goals by promoting EV usage.

Stakeholders and the public have identified a number of consumer experience concerns including, but not limited to charger reliability, the number of apps needed to both locate available and reliable charging infrastructure and to pay for charging services, consistent and accurate customer information, consistent charging experience and charger types, physical accessibility at charging stations, and the lack of roadway signage for charging stations.

The Second Assessment identifies issuance of the charger uptime regulations, including working with industry stakeholders on the development of such regulations and ensuring implementation of the statutory real-time data, and proliferation of the “Plug and Charge” model, which lets you start charging your EV just by plugging it in, as key to improving the EV charging experience.

Where we need to go – EV charging technology and business model innovation

As the EV charging industry grows, diverse business models have emerged to meet varying needs across the public and private sectors. These models balance financial risk, site host control, user experience, and network scalability in different ways, each presenting its own advantages and limitations.

Current EV charging business models offer a range of approaches to infrastructure deployment and management. However, these models often require significant upfront investment and ongoing maintenance responsibilities. As the EV market evolves, innovative business models are emerging to address the limitations of traditional charging infrastructure. These novel approaches aim to enhance flexibility, optimize energy usage, and improve accessibility for a broader range of users. However, these models also face challenges, including regulatory complexities, technological integration hurdles, and the need for consumer education to ensure widespread adoption and trust in new systems.

The most promising novel business model is Charging as a Service (CaaS), which offers turnkey solutions with minimal upfront costs for site hosts and long-term operations and maintenance support. Finding ways to support the growth of this business model is key to unlocking additional private investments in the future.

How we plan to get there – Massachusetts' strategic plan for an equitable, interconnected, accessible, and reliable EV charging network

Massachusetts has made significant progress on the development of an equitable, interconnected, accessible, and reliable EV charging network in recent years. However, in the short-term, it is imperative that EV charger deployment continues to grow despite the federal and market headwinds, improvements are made to the customer experience, and that private funding is further leveraged. In the long-term, EV charger deployment will need to significantly increase in order to meet the Commonwealth's climate requirements.

This Assessment provides insights and analysis into the future of EV charging in Massachusetts. Based on those insights and analysis, in addition to EVICC member input over the past year as well as public comments at the monthly EVICC meetings and public hearings on the Second EVICC Assessment, EVICC developed the following set of strategic actions to shape the future of EV charging initiatives in Massachusetts.

These actions will ensure that Massachusetts is well-positioned to continue its progress in deploying EV charging and provide the flexibility to effectively adapt to changing circumstances. These actions are organized into eight areas:

1. Prioritizing Value

New and existing incentive programs designed to deploy EV charging will target the highest value charging opportunities, while also ensuring equitable deployment across the Commonwealth.

2. Enhancing Current Programs

Administrators of existing programs will work to improve the efficiency of and coordination between programs to enhance the customer experience and stretch current funding further.

3. Reducing Barriers

EVICC will develop additional resources, among other efforts, for municipalities and potential EV charging site hosts to address barriers to deployment.

4. Unlocking Private Funding

Massachusetts will leverage private industry and funding to a greater degree by, among other efforts, enabling new EV charging business models.

5. Improving Customer Experience

Massachusetts will develop and implement tangible solutions to improve the customer experience with EV charging, including through regulations to establish minimum reliability standards, consumer price and fee structure transparency, and charging station signage.

6. Minimizing Grid Impact

EVICC will work with the utilities to ensure that programs and technologies are deployed to minimize the need for electric grid upgrades to accommodate EV charging. These efforts should target the highest value opportunities and be incorporated into all proactive planning efforts.

7. Proactive Planning

EVICC will work with state agencies and stakeholders to execute on strategic, long-term planning efforts to ensure efficient EV charging infrastructure deployment, including through implementation of Section 103 of An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers (2024 Climate Act).

8. Sustainable Funding

EVICC will work with relevant stakeholders to explore funding models that leverage existing funding pathways and reduce the reliance on funding from electric utility customers.

Specific actions aligned with these categories are included below. It is important to note that while these actions largely focus on what state agencies and the legislature can do, municipalities and private actors are equally as important in realizing Massachusetts' EV charging goals. More than any other group, these two will be responsible for deploying charging infrastructure. Municipalities have the particularly important role of ensuring that residents without off-street parking have access to EV charging in public spaces. The EV transition cannot happen without empowering and partnering with private actors, such as developers and EV charging companies, and municipalities.

Recommended Actions

Prioritizing Impact

- **Agency Action:** Explore creation of an initiative focused on deploying fast charging stations along secondary corridors and underserved areas within designated Alternative Fuel Corridors not covered by NEVI funding. (EEA, MassDOT, DOER, MassDEP, and the EDCs)
- **Agency Action:** Explore development of an initiative to support medium- and heavy-duty EV charging by establishing hubs near fleet depots and industrial zones and potentially piloting MHD charger-sharing reservations with turnkey solutions and other offerings to reduce common EV charging barriers. (EEA, DOER, MassDEP, and MassCEC)
- **Agency Action:** Explore partnerships with state, municipal, and stakeholder partners to conduct tailored outreach and ways to package existing incentive programs to high value locations for EV charging infrastructure including (i) grocery stores, (ii) box stores, (iii) small businesses in city centers, (iv) popular destinations (e.g., hotels and resorts in the Berkshires and on Cape Cod, and (v) MHD fleets that could financially benefit from electrifying (e.g., last mile delivery and vocational vehicles). (EEA, MassDEP, DOER, and municipal governments)

Enhancing Current Programs

- **Agency Action:** Better align MassEVIP and the utility EV charger incentive programs by coordinating customer eligibility and program requirements to improve the customer experience and efficient disbursement of available funding. (MassDEP, EEA, DOER, and the EDCs)
- **Agency Action:** Improve funding availability disclosure and communication of application queue positions of state-funded programs, with the objective of improving transparency and helping stakeholders plan future EV charging infrastructure deployment more effectively. (EEA, MassDEP, DPU, as appropriate, and the EDCs)

Reducing Barriers

- **Legislative Action:** Collaborate with the legislature and relevant stakeholders to explore legislation standardizing local EV charger permitting, including model ordinances and enabling authority to reduce deployment delays across municipalities. (EEA and DOER)
- **Agency Action:** Create a Municipality Resource Committee that will meet on an ad hoc basis to support the development of resources targeted at reducing barriers for municipalities, potential EV charging site hosts, and other EV charging stakeholders similar to the Public Level 2 EV Charging Station Fees and Policies Guide. EEA will work with DOER's Green Communities Division and the Metropolitan Area Planning Council to identify potential members of the committee and others who can help review developed materials. (EEA, DOER, and MAPC)
- **Agency Action:** Create and maintain a public inventory of EV chargers in Massachusetts, to the greatest extent practically possible, to inform the bi-annual EVICC Assessment. This inventory will leverage existing data sources and future Division of Standards (DOS) registration processes. (EEA)

Unlocking Private Funding

- **Agency Action:** Build on the success of the existing innovative EV charging infrastructure programs and ACT4All, Round 2 innovative charging projects by providing resources and lessons learned to help further unlock the potential of these business and technology models and looking for new opportunities to test and help scale other innovative business models. (MassCEC)
- **Agency Action:** Explore ways to further unlock the Charging-as-a-Service business model for publicly accessible charging. (EEA and MassCEC)

Improving Customer Experience

- **Legislative Action (Continued from First Assessment):** Renew efforts to pass comprehensive "right-to-charge" legislation by expanding on the 2024 Climate Act to include renters and incorporating implementation tools and financial supports. (EEA and DOER)
- **Legislative Action (Continued from First Assessment):** Expand consumer protection regulations for EV chargers by building on the 2024 Climate Act to allow the Division of Standards to enforce such regulations and to inspect the accuracy of pricing information through a charger registration process. (EEA and DOS)
- **Agency Action:** Implement a phased approach to regulating the reliability of fast and Level 2 charging, setting minimum uptime standards for fast chargers installed on or after June 1, 2026 and other chargers installed on or after June 1, 2027. Implementation of such regulations should seek to balance the dual objectives of improving the customer EV charging experience and making any new requirements as easy to understand and implement as possible. (EEA, DOER, MassDEP)
- **Agency Action:** Develop guidance on EV charging station and wayfinding signage. (EEA)
- **Agency Action:** Explore development of model local ordinances that allow municipalities to fine internal combustion engine vehicles for parking in EV charging parking spots, consistent with state law. (EEA and DOER)

Minimizing Grid Impacts

- **Agency Action:** Explore active managed charging in residential areas projected to face grid constraints by 2030 or 2035, testing novel incentive structures, customer engagement strategies, and reliability impacts. (EEA, DOER, and the EDCs)
- **Agency Action:** Develop a long-term managed charging strategy, defining program benefits, cost-effectiveness metrics, and incentive structures, and integrating lessons from pilot projects into broader implementation. Such strategy should include relevant metrics that provide meaningful insight into their progress in developing and implementing the comprehensive strategy. (DPU, as appropriate, DOER, EEA, and the EDCs)
- **Agency Action:** Incorporate anticipated load reductions resulting from managed charging programs into distribution system planning efforts and plans. (DPU, as appropriate, DOER, EEA, and the EDCs)
- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV load management planning and vehicle-to-everything (V2X) load dispatch capabilities. (DPU, as appropriate, DOER, MassCEC, EEA, and the EDCs)

Proactive Planning

- **Agency Action:** Create a planning framework for integrating EV infrastructure projections into electric distribution system planning through the requirements outlined in Section 103 of the 2024 Climate Act, including identifying potential grid constraints that may be caused by transportation electrification in 2030 and 2035 for further investigation by the EDCs. (EEA, DOER, DPU, as appropriate, and the EDCs)
- **Agency Action:** Assess grid resilience and infrastructure needs for electrifying emergency vehicle fleets ahead of the next EVICC Assessment, identifying key reliability gaps and backup power solutions to inform future planning. (EVICC and emergency management agencies)
- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV charger interconnection processes and transportation electrification inputs and strategies for the next Clean Energy and Climate Plan (CECP). (EEA, DPU, as appropriate, DOER, MassDEP, MassCEC, and the EDCs)

Sustainable Funding

- **Legislative Action:** Work with stakeholders and the legislature to explore sustainable, long-term models to fund EV charging initiatives that leverage existing funding pathways and reduce the reliance on funding from electric utility customers

Purpose and Context

Policy Background

2025/2030 Clean Energy and Climate Plan (CECP) EV and charger targets

Massachusetts is required by law[1] to reduce economy-wide greenhouse gas emissions by 85% and achieve net zero in 2050 against a baseline established in 1990. The Secretary of Energy and Environmental Affairs was also required to set limits on greenhouse gas (GHG) emissions for 2025 and 2030, set specific limits for certain sectors of pollution, and produce a comprehensive plan to achieve the required emissions reductions.[2] The Clean Energy and Climate Plans (CECPs) for 2025/2030 and 2050 establish economy-wide limits and sector-specific sub-limits for reducing greenhouse gas emissions. For the transportation sector, the EEA Secretary set an emissions sublimit of 34% below 1990 levels for 2030, and 86% for 2050. (See Table 2.1)

Table 2.1. Summary of GHG Emissions Sublimits for Transportation Sector

	1990	2025	2030	2050
GHG Emissions (MMTCO2e)	30.2	24.9	19.8	4.1
Percent Reduction from 1990		18%	34%	86%

Comprising about 38% of total emissions in 2021[3], the transportation sector is the largest contributor to the Commonwealth's total greenhouse gas emissions. The CECPs for 2025/2030 and 2050 proposed achieving the required emissions reductions from transportation by transitioning most vehicles to EVs, and reducing growth in total vehicle miles travelled (VMT) by improving alternatives to personal vehicles. To achieve the emissions sublimit for the transportation sector, the 2025/2030 CECP set a goal of 200,000 total EVs on the road by 2025 and 900,000 EVs by 2030.

[1]Commonwealth of Massachusetts. An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, 2021 Mass. Acts ch. 8. Accessed May 29, 2025. https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8.

[2]Commonwealth of Massachusetts, "Massachusetts Clean Energy and Climate Plan for 2050," Mass.gov, December 2022. https:// www.mass.gov/doc/2050-clean-energy-and-climate-plan/download.

[3]Commonwealth of Massachusetts. Massachusetts Clean Energy and Climate Metrics. Executive Office of Energy and Environmental Affairs. Accessed May 29, 2025. https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics.

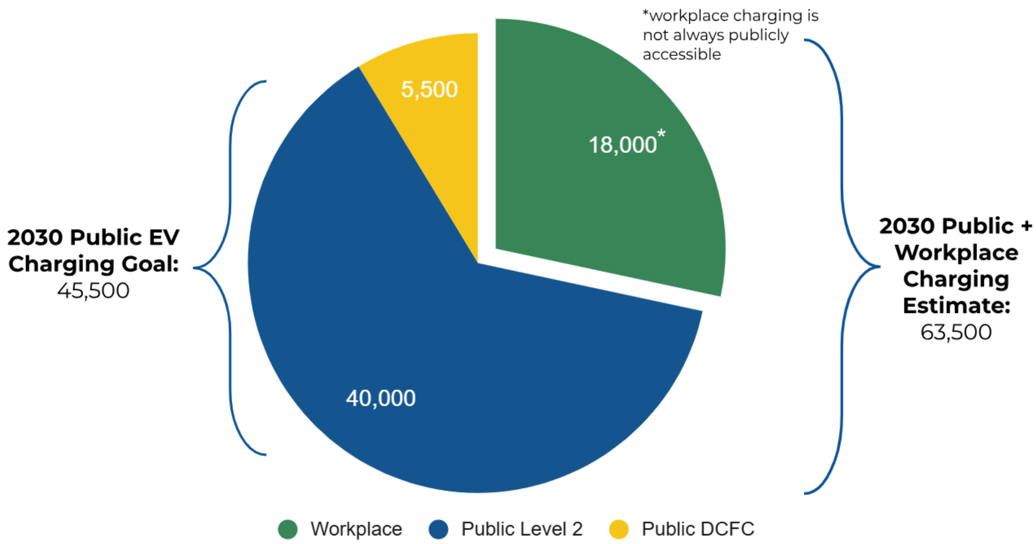
To support those EVs, the 2025/2030 CECP estimated the need for 15,000 public charging station ports by 2025 and 75,000 by 2030. These figures combined public charging stations accessible to all members of the public with workplace charging stations.

EEA has historically utilized the US DOE Alternative Fuels Data Center (AFDC) to track progress against the 2025/2030 CECP EV charging estimates. However, while the AFDC provides comprehensive data on public chargers, it only reports a small subset of workplace chargers. EVICC has access to data on workplace chargers that have received state incentives, which can be used to supplement the AFDC workplace charging data, but likely still does not represent a complete list of workplace chargers as some workplace chargers may not have received state incentives. Unfortunately, it is likely to remain difficult to compile comprehensive data on workplace charging as many workplace chargers will remain closed to the broader public and/or may not be connected to a charger network that could provide charger information.

The Second EVICC Assessment utilizes a more advanced methodology and more up-to-date data to estimate 2030 charging infrastructure needs than the 2025/2030 CECP. The Second Assessment estimates a similar overall volume of charging infrastructure needed in 2030 from public charging stations accessible to all members of the public and workplace charging at 63,500, with 40,000 public Level 2 chargers, 5,500 public, and 18,800 workplace chargers in 2030. However, given that workplace charging is not always available to the public and the difficulty in tracking workplace charging, the official state EV charger target will only include fully publicly accessible chargers moving forward, making 45,500 EV chargers the official target for 2030. A summary of these projections is shown in Figure 2.1 below.

This target will be used as the official state target in future Climate Report Cards. Importantly, the updated EV charger projections included in the Second EVICC Assessment and the refined EV charger target are both consistent with the underlining state target of 900,000 EVs on the road by 2030.

Figure 2.1 2030 Estimated Public and Workplace Charging to Meet CECP Emissions Sublimits



Regulatory context

Massachusetts has formally adopted the Advanced Clean Cars II (ACC II) program along with 11 other states and the District of Columbia,, aligning with California's more stringent vehicle emission standards to combat climate change and improve air quality. Under ACC II, auto manufacturers are mandated to incrementally increase the percentage of zero-emission vehicles (ZEVs) sold in the state, starting at 35% for Model Year 2026 and reaching 100% by 2035.

Massachusetts has also adopted the Advanced Clean Trucks (ACT) regulation to align with California's standards to reduce emissions from medium- and heavy-duty (MHD) vehicles. Under ACT, manufacturers are required to achieve a certain level of electric truck sales as a percentage of their overall sales, with that percentage gradually increasing. Manufacturers can average those sales over time and buy and sell credits to meet those requirements. The rule has been adopted in 11 states, including Massachusetts.

In April 2025, the Healey-Driscoll Administration announced enforcement discretion for manufacturers that do not meet minimum electric truck sales required for Model Years 2025 and 2026 under the ACT program.[4] The enforcement discretion means that manufacturers that do not meet those sales requirements in Massachusetts will receive relief for Model Years 2025 and 2026, provided they stop a practice known as rationing where manufacturers withhold internal combustion engine trucks to distributors seeking them.

In May 2025, the U.S. Congress advanced legislation invalidating recent U.S. Environmental Protection Agency waiver decisions under the federal Clean Air Act (CAA). The CAA and waiver decisions form the basis for ACC II and the Advanced Clean Trucks regulation. Due to this and other economic uncertainties instigated by the federal government, the Healey-Driscoll Administration subsequently announced a two-year pause of light-duty EV sales requirements for manufacturers that do not meet minimum sales required for Model Years 2026 and 2027 under the ACC II program.[5] During the pause for both ACT and ACC II, manufacturers are still incentivized to continue sales of EVs in Massachusetts and can earn and carry forward credits for future compliance.

[4]Massachusetts Department of Environmental Protection, Enforcement Discretion for Advanced Clean Trucks Requirements, April 14, 2025, https://www.mass.gov/doc/act-enforcement-discretion-apr-14-2025/download.

[5]Massachusetts Executive Office of Energy and Environmental Affairs, "Massachusetts Announces Flexibilities for Electric Vehicle Requirements," Mass.gov, May 23, 2025, https://www.mass.gov/news/massachusetts-announces-flexibilities-for-electric-vehicle-requirements.

EVICC Background

In August 2022, An Act Driving Clean Energy and Offshore Wind (2022 Climate Act) was signed into law. The Act created the Electric Vehicle Infrastructure Coordinating Council (EVICC) to develop a comprehensive plan for an equitable, interconnected, accessible, and reliable EV charging network throughout Massachusetts.

EVICC is required to submit an Assessment to the legislature on the Commonwealth's EV charging strategies every two years, starting in August 2023. Each Assessment must contain, but is not limited to the following:

- Assessment of the present condition of, and future needs for, road and highway electrification;
- Estimates of the number and type of EV charging stations in public and private locations;
- Suggestions for optimal locations for EV charging stations in urban, suburban, and rural locations and low and moderate income communities;
- Discussion of present and projected future costs and methods of financing those costs;
- Discussion of technological advances in charging stations and related infrastructure;
- Discussion of strategies to maintain EV charging stations in full and continuous working order;
- Recommendations to assist governmental and private sector officials in installing charging stations and related infrastructure, equipment, and technology; and
- Identification and discussion of current policies and recommendations for policies, laws, and regulatory actions to facilitate deployment of charging stations and related infrastructure.

EVICC's membership is established by the Act, and comprises a comprehensive group of state officials with an interest in EV charging, as well as the Metropolitan Area Planning Commission and the chairs of the Joint Committee on Telecommunications, Utilities and Energy. EVICC is chaired by the Executive Office of Energy and Environmental Affairs.

Since May 2023, EVICC has held monthly public meetings to plan for the biannual assessments, share updates on state charging programs and policies, and provide presentations on EV charging industry and technology developments. Past EVICC monthly meetings, along with other resources from the council, can be found on the EVICC website.

Progress Since the Initial Assessment

In August 2023, EVICC filed its first Assessment with the General Court of Massachusetts (First Assessment). Key takeaways from the first Assessment included:

- Deployment of EV charging infrastructure needs to be accelerated to meet the Commonwealth's 2030 climate goals
- Current EV incentive programs offered by government agencies and the utilities are confusing to customers
- EV charger reliability is a concern for EV drivers
- Limited electric grid capacity poses challenges to deploying EV chargers
- Massachusetts should prioritize investments in charger access for hard-to-reach consumers like tenants, low- and moderate-income residents, rural communities, and environmental justice population.

The Assessment recommended certain actions be taken by the legislature, state agencies, and EVICC to address these takeaways. A selection of recommendations and progress made in addressing those recommendations can be found in Table 2.2.

Table 2.2. Progress Since Initial Assessment

Takeaway	Recommendation	Progress
Deployment of EV charging infrastructure needs to be accelerated to meet the Commonwealth's 2030 climate goals.	EEA will lead the EVICC in developing a plan to use the $50 million in the Charging Infrastructure Deployment Fund. This plan will be developed consistent with the recommendations in this initial assessment and will draw from future EVICC findings.	The Administration awarded $50 million to initiatives to build out EV charging infrastructure across Massachusetts, increase access to charging infrastructure for more residents, electrify the state fleet, improve operation of public charging stations, manage the impact of charging infrastructure on the electric grid, and provide charging solutions for difficult to electrify vehicle types.
	The EVICC will refine its assessment of charging station needs by providing focused attention on the need for public fast charging to support long distance trips, including on peak travel days.	With its consultants, EVICC completed analysis of public fast charging infrastructure needed to support long-distance travel. A summary of this analysis can be found in Chapter 4.

Takeaway	Recommendation	Progress
Current EV incentive programs offered by government agencies and the utilities are confusing to customers.	The EVICC will consider establishing a transportation clearinghouse website for information on EVs, EVSE, and funding opportunities for stakeholders in the Commonwealth.	MassCEC developed a new, one-stop webpage for EV programs and information on Clean Energy Lives Here. Additionally, MassCEC launched a call center to answer questions about EVs and incentives.
EV charger reliability is a concern for EV drivers.	Legislation should require publicly accessible EV chargers to register with the Division of Standards (DOS) so that they can be regularly inspected; DOS will develop new regulations to ensure that publicly accessible EV chargers are registered, inspected, and tested.	The 2024 Climate Act requires DOS to develop regulations to (1) inventory EV charging stations and (2) ensure the accuracy of pricing and volumes of electricity purchased at public EV chargers. Separately, EEA is required to develop regulations to (1) monitor EV charger utilization, (2) monitor EV charger reliability, and (3) require data sharing by public EV chargers. DOS and EEA are currently developing regulations to address these requirements. More information on these efforts can be found in Chapter 6.
Limited electric grid capacity poses challenges to deploying EV chargers.	The EVICC will continue work with the Grid Modernization Advisory Council, utilities, and other stakeholders to proactively manage the grid impacts of expanded EV charging infrastructure.	The 2024 Climate Act required a new grid planning process to accommodate forecasted EV charging demand. Further, funded by $6.1 million from EVICC, MassCEC launched its Vehicle-to-Everything (V2X) Demonstration program to deploy bi-directional charging infrastructure to improve grid resilience, reduce energy costs, and increase renewable energy integration. Additionally, EVICC's consultant team analyzed the impact of forecasted EV demand on the electric distribution grid in 2030 and 2035. A summary of this analysis can be found in Chapter 5.

Takeaway	Recommendation	Progress
Massachusetts should prioritize investments in charger access for hard-to-reach consumers like tenants, low- and moderate-income residents, rural communities, and environmental justice populations.	The Healey-Driscoll Administration will work with the legislature to pass "right to charge" legislation that will help tenants and people living in condominiums install charging infrastructure.	The 2024 Climate Act passed into law a "right to charge" for condominium owners.
	DOER will work with municipalities to develop guidance and support for programs to expand curbside charging and overnight charging infrastructure for tenants and garage orphans.	Funded by $11.2 million from EVICC, MassCEC launched a new program to support municipalities in installing on-street charging, and to develop a guidebook to equip all municipalities to successfully develop on-street charging programs.

New EVICC responsibilities

On November 21, 2024, Governor Maura Healey signed into law An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers (2024 Climate Act). The 2024 Climate Act included several provisions which expanded EVICC's responsibilities and membership. As a result, EVICC's membership grew to include representatives from the Massachusetts Clean Energy Center and the Division of Standards.[6]

In addition to its existing statutory responsibilities, EVICC is now required to (1) monitor the overall effectiveness of public and private initiatives involved with EV chargers in the Commonwealth; (2) support compliance with the National Electric Vehicle Infrastructure Formula Program; and (3) ensure signage on highways and on streets adjacent to charging locations.[7]

The EVICC Assessment is now required to include an estimate of the number of medium- and heavy-duty EV chargers required to meet the Commonwealth's climate requirements. EVICC is also required to report on its efforts to lead and direct EV charger deployment in each assessment.[8] The EVICC Assessment must now also include a forecast of all EV charging demand (i.e., charging for light-, medium-, and heavy-duty vehicles) throughout the Commonwealth for the next 10 years and estimate electric distribution grid impacts, identifying areas of the grid that may require modification due to such impacts.[9]

After the submission of the EVICC Assessment to the General Court, EVICC is required to work with the Department of Energy Resources (DOER) and the Massachusetts Department of Transportation (MassDOT) to identify potential areas for DCFC and fleet charging hubs along major corridors within six months of the issuance of the Assessment. Last, the electric distribution companies are required to identify distribution system upgrades necessary to meet the 10-year EV charging demand included in the EVICC Assessment and to file a plan for the necessary upgrades with DPU within 12 months of the issuance of the EVICC assessment.[10]

EVICC takes its statutory responsibilities seriously and has worked to expeditiously incorporate these changes into its monthly meetings and this Assessment.

[6] An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 104, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[7] *An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers*, ch. 239, § 104, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[8] *An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers*, ch. 239, § 104, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[9] *An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers*, ch. 239, § 104, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[10] Section 103 of the 2024 Climate Act

Development of the Second Assessment

EVICC is tasked with writing a formal assessment every two years outlining strategies that will result in an equitable, interconnected, accessible and reliable EV charging network in Massachusetts. The First Assessment was published in August 2023 and the Second Assessment will be presented to the General Court by August 11, 2025. EVICC has continuously discussed topics for inclusion in the Second Assessment over the past two years, but work on the Second Assessment began in earnest in August 2024 and concluded in August 2025.

Second Assessment Workplan

EVICC Chair Joshua Ryor provided EVICC members and the public a memorandum outlining a workplan for the Second Assessment, including a proposed outline of the Assessment, new technical analysis and qualitative work to be completed, and a work schedule. The workplan was presented and discussed at the August 7, 2024 EVICC meeting, and formally adopted by EVICC at the September 4, 2024 EVICC meeting.[11]

Public Engagement

In addition to discussions and presentations at EVICC and Technical Committee meetings, four public hearings were held in geographically diverse regions of the state to gather feedback from the public and key stakeholders. Feedback from the public hearings helped inform recommendations throughout the Second Assessment and, in particular, Chapter 6 on Consumer Experience. The hearings provided an avenue to share information with the public about EVICC's work since 2023 and on the state's suite of EV charging programs and initiatives. A summary of public feedback is available online.[12]

Public Hearings

- New Bedford - March 27, 2025
- Worcester - March 31, 2025
- Holyoke - April 3, 2025 (Hybrid)
- Boston - April 8, 2025 (Hybrid)

Other stakeholder engagement included soliciting feedback on a draft of the Second Assessment from various industry and advocacy stakeholders and a stakeholder session held on July 9, 2025.

[11] Josh Ryor and Katie Gronendyke, Final 2024–2025 EVICC Workplan Memorandum, Massachusetts Executive Office of Energy and Environmental Affairs, August 28, 2024, https://www.mass.gov/doc/final-2024-2025-evicc-workplan-memorandum/download.Mass.gov

[12] Massachusetts Executive Office of Energy and Environmental Affairs, Electric Vehicle Infrastructure Coordinating Council (EVICC) Meeting Slide Deck, May 7, 2025, https://www.mass.gov/doc/evicc-meeting-deck-may-7-2025/download

Current EV Charging Programs and Initiatives

Several different federal, state, and utility funded EV infrastructure incentive programs exist to support the development of a robust network of EV charging through the Commonwealth. These programs include incentives for residential, workplace, fleet, and public charging needs.

Incentive programs that help offset the costs of electrical infrastructure upgrades (called "make-ready"), charging equipment (called "EVSE" for electric vehicle supply equipment), and other costs are key to accelerating the rate of charger deployment to overcome this barrier. This section provides an overview of all EV incentive programs made available in Massachusetts, their eligibility requirements, funding sources, and the impact they have had on charging deployment. Table 3.1 provides a summary and comparison of these programs. Additionally, MassCEC and other fleet advisory services offer both public and private fleet owners support to overcome challenges with EV fleet deployment. This chapter also provides additional case studies on other notable EV charging programs in Massachusetts.

MassCEC's Clean Energy Lives Here, Electric Vehicle website provides a clearinghouse of information on the programs detailed in this section and links to specific program resources and webpages. More detailed information about these programs is also available in Appendices 2 through 5.

Table 3.1. Summary of Massachusetts Programs Offering EV Charger Incentives[1]

	MassEVIP		Utility Programs[2]			DCAMM / LBE	Green Communities
Use Case(s)	Workplace, fleet, multi-unit dwellings, and educational campuses	Public Access	Residential	Public Access & Workplace	Fleet	State fleets, including charging state vehicles at home	Publicly accessible and fleet charging stations on municipally owned land
Charger Type(s)	Level 1 or 2	Level 1 or 2	Level 2	Level 2 or DCFC; Level 1 (National Grid only for certain cases)	Level 2 or DCFC	Level 2	
Covered Expenses	EVSE + make-ready costs (only for non-Eversource/ National grid customers)	EVSE + make-ready costs (only for non-Eversource/ National grid customers)	Make-ready; EVSE for low-income customers and multi-unit dwellings; networking and energy management systems for multi-unit dwellings depending on the utility	Make-ready, EVSE, networking for public access, and energy management systems depending on the utility	Make-ready and EVSE, depending on the fleet	EVSE + 3-5 years of O+M and networking costs	
Percentage of Expenses Covered[3]	Up to 60%, to a maximum of $50,000 per address	Up to 80-100%, to a maximum of $50,000 per address	Up to 150% of average make-ready costs and, up to 100% of EVSE costs	Up to 150% of average make-ready costs and, up to 100% of EVSE costs	Up to 150% of average make-ready costs and, up to 100% of EVSE costs	Up to 100%	Up to $7,500 per charging station

[1]See Table 1.2 for a complete list of EV charger programs in Massachusetts. This table compares the eligibility criteria of a subset of programs that offer EV charger incentives on a rolling basis.
[2]Utility incentive program offerings and use cases vary by utility. For more information, see the below section "Investor-owned utility programs" and Appendix 3.
[3] None of the programs allow for recovery of costs above what is actually incurred.

State EV charging incentive programs

Massachusetts Electric Vehicle Incentive Program (MassEVIP)

Program Overview

The Massachusetts Department of Environmental Protection (MassDEP) introduced MassEVIP in 2013 to promote the adoption of EVs and the development of EV charging infrastructure across the state. The early goal was to help cities and towns acquire electric vehicles and charging stations by offsetting the upfront costs. In 2014, MassEVIP expanded to incentivize the early adoption of charging stations at workplaces. MassEVIP has subsequently expanded to include incentives for multi-family housing, workplace, fleet, and public access chargers.

In addition to charging infrastructure programs, MassEVIP also has a Fleets Electric Vehicle Program which provides public entities with funding for purchasing or leasing EV fleet vehicles, up to 10,000 pounds.

Most MassEVIP programs are ongoing and accept applications on a rolling basis, except for the direct current fast charge (DCFC) Charging program, which closed on March 19, 2021. A summary of MassEVIP Charging Infrastructure programs is included in Appendix 2.

Program Funding

The MassEVIP program has been funded by a number of sources, including from legal settlements and trusts. The Climate Protection and Mitigation Expendable Trust (CMT), which is funded by the sale of allowances and alternative compliance payments paid by ratepayer, is currently the primary source of funding for MassEVIP grants and contractor support to process applications and payment requests.

Program Impact

MassEVIP programs have disbursed approximately $35 million and supported the deployment of over 7,100 EV charging ports. A summary of the funding disbursed and number of ports for each MassEVIP program is provided in Appendix 2.[2]

[3]In total, 565 projects are completed, contracted, or awaiting approval indicated that they also were participating in a utility make-ready program, and therefore would go through two separate contracting and payment processes: MassDEP's and a utility's

Massachusetts Green Communities Designation & Grant Program

Program Overview

The Green Communities Designation & Grant Program is part of the Massachusetts Department of Energy Resources (DOER) Green Communities Division. Municipalities that become certified as Green Communities are eligible for the competitive grant program, which distributes up to $20 million per year for municipal projects, focused on energy efficiency and clean energy projects, including public and fleet EV charging projects. Several communities in the Central Massachusetts Regional Planning Commission (CMRPC) region have already utilized their Green Community Grants to install EV charging stations including Mendon, Millbury, Charlton, Blackstone, Hardwick, and Barre.[3]

Green Communities grants can be used to fund new publicly available and/or fleet EV charging stations on municipally owned property. Up to $7,500 is available per charging station for installation and equipment costs that must comply with the state's appliance efficiency standards. Notably, Green Communities and Leading By Example (LBE) funding (described in the State Fleet Charging Programs Section below) cannot be combined with MassEVIP funding.[4]

Program Funding and Impact

Since 2010, the Grant Program has disbursed more than $185 million to help municipalities implement energy efficiency measures, construct renewable energy projects, or pursue other avenues to reduce their fossil fuel energy consumption. While most grant program funds are used for building energy conservation projects, the Grant Program has funded 174 EVSE projects in 51 municipalities over the past 14 years.

[3] Massachusetts Executive Office of Energy and Environmental Affairs, Massachusetts Electric Vehicle Charging Station Policies and Fees, ArcGIS StoryMaps, accessed May 22, 2025, https://storymaps.arcgis.com/stories/ec4d0ab0fe8d434fa71958908d40bdf8.

[4] Massachusetts Department of Environmental Protection, MassEVIP Frequently Asked Questions, April 16, 2025, https://www.mass.gov/doc/massevip-frequently-asked-questions/download.

Investor-owned utility programs

Investor-Owned Electric Utilities / Department of Public Utilities

Program Overview

The Department of Public Utilities (DPU) began its work on EVs and EV charging in 2013 when it investigated its jurisdiction over both, finding in D.P.U. 13-182-A that owners of EV chargers do not meet the statutory definition of electric distribution companies. Since 2013, DPU has reviewed and approved EV program proposals by Eversource, National Grid, and Unitil and has worked to incentivize and standardize the review of the electric distribution companies' EV infrastructure plans. In 2022, DPU approved the current EV infrastructure programs for all utility companies, including the first EV program in Unitil's service territory.[5]

Utility incentives are structured around several rebate categories, including rebates for EV charging infrastructure, charging equipment, and some networking costs. Eversource's and National Grid's EV infrastructure programs include a residential segment, a public and workplace segment, and a fleet segment. Unitil's EV infrastructure program includes a residential segment and a public segment. Other important utility programs include Demand Charge Alternative Rates, and fleet advisory services (discussed in more de tail in the Other Efforts section of this chapter).

Make-Ready Programs: The Eversource, National Grid, and Unitil make-ready programs, approved by DPU, offer rebates for infrastructure upgrades and installation costs for EV charging infrastructure. Make-ready costs include both "utility make-ready", which refers to the electrical upgrades needed on the utility's side of the electrical meter to accommodate increased electrical demand, and "customer make-ready", which refers to the electrical work needed on the customer's property to prepare for the installation of EV chargers.

EVSE Rebates: Eversource, National Grid, and Unitil provide rebates to cover EVSE costs for low-income residential customers in one to four-until dwellings. Additionally, Eversource and National Grid provide rebates to cover EVSE costs for their public and workplace, residential multi-unit dwelling (with five or more units), and fleet segments. The DPU's analysis prioritized the highest level of EVSE funding for communities that meet the Environmental Justice criteria,[6] and directed Eversource and National Grid to implement a sliding scale for EVSE rebates with more funding for chargers deployed in Environmental justice (EJ) communities. Rebates for chargers in EJ communities generally cover 75-100% of costs, depending on which of the EJ population criteria are met, and cover 50% of cost for non-EJ communities.

Networking Rebates: The DPU approved networking rebates for publicly accessible sites and multi-unit dwellings.

Demand Charge Alternative Rates: Demand charges for commercial utility customers can be quite high, especially for DCFC stations, and can easily make the cost of owning and operating

[5] Electric Vehicles, D.P.U. 21-90/21-91/21-92, at 168–69 (Mass. D.P.U. 2022); Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 18-150, at 384–94 (Mass. D.P.U. 2019); Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 17-13, at 62 (Mass. D.P.U. 2018); Eversource and Western Massachusetts Electric Company, D.P.U. 17-05, at 501–03 (Mass. D.P.U. 2017).

[6] More information about Environmental Justice populations and criteria is available in Chapter 4.

an EV charging site financially unsustainable. In order to address this barrier to EV charging deployment, DPU approved optional demand change alternative rates for Eversource, National Grid, and Unitil for a ten-year term, from 2023 through 2033, in D.P.U. 21-90/D.P.U. 21-91/D.P.U. 21-92. These rates are available to all separately metered, eligible EV charging sites. Site owners must apply for the rebate programs and can receive up to 100% demand charge discount in their first year, with rates for subsequent years being calculated based on the charging station's load factor. These programs help reduce financial barriers for EV charging station owners. A summary of the Companies' demand charge alternative rates is provided in Appendix 3.

Program Funding

Utility incentive programs are funded by the utilities, meaning they are supported by ratepayers. Funding levels vary by utility company and program and are summarized in Appendix 3. In total, the current utility programs are funded for up to $395 million.

Program Impact

Eversource and National Grid are on pace to exceed the targets set by DPU in approving the programs. For both public, workplace, and residential multi-unit dwelling segments, the DPU established port deployment targets in EJ populations of 35 percent and 28.5 percent for Eversource and National Grid, respectively. For fleet segments, the DPU established port deployment targets in EJ populations of 40 percent for both Eversource and National Grid. Port deployment targets for EJ populations were not set for Unitil since the majority of the service territory meets multiple EJ population criteria. Eversource, National Grid, and Unitil submit annual reports on key program metrics. Eversource, National Grid, and Unitil filed their annual reports for calendar year 2023 on May 15, 2024 in D.P.U. 24-42, 24-64, and 24-54, respectively.

Electric Vehicle Infrastructure Program Mid-Term Modification Filings

In December 2024, Eversource, National Grid, and Unitil filed petitions for mid-term modifications to their EV infrastructure programs in D.P.U. 24-195, 24-196, and 24-197, respectively.[7] These mid-term program modification requests reflect the success to date of the programs and future expansion plans. The requested modifications included expanded ability to stack third-party incentive funding and expanded managed charging opportunities across all three companies. Eversource and Unitil proposed a residential managed charging program as part of their proposals, and National Grid proposed to eliminate the cap on the number of residential and fleet customers that can participate in its off-peak charging rebate program and to shift previously authorized funding to their off-peak charging rebate program and the public and workplace segments. Both Eversource and National Grid are proposing to lower the EVSE rebate for public DCFC due to the interest in the program to date.

A summary of all components of the Companies' filings are provided in Appendix 3. The mid-term modification filings are still under review by DPU at the time of publishing the Second Assessment. DPU is expected to issue an Order on Eversource and Unitil's proposals by September 2025.

[7]Visit the DPU file room and insert 24-195, 24-196, or 24-197 as the "Docket No." to access information related to these filings and corresponding DPU proceedings.

State fleet charging programs

Program Overview

Massachusetts Executive Order 594 established a 20% electrification target for the entire state fleet by 2030. Lack of EVSE charging infrastructure for state fleets was quickly identified as a significant barrier. In 2023, the Department of Energy Resources (DOER) began supporting the deployment of EV charging infrastructure for state vehicles through grant programs managed by the Leading by Example Division (LBE), in coordination with the Division of Capital Asset Management and Maintenance (DCAMM) which runs a complementary program.

The DCAMM EVSE program prioritizes the installation of fleet charging at state-owned sites that the Office of Vehicle Management identified as high priority, which largely centers on Executive Branch agencies. The LBE Grant Program is open to all state entities, including Executive Branch agencies, constitutional agencies, public institutions of higher education, and quasi-public state authorities (see Appendix A for the full list of eligible entities).

The state fleet incentive programs provide a streamlined funding process to enable state entities to obtain 100% of the EV charging equipment and installation costs. Both the LBE Grant Program and the DCAMM EVSE Program typically cover all costs associated with EVSE installation and equipment, as well as three to five years of prepaid networking, maintenance, and warranty fees depending on the program.

As of January 2025, with the approval of the MA Domicile EV Charging Policy, the LBE Grant Program now also funds the installation of domicile EV charging for use with electric take-home state fleet vehicles.

Program Funding

These efforts have leveraged funding from several sources. Since 2023, the LBE Program has received $2 million in funding for its grant program, including $800,000 from Regional Greenhouse Gas Initiative (RGGI) funds and $1.2 million in state capital funds (CIP), and has awarded nearly all of this funding to-date. In 2024, DCAMM received $9.5 million and LBE received $1.5 million in American Rescue Plan Act (ARPA) funds from EVICC. Since January 2023, DCAMM and LBE have allocated over $12.8 million toward the deployment of state fleet charging.

Program Impact

For the 10 years prior to the LBE and DCAMM programs, state entities had installed just 92 fleet charging ports. Since the incentive programs were implemented, deployment of fleet chargers has spiked, with 452 charging ports installed between 2023 and the end of 2025. Ports that received LBE and DCAMM funding made up the majority of all fleet chargers deployed, indicating that these incentive programs have played a crucial role in charger deployment.

Appendix 5 includes details of ports funded by LBE and DCAMM programs as well as Annual Fleet Charging Port Deployment by Funding Type.

[8]Massachusetts Department of Energy Resources, "LBE Priorities and Efforts: Clean Transportation," Mass.gov, accessed May 22, 2025, https://www.mass.gov/info-details/lbe-priorities-and-efforts-clean-transportation.

State work on Federal programs

National Electric Vehicle Infrastructure (NEVI) Formula Program

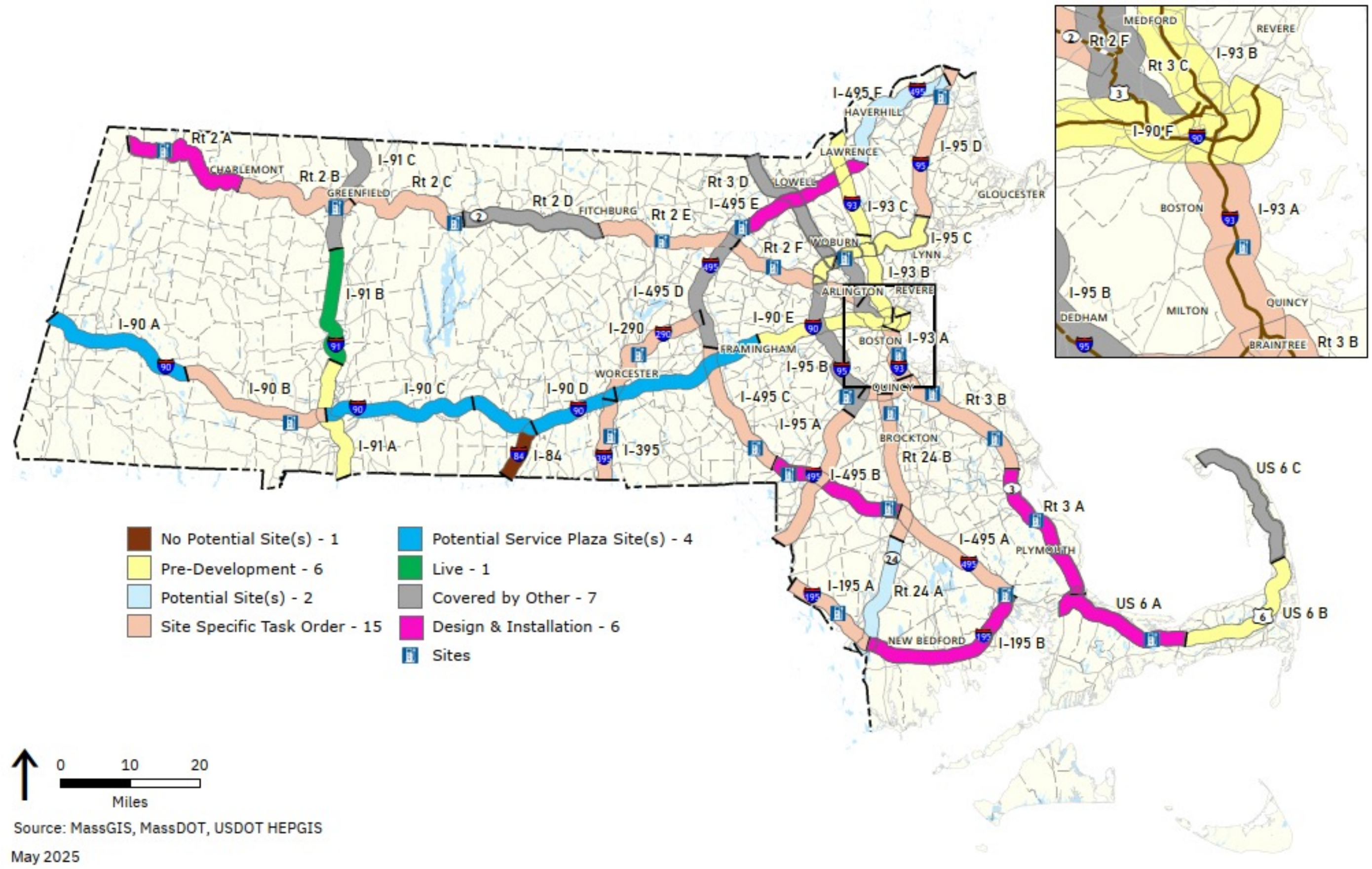
Program Overview

Several federal programs provide funding for EV infrastructure and are generally administered through state Departments of Transportation. The U.S. Department of Transportation's (DOT) Federal Highway Administration (FHWA) NEVI Formula Program provides funding to states to strategically deploy EV chargers and establish an interconnected network to facilitate data collection, access, and reliability. The program specifically funds chargers along FHWA designated Alternative Fuel Corridors (AFCs). In order to be eligible for NEVI funding, MassDOT developed the NEVI Program Deployment Plan which provides a framework for Massachusetts to expand its EV highway fast charging network through NEVI funding.

The Massachusetts NEVI Program Deployment Plan focuses on DCFC charging infrastructure serving long-distance travel corridors, specifically Massachusetts' federally designated AFCs. All AFCs are divided into maximum 25 mile segments and the program requires that each segment be served by at least one charging station. This spacing requirement ensures that stations will be at most 25 miles from the State border and within 50 miles from each other (see Figure 3.2). There are 42 segments across the Commonwealth, shown in Figure 3.3. Overall, the stations in Massachusetts will be less than 25 miles apart on average, which exceeds NEVI spacing requirements.

Figure 3.2. AFC Segments for Massachusetts

Figure 3.3. AFC Segment Status Map, May 2025 (Source: MassGIS, MassDOT, USDOT, HEPG2S)



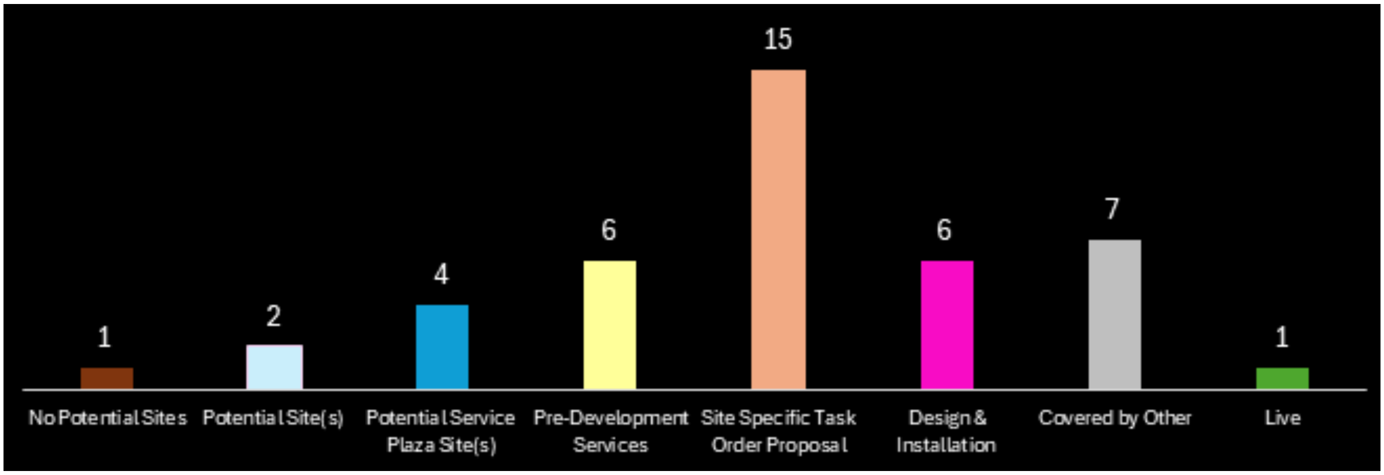
Program Funding

At the federal level, NEVI is funded through the 2021 Infrastructure Investment and Jobs Act (IIJA), with resources available annually through FY2026. The NEVI program apportioned approximately $64 million of formula funds to Massachusetts, of which approximately $50M has been allocated. Massachusetts continues to have access to the previously allocated funding. These resources will support the Commonwealth's comprehensive EV charging infrastructure network which will equitably support the needs of the Commonwealth.

Program Impact

Of the 42 total segments along AFCs in Massachusetts, one segment has a live site, and an additional 21 segments are in the design or installation phase. An additional 12 segments are in pre-development stages and 7 segments are covered by other charging providers. A summary of each segment's status is provided in Figure 3.4. Only one segment does not have a site identified. The number of charging ports at each station may vary, but NEVI funding is expected to fund at least 84 DCFC ports throughout the state.

Figure 3.4. AFC Segment Status Summary



Service Plazas

MassDOT owns 18 Service Plazas along major transit corridors through Massachusetts, including 11 Service Plazas along the Mass Pike.[9] The Service Plazas are spread across the geography of the state, serving the population from Barnstable to Lee, and from Beverly to Plymouth and Bridgewater. The service plazas are integral to the Commonwealth meeting the needs of the traveling public and are especially important for supporting long distance travel. Annually, there are over 15 million passenger vehicles and roughly 2.25 million truck visitations to the Service Plazas. In 2024, at just the 11 Mass Pike service plazas, 31,537,874 gallons of gasoline, and 5,580,213 gallons of diesel were sold.

MassDOT is completing the selection of the next private operator for MassDOT's 18 service plazas. As the MassDOT service plazas will serve as critical EV charging hubs to support long distance travel and daily commutes throughout the Commonwealth, including for heavy duty vehicles along the Mass Pike, robust and continuing EVSE buildout requirements were included in the recently issued Request for Proposals (RFP), including:

1. By January 1, 2027, build out of EV charging stations at the Natick, Framingham, Ludlow Eastbound, Ludlow Westbound, Blanford, Lee Westbound, and Lee Eastbound Service Plazas Operator to utilize the 2MW of power anticipated to be available to the maximum extent possible.
2. By January 1, 2027, four EV charging stations for medium- and heavy-duty vehicles along I-90.
3. By January 1, 2028, all Service Plazas will have at least four direct-current, fast chargers (DCFCs).
4. By January 1, 2035, sufficient charging stations to ensure no queue during non-holidays.

The contract for the next service plaza operator, as currently written, also sets contractual performance standards that should ensure a much improved charging experience for customers, including: 24 hour customer service

[9] See "Service Plaza Locations," MassDOT, https://www.mass.gov/info-details/service-plaza-locations. Rest areas and Tourist Information Centers are also included within the map and list on the MassDOT website.

support; 97% or greater uptime; and amenities on par with those of the gas fueling stations. The service plaza operator RFP with the relevant information, which is subject to modification in the final service plaza operator agreements, is available online.

The next service plaza operator(s) will be able to ensure that Massachusetts remains a leader in supporting the adoption of EVSE so long as the service plazas are provided with sufficient electric capacity and affordable interconnection costs.

Charging and Fueling Infrastructure (CFI) Grant Program

Program Overview

The federal Charging and Fueling Infrastructure (CFI) Program, was enacted through the Bipartisan Infrastructure Law and is administered by the FHWA. CFI includes two funding categories. The Community Program provides funding for installation of publicly accessible chargers, particularly in low-income, underserved, rural, and high-density communities. The Corridors Program funds infrastructure deployments along NEVI Alternative Fuel Corridors.

Massachusetts has received four CFI awards:

- **Town of Deerfield:** $2.46 million for four DCFCs and four Level 2 chargers located near Interstate 91 in Deerfield, Massachusetts
- **Department of Conservation and Recreation's (DCR) Public Access EV Charging Program:** $1.2 million for Level 2 EV charging stations deployed across DCR's portfolio of properties, including at state parks. A strategic plan will be developed through fiscal year 2026, with installations intended to begin in fiscal year 2027.
- **City of Boston:** $15 million for a mix of over 300 Level 2 and DCFCs strategically placed across the city. These chargers will be within a 10-minute walk for most residents, with a strong focus on environmental justice communities.
- **Massachusetts Transit Regional Innovative Charging Expansion Strategy (MATRICES):** $14.4 million for 472 EV charging ports at MassDOT-owned Park and Ride lots and Massachusetts Bay Transportation Authority (MBTA) owned transit station parking lots to support multi-modal transit and expand access in disadvantaged communities near dense multi-family housing. MATRICES also includes education, workforce training, and community outreach to promote equitable EV infrastructure adoption.

Program Funding

In total, these projects were awarded $23.06 million from FHWA from BIL. However, the future of the funding delivery remains unclear for the DCR, City of Boston, and MATRICES projects. DCR continues to have access to its funding through CFI and plans to progress progress as if all of the funding will be delivered. The Town of Deerfield project has already been completed.

Program Impact

Should resources be available, these projects would deploy over 750 EV chargers at dozens of locations across Massachusetts. The EV charging site in Deerfield was the first NEVI-qualifying site across the Commonwealth to go live for public use.

Massachusetts Clean Energy Center Innovative Programs

The Massachusetts Clean Energy Center is a state energy and economic development agency which administers several programs designed to pilot and support rollout for innovative EV charging strategies. A summary of MassCEC's EV charging-related programs is provided below.

More information on On-Street Charging Solutions, Ride Clean Mass: Charging Hubs, Vehicles-to-Everything Demonstration Projects, and Medium- and Heavy-Duty Charging Solutions can be found on MassCEC's EV Charging Infrastructure webpage. Early lessons learned from each program can be found in Appendix 6.

More information on ACT4All, Round 2 (ACT4All 2) can also be found on MassCEC's dedicated webpage.

On-Street Charging

The Initial EVICC Assessment found that access to charging is a significant barrier to EV adoption for residents without a dedicated garage, driveway, and/or private parking space. The Initial Assessment recommended that state agencies work with municipalities to develop guidance and support for programs to expand curbside charging and overnight charging infrastructure. However, municipalities face high upfront costs for installation and complex technical landscapes; as such, MassCEC's On-Street Charging Solutions Program was designed to address these barriers.

The On-Street Charging Solutions Program provides no cost EVSE planning support and feasibility studies to a representative subset of 25 municipalities, as well as funding and technical support to install on-street charging projects in 15 municipalities. The program focuses on municipalities with high populations of renters, multi-unit dwelling residents, and Environmental Justice Communities. Feasibility studies will be delivered to municipalities by September 2025 and charging stations are scheduled to be installed and energized by January 2026. A comprehensive On-Street Charging Guidebook will be published in December 2026 to leverage program lessons learned and equip all municipalities with step-by-step guidance, barriers and solutions to consider, and practical tools and resources needed to successfully design and develop future on-street EVSE installation.

Program Funding

In 2024, MassCEC received $11.2 million in ARPA funds from EVICC for the On-Street Charging Solutions Program.

Transportation Network Company (TNC) Charging Hubs

Vehicle-for-Hire (VFH) drivers, including both Transportation Network Company (TNC) drivers and taxi drivers, are likely to be low-or-moderate income (LMI), have two or more jobs, and drive more miles than the average driver. In 2023, approximately 78.7 million TNC rides originated in Massachusetts. These high-mileage drivers are a priority for electrification and require access to fast, reliable, and convenient charging.

MassCEC's Ride Clean Mass: Charging Hubs program is piloting EVSE charging station hubs for TNC and taxi drivers. Implementation will include the purchase and installation of publicly accessible Level 2 and DCFC charging stations at approximately six sites across the Commonwealth.

Based on VFH driver survey results, sites were chosen with a focus on locations with high numbers of TNC drop-offs and pickups, locations where VFH drivers reside, and locations with few to no existing charging stations. Leveraging lessons learned from the program, a Charging Station Siting Strategy will be published in December 2026 to provide guidance on siting considerations, business models, and VFH driver needs, preferences, and usage to support public and private sites with EVSE installation intended for VFH drivers.

Program Funding

In 2024, MassCEC received $7.2 million in ARPA funds from EVICC for the Ride Clean Mass: Charging Hubs program.

Vehicle-to-Everything

Bidirectional charging enables the batteries in electric vehicles to both receive energy from charging stations and discharge through them to an external load allowing EVs to be used as energy storage assets. This technology is particularly effective in supplying energy back to the grid during peak hours and providing back-up power during grid outages.

MassCEC's Vehicle-to-Everything (V2X) Demonstration program launched in early 2025 and will ultimately deploy bi-directional charging infrastructure across the Commonwealth to improve grid resilience, reduce energy costs, and increase renewable energy integration. The program will explore a variety of use cases by deploying approximately 100 bi-directional chargers at residential, commercial, and school sites, and will prioritize locations in rural areas, Gateway Cities, and Environmental Justice Communities.

All bidirectional charging stations are expected to be installed and operating by January 2026, and data collection will be ongoing throughout 2026. At the conclusion of this program, a comprehensive Guidebook will be developed based on program lessons learned to provide stakeholders with the technical information needed, such as costs, charging management, and potential barriers and solutions, to independently assess the technical and financial viability of V2X charging projects. In addition, the program will connect stakeholders and share learnings across the state and nation through regional and national stakeholder groups.

Program Funding

In 2024, MassCEC received $6.1 million in ARPA funds from EVICC for the Vehicle-to-Everything (V2X) Demonstration program.

Mobile Charging for Medium- and Heavy-Duty Vehicles

Mobile charging solutions can minimize the complexity of EVSE installation, making it an increasingly appealing option for fleet owners and operators looking to test out and right size medium- and heavy-duty (MHD) zero emission vehicles (ZEVs). To install permanent EVSE infrastructure, fleet owners incur hefty charging infrastructure costs, face lengthy utility and equipment lead times, and often experience grid or facility ownership restraints that can prohibit electrification.

To address these barriers, MassCEC's MHD Mobile Charging Solutions Program will pilot semi-permanent, off-grid, and grid-flexible charging solutions with four (4) MHD fleets domiciled and operating throughout the Commonwealth, with a focus on fleets domiciled in EJ communities. Mobile charging stations and MHD ZEVs are expected to be deployed on a rolling basis no later than May 2026. Public resources will be published in December 2026 to provide all fleet owners and operators with the technical and financial information, such as total cost of ownership, siting considerations, and optimal duty cycles and use cases, to independently pursue mobile charging station deployment projects.

Program Funding

In 2024, MassCEC received $5.4 million in ARPA funds from EVICC for the MHD Mobile Charging Solutions Program.

Accelerating Clean Transportation for All Round 2

MassCEC's ACT4All is an equity-focused clean transportation grant program with the dual goals of increasing access to clean transportation and decreasing burdens from the existing transportation system for overburdened and under-served populations. ACT4All, Round 2 (ACT4All 2) sought innovative and replicable projects to increase access to EVSE for MA residents without a dedicated private-parking spot, including residents of multi-unit dwellings (MUDs), residents of low-income housing, and renters.

The four projects that were selected under the EVSE topic area are funded through $4.4 million in ARPA funding provided by EVICC:

- **Equal Energy Mobility:** Installing curbside and streetlight-mounted EV chargers in Barnstable County and Mashpee Wampanoag Tribal Lands in collaboration with Zipcar and other partners.
- **Matcha:** Deploying vendor-owned and operated Level 2 EV chargers at MUDs in partnership with community-based organizations.
- **Metropolitan Area Planning Council:** Deploying mobile solar- and battery-powered EV charging stations at public housing developments, paired with carshare.
- **PowerOptions:** Piloting a vendor-owned and operated model to expand charging access for non-profit and public properties in priority population communities.

Other Efforts

MassCEC and EDC Fleet Advisory Services

Several fleet advisory programs are available to public and private fleet owners across Massachusetts. These programs provide technical assistance for EV and charging infrastructure decisions to help overcome common barriers to EV fleet deployment. Across all programs, participating fleet owners receive a customized report on transitioning their fleet, vehicle recommendations, and ongoing technical assistance for pursuing funding.

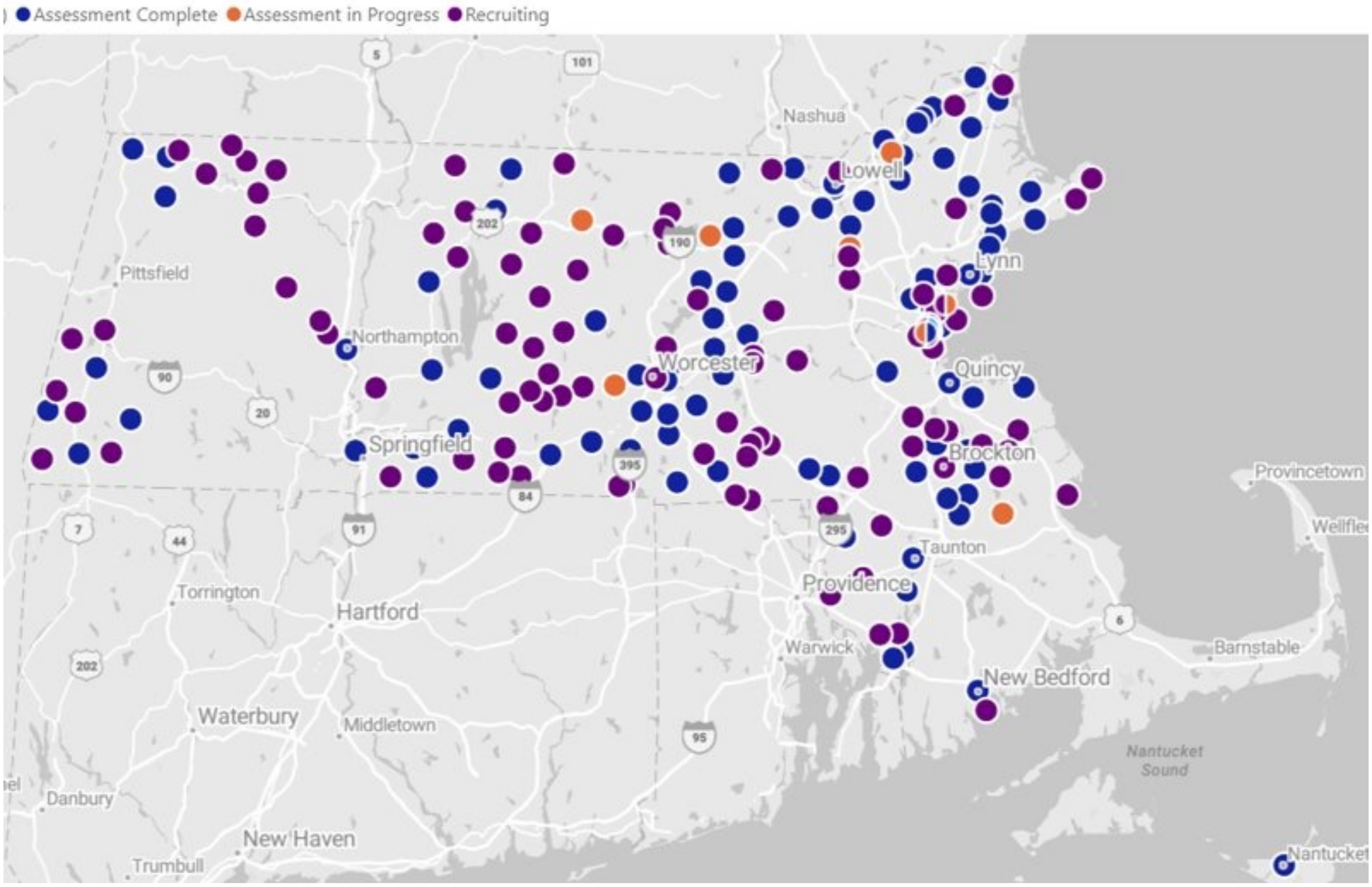
The fleet advisory programs help participants leverage financial support, educate staff on EV charging and maintenance, and procure EVs for targeted uses to help overcome common barriers such as upfront costs, organizational growing pains, and concerns about charging times, maintenance costs, and range anxiety, among others.

Eversource and National Grid Advisory Programs

ICF runs fleet advisory services for Eversource and National Grid, which provides technical assistance and a customized report to participants. Eligible fleets include public transit, public university/college, and municipal, state, and federal government entities. The program has enrolled over 100 fleet customers, primarily local governments.

Figure 3.5 shows the number and location of fleets that have received an assessment (blue dot), have an assessment in progress (orange dot), or ICF or the utilities are actively recruiting to participate in the program (purple dot).

Figure 3.5. Fleets Participating in the Eversource and National Grid Advisory Program as of January 8, 2028[10]



MassCEC Mass Fleet Advisor

MassCEC's Mass Fleet Advisor program, administered by CALSTART in partnership with PowerOptions, provides a personalized electrification strategy for each participating fleet, along with guidance for EV purchasing decisions and navigating financial incentives. Eligible fleets include private or non-profit fleets with depots in Massachusetts and municipalities served by Municipal Light Plants (MLPs). The program filled its original 65 slots and has since expanded to 200 fleets.

More information on the programs detailed above can be found on each organization's dedicated webpage (Eversource, National Grid, and MassCEC) and in the slides presented at the January 8, 2028 EVICC Public Meeting.

[10] "EVICC Public Meeting," EVICC, January 8, 2025, slide 19, https://www.mass.gov/doc/evicc-meeting-deck-january-8-2025/download.

Other notable EV charging efforts in Massachusetts

Boston Curbside Charging Case Study

To help meet future emissions goals, the City of Boston is expanding curbside EV charging options, installing 250 curbside charging stations across the city by 2030. The Curbside Charging program aims to provide accessible charging options for residents, particularly those without private parking options, with the goal of having at least one charger located within a five minute walk of every home in Boston.

The program employs two models:

- Model 1 involves public-private partnerships with vendors like itselectric and Greenspot, who install and operate low-profile charging stations at no cost to the city. The city does provide oversight on charger operations and fee structure. Parking at these stations is on a first-come, first-served basis with a four-hour limit during the day, with unrestricted overnight parking.
- Model 2 consists of city-owned stations installed and maintained by Better Together Brain Trust in partnership with Flo. Each location will have four charging ports and is strategically placed near public amenities such as parks, libraries, and commercial areas.

As of the middle of 2025, the program is still relatively new, and has not yet disseminated impact data. It will continue to contribute to Boston's broader goals to promote clean transportation and reduce greenhouse gas emissions.

Massachusetts Municipal Light Plants (MLPs) Case Studies Background

Since 2018, Massachusetts Municipal Light Plants (MLPs) have emerged as leaders in transportation electrification, leveraging their unique position as community-owned utilities to design innovative Electric Vehicle programs that demonstrate public power's core advantages of affordability, reliability, and local control. These utilities have implemented comprehensive solutions ranging from off-peak charging incentives and income-qualified rebates to smart load management systems and community partnerships, with notable successes like Braintree Electric's 60% participation rates, Concord Municipal Light's community collaborations and Shrewsbury's active charge management and community engagement. Through their ecosystem of technical solutions, financial incentives, and educational tools, MLPs demonstrate how local control enables responsive, customer-focused program design that accelerates EV adoption while ensuring equitable access across their service territories. With many of these MLP programs supported by municipal energy services organization Energy New England and public power agency Massachusetts Municipal Wholesale Electric Company (MMWEC), these MLPs are well-positioned as essential partners in achieving state transportation electrification goals while maintaining affordability and reliability for all customers.

Town of Concord/CMLP Case Study

The Concord Municipal Light Plant (CMLP) offers comprehensive support for EV charging infrastructure across residential, commercial, and multi-unit dwelling (MUD) properties. CMLP's Commercial EV Charging Station Rebate provides up to $6,000 per Level 2 charger to offset hardware and installation costs at workplaces, schools, retail locations, fleets, and MUDs. For residential customers, a $250 rebate is available for Level 2 charger installation, including associated electrical upgrades. CMLP also assists MUD property owners with technical guidance and promotes awareness of Massachusetts' "Right to Charge" law to ensure equitable access to home charging. In addition, the Connected Homes Program offers financial incentives for off-peak charging to support grid efficiency. These programs complement state-level funding and reflect Concord's broader climate goals to reduce transportation emissions, which represent 36% of the town's total greenhouse gas output. By reducing cost barriers and supporting diverse use cases, CMLP's initiatives aim to accelerate EV adoption and contribute to the town's target of an 80% reduction in emissions by 2050.

Shrewsbury/SELCO Case Study

Guided by a strategy of supporting beneficial electrification, Shrewsbury's electric utility, SELCO, has made significant efforts to drive EV adoption. SELCO offers rebates up to $1,000 on the purchase/lease of EVs, up to $350 for EV chargers, and ongoing bill credits for participating in SELCO's demand response program, Connected Homes, which limits EV charging during peak events.

SELCO has also installed and manages 32 ports of public facing Level 2 chargers to increase accessibility to convenient charging in Shrewsbury. Additionally, SELCO has heavily promoted their energy programs, and consumers rely on SELCO as a trusted advisor on electrification. In response to common customer concerns about EVs (e.g. limited range, unreliable charging infrastructure, and high initial costs), SELCO has crafted marketing materials to highlight the benefits of EV adoption for their customers, including saving money on maintenance and fuel, as well as reducing carbon emissions. Additionally, SELCO is upgrading their distribution system to bolster customer confidence in grid reliability, strategically electrifying their own fleet, and building more public charging stations.

Recommendations

Public Comments

During the monthly EVICC public meetings in 2024 and 2025 and at the public hearing on the Second EVICC Assessment, EVICC members and members of the public provided feedback about the state's current efforts related to EV charging. Key themes from those comments are highlighted below.

- Program offerings and eligibility requirements can be difficult to navigate, especially when trying to compare across state and utility programs.
- More funding for DCFC is necessary, along with increased transparency about the amount of funding allocated for other incentive programs.
- More resources and technical assistance are needed to help applicants navigate program applications; a centralized location for information about all of the incentive program offerings would be helpful.

A summary of comments provided during the public hearings on the Second EVICC Assessment are available on the EVICC website. Similarly, the minutes from prior EVICC public meetings can be found on the EVICC website.

EVICC Recommendations

EVICC recommends the following actions to address the key themes highlighted in this Chapter and to improve the existing suite of EV charging infrastructure efforts to ensure an equitable, interconnected, accessible and reliable EV charging network in Massachusetts.

- **Agency Action:** Better align MassEVIP and the utility EV charger incentive programs by coordinating customer eligibility and program requirements to improve the customer experience and efficient disbursement of available funding. (MassDEP, EEA, DOER, and the EDCs)
- **Agency Action:** Improve public information on the status and future of existing incentive programs and customer communication on application status and other relevant information, as necessary and appropriate, with the objective of improving transparency and helping stakeholders plan future EV charging infrastructure deployment more effectively. (MassDEP, EEA, DOER, DPU, as appropriate, and the EDCs)
- **Agency Action:** Build on the success of the existing innovative EV charging infrastructure programs and ACT4All, Round 2 innovative charging projects by providing resources and lessons learned to help further unlock the potential of these business and technology models and looking for new opportunities to test and help scale other innovative business models. (MassCEC)

EV Charger Deployment

Current state of deployment

As Massachusetts accelerates its transition to EVs, understanding the current landscape of EV charger deployment in the Commonwealth is important to identifying infrastructure gaps and planning for future needs across geographies and charger and vehicle types.

This section provides a snapshot of EV charger deployment in Massachusetts, including the number and distribution of public, workplace, fleet, commercial, and residential chargers, charger deployment by state, utility, and federal programs, and key trends.

This Assessment provides information on current and future EV charging infrastructure deployment in all customer segments and charger categories. This Assessment also provides analysis and next steps for each charger category, which focuses primarily on the types of EV charging infrastructure that have the highest value and on which EVICC and the state can have the greatest impact:* (1) EV charging infrastructure accessible to all members of the public (i.e., "public" EV charging), including on-street charging for residential customers; and (2) EV charging infrastructure for fleet vehicles.

Public charging is uniquely important for a variety of reasons, including that the availability of public EV charging infrastructure impacts consumer confidence in switching to EVs, deployment can be targeted through state and utility programs, and public chargers serve the greatest number of Massachusetts drivers. EV infrastructure for fleet vehicles, particularly for medium- and heavy-duty (MHD) fleet vehicles, also offers significant opportunities for impact as EV charging for MHD fleets need to be scaled more than other EV charging infrastructure based on current deployment and MHD fleet vehicles have a higher impact on transportation emissions.

Other segments are also important, but offer EVICC and the state less opportunity for impact. For example, single-family charging infrastructure likely requires significantly less financial support than public EV charging infrastructure and only provides charging for vehicles parked at that single-family home.

*This conclusion is based on public comments, EVICC public meeting discussions, the analysis included in this Assessment, and EEA staff expertise and is explained further later in this Chapter. These categories may change over time and will be re-evaluated in the next EVICC Assessment.

Overview

Massachusetts' EV charging network has grown significantly through a combination of public and private investment, state-led incentive programs, and utility programs and infrastructure support. Drawing from the U.S. Department of Energy's Alternative Fuel Data Center and a range of state-specific data sources, this section outlines the current distribution of chargers by sector and location.

Total deployment - incentive programs

Table 4.1 summarizes available deployment data from state, federal, and utility incentive programs, including contributions from programs such as MassEVIP and the investor-owned utility programs, offering a clear picture of the EV charging infrastructure installed to date as a result of these programs.[1]

Table 4.1. Total EV ports by segment funded through state or utility incentive program[2]

	Segment						
Program	**Public**	**Workplace**	**Fleet**	**Residential**	**MUD**	**Other**	**Program Total**
MassEVIP	2,681	2,825	450	-	806	206	6,968
Eversource	1,996	1,265	260	3,974	682	-	8,177
National Grid	1,706	484	19	2,215	417	-	4,841
NEVI/CFI	8	-	-	-	-	-	8
Green Communities	-	-	-	-	-	174	174
DOER/LBE	-	-	240	-	-	-	240
DCAMM	-	-	212	-	-	-	212
Segment Totals	6,391	4,574	1,181	6,189	1,905	380	
Total Ports Funded	20,620						

[1]The U.S. Department of Energy Alternative Fuels Data Center indicates that nearly 10,000 private and public EV charging ports have been deployed in Massachusetts as of May 2025. However, it is unclear how many of those charging ports are incremental to the charger ports numbers included in Table 4.1. EEA is working to develop an inventory of Massachusetts EV charging infrastructure, which aims to reconcile these data sources.

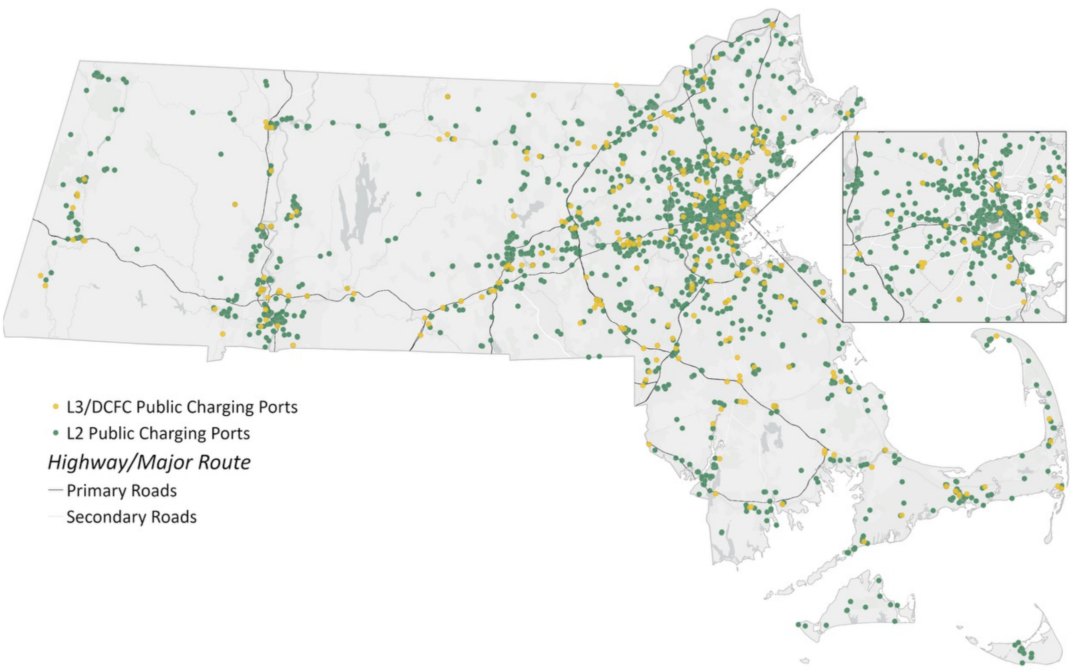
[2]Note: In the 'Other' segment column, the 206 MassEVIP ports represent ports funded through their Educational Campus program. The 174 Green Communities chargers are listed as 'Other' because Green Communities does not collect information about whether their funded ports are publicly accessible or municipal fleet charging.

Public EV charging

Current status

The network of public charging stations in Massachusetts has grown significantly since the Initial EVICC Assessment was released in 2023. When the Initial Assessment was published, there were 2,623 publicly accessible charging station locations, with 6,082 ports. Since then, the number has grown to at least 3,750 charging station locations, with 9,413 ports, as of May 2025.[3] Figure 4.1 shows the location of these DC fast charging and Level 2 charging stations across the Commonwealth.

Figure 4.1 Public DC fast charging and Level 2 charging stations in Massachusetts



Incentive funding

While some public charging stations have been built without incentive funding, the majority of public charging stations in Massachusetts have benefited from a state, investor-owned utility, or federal incentive or grant program. Approximately 67.9% of all public charging ports have received funding from these programs, which shows the important role incentive funding has played in deploying EV charging infrastructure to date.[4] Table 4.2 shows the impact that different incentive programs have had on public charging deployment.[5]

[3]Alternative Fuels Data Center, "Alternative fueling station counts by state," U.S. Department of Energy. https://afdc.energy.gov/stations/states. Trends in EV charger deployment in Massachusetts using data from the Alternative Fuels Data Center yield unlikely results for some periods of 2025. Moreover, EEA understands that data from some EV charger companies is not regularly being updated. Thus, EEA has reason to believe that more than 9,413 public EV charger ports are currently deployed in Massachusetts.

[4]Some Municipal Light Plants (MLPs) also offer charging incentives, which are not included in this data.

[5]Chargers funded through the Green Communities program are not included in Tables 4.X or 4.X because the program does not collect data about whether chargers funded are publicly accessible or for municipal fleet charging. Since the 174 chargers that Green Communities has funded are a relatively small proportion of overall chargers in the state, their omission does not substantively affect the analysis.

Table 4.2 Public charging ports funded by state- and investor-owned utility incentive programs

Program	Public Charging Ports Funded	% of Total Public Chargers in MA
MassEVIP	2,681	28.48%
Eversource	1,996	21.20%
National Grid	1,706	18.12%
NEVI/CFI	8	0.08%
TOTAL	**6,391**	**67.90%**

Comparing public charging infrastructure in other states

Massachusetts has one of the most robust networks of public EV charging infrastructure of any state.

EV charging ports per capita and EV charging ports per EV serve as useful metrics for comparing EV deployment across geographies and jurisdictions.Chargers per capita provides insights into the overall status of EV charging infrastructure available to potential EV drivers in a state and can help identify population centers that may need increased charging infrastructure as EV adoption increases. Thus, chargers per capita is a useful metric for long-term planning. Measuring chargers per registered EV, on the other hand, provides insights into how well served current EV drivers are by existing charging infrastructure and can help highlight places with high EV-to-charger ratios that would benefit from additional charging infrastructure in the near-term.

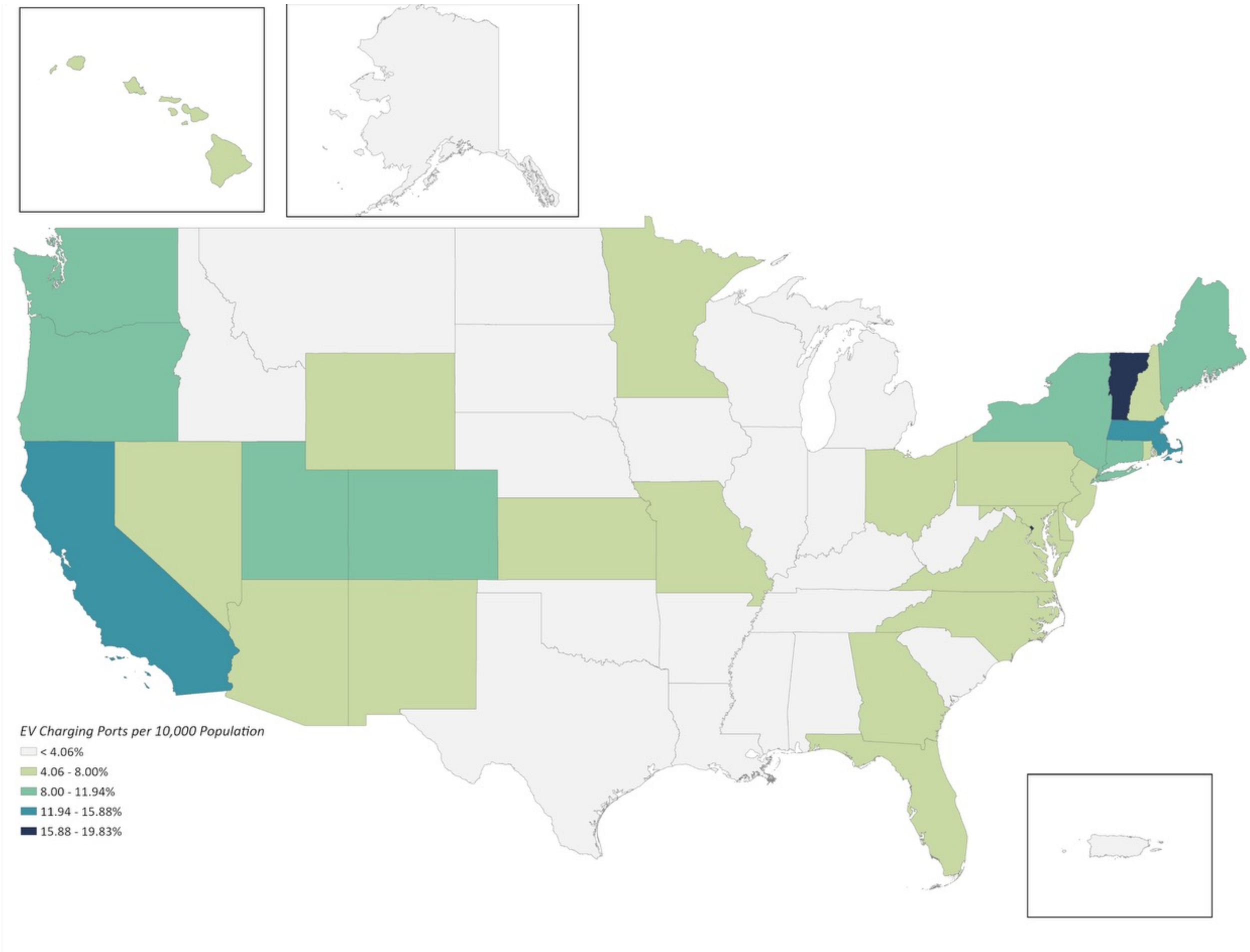
At the local level, the ideal number of EV chargers likely falls between the charger per capita ratio needed to meet the long-term estimate of EV drivers and the ideal charger per EV ratio to serve the current number of EV drivers as charging infrastructure should be built to ensure that future EV drivers have sufficient charging and that potential EV drivers feel confident that this is the case, while also balancing the financial risk of overbuilding. At the state level, these metrics offer convenient points of comparison in a state's progress in building towards future EV needs and meeting current EV charging demand.

As of June 2025, Massachusetts ranks fourth in EV charging ports per capita amongst all states behind Vermont, Washington D.C., and California.[6] Similarly, Massachusetts ranks fifth in EV charging ports per EVs amongst the top ten states in EV charging ports per capita.

Figure 4.2 shows EV chargers per capita across all states. Table 4.3 provides the underlying data from Figure 4.2 and EV charging per EVs for the ten top states in terms of EV chargers per capita.

[6]Population data came from the American Community Survey (ACS) 2023 1-year estimates and EV charging port data came from the U.S. Department of Energy's Alternative Fuels Data Center.

Figure 4.2 Public charging ports per capita (per 10,000 people) by state[1]



[7]Population data came from the American Community Survey (ACS) 2023 1-year estimates and EV charging port data came from the U.S. Department of Energy's Alternative Fuels Data Center.

Table 4.3 Top US states by charging ports per capita and charging ports per registered EV

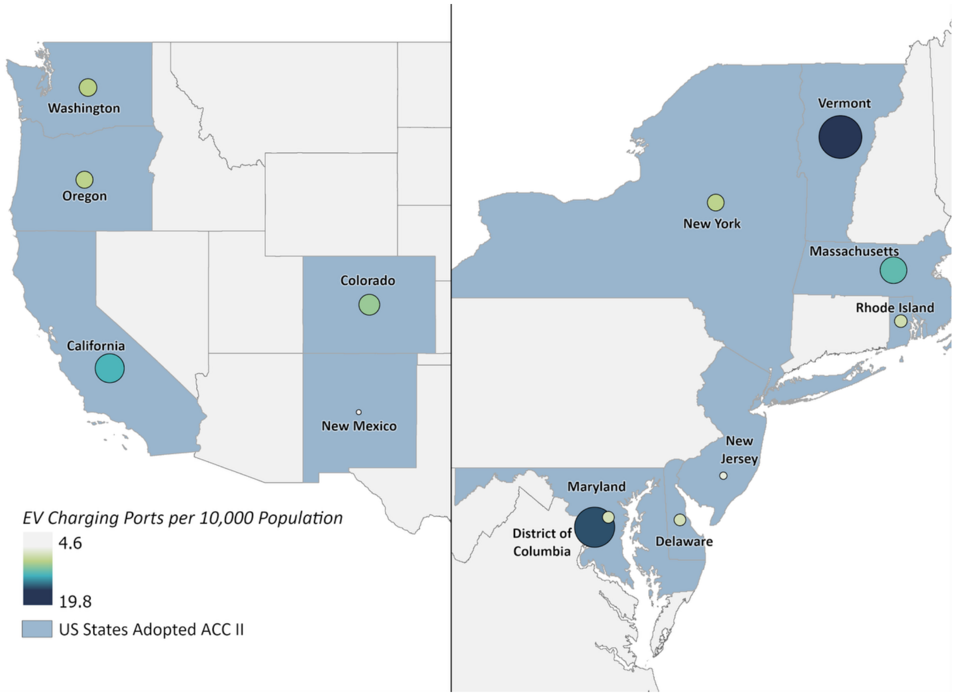
State	Population[2]	Registered EVs	Count of EV Ports[3]	Ports Per Capita (per 10,000)	Ports per Registered EV	EV Registration Data Date	EV Registration Data Source
Vermont	647,464	18,790	1,284	19.83	6.83	2025	Open Vehicle Registration Initiative
District of Columbia	678,972	11,800	1,275	18.78	10.81	2023	U.S. Department of Energy Alternative Fuels Data Center
California	38,965,193	1,892,731	56,055	14.39	2.96	12/2024	California Energy Commission
Massachusetts	7,001,399	145,627	9,413	13.44	6.46	4/2025	Massachusetts Vehicle Census
Colorado	5,877,610	183,376	6,532	11.11	3.56	2025	Open Vehicle Registration Initiative
Connecticut	3,617,176	59,893	3,957	10.94	6.61	12/2024	Open Vehicle Registration Initiative
Washington	7,812,880	246,137	7,622	9.76	3.10	5/2025	Washington State Department of Licensing
Maine	1,395,722	19,448	1,344	9.63	6.91	2025	Open Vehicle Registration Initiative
Oregon	4,233,358	118,004	4,022	9.50	3.41	2025	Open Vehicle Registration Initiative
New York	19,571,216	292,641	18,460	9.43	6.31	2025	Open Vehicle Registration Initiative

*Population data came from the American Community Survey (ACS) 2023 1-year estimates and EV charging port data came from the Alternative Fuels Data Center.

It is particularly useful to understand where the Commonwealth stands regarding public EV charging infrastructure in comparison to other states that have made strong commitments to increasing EV adoption. Massachusetts, along with 11 other states and the District of Columbia, have adopted Advanced Clean Cars II (See Chapter 3). Massachusetts ranks fourth among these 13 leading jurisdictions in EV charging per capita. Figure 4.3 shows how Massachusetts' EV charging ports per capita compares to other ACC II states.

[8]Population data came from the American Community Survey (ACS) 2023 1-year estimates.
[39]EV charging port data came from the U.S. Department of Energy's Alternative Fuels Data Center.

Figure 4.3 Public chargers per capita (per 10,000 people) in states that have adopted the ACC II rule



Workplace and fleet charging

While public EV charging infrastructure is the most visible part of the state's charging network, commercial charging applications like workplace and fleet charging also contribute to the overall charging infrastructure that support EVs. Workplace charging plays an important role in supporting EV drivers who commute, including those who may not have access to charging at their residences. Moreover, while EV fleet vehicles make up a much smaller proportion of all EVs on the roads, they are an important part of the Commonwealth's efforts to reduce transportation sector emissions through electrification. MHD vehicles specifically accounted for more than a quarter of all transportation sector emissions in 2019,[10] despite representing less than 4% of registered vehicles in Massachusetts.[11]

Similar to public charging stations, state and utility incentive programs play a large role in the deployment of workplace and fleet charging infrastructure. Table 4.4 shows the number of workplace and fleet charging ports funded through the various incentive programs.[12] The state and utilities also offer fleet advisory programs help fleet owners plan out EV purchases and the charging infrastructure necessary to support them (See Chapter 3).

[10]Emissions from medium- and heavy-duty vehicles was over 8 million metric tons of carbon dioxide equivalent (MMTCO2e) in 2019 (2025/2030 CECP, p. 31). Total transportation sector emissions were slightly over 29 MMTCO2e in 2019 (Massachusetts Clean Energy and Climate Metrics). 8 MMTCO2e is approximately 28% of 29 MMTCO2e.

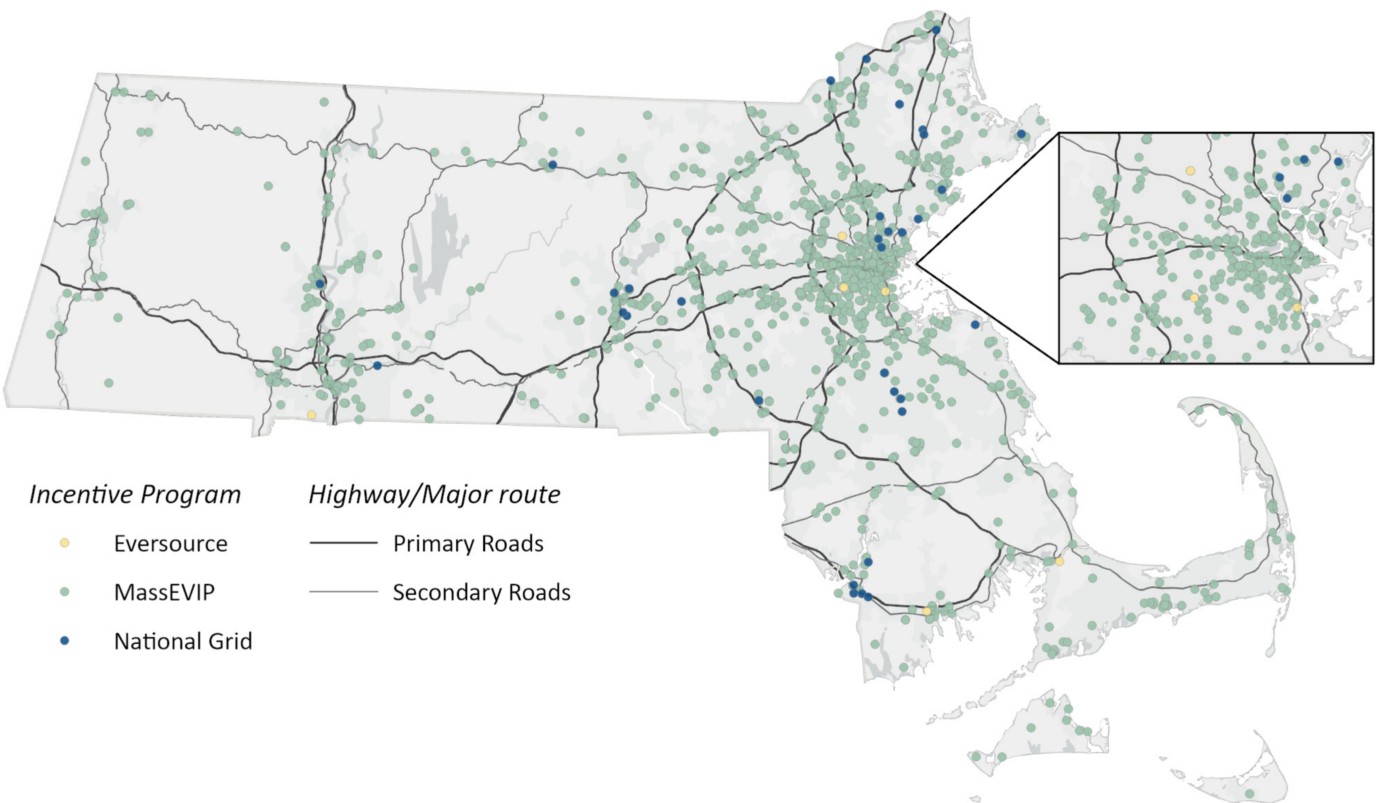
[11]As of January 1, 2020, 5,096,498 total vehicles were registered in Massachusetts, of which 172,587 were MHD vehicles (Massachusetts Vehicle Census). 172,587 is approximately 3.4% of 5,096,498.

[10]Chargers funded through the Green Communities program are not included in Tables 4.X or 4.X because the program does not collect data about whether chargers funded are publicly accessible or for municipal fleet charging. Since the 174 chargers that Green Communities has funded are a relatively small proportion of overall chargers in the state, their omission does not substantively affect the analysis.

Table 4.4 Public charging ports funded by state- and investor-owned utility incentive programs

Program	Workplace	Fleet
MassEVIP	2,825	450
Eversource	1,265	260
National Grid	484	19
DOER/LBE	-	240
DCAMM	-	212
Total	4,574	1,181
TOTAL	**6,391**	**67.90%**

Figure 4.4 shows workplace and fleet charging ports in Massachusetts that have received state or utility funding.



Residential EV charging

Residential EV charging is the final piece of the EV charging network. EV charging in residential areas is perhaps the most important component of the EV charging ecosystem as the majority of EV charging occurs at home.[13] Residential charging can take the form of a Level 1 or Level 2 charger in a residential home or as chargers (usually Level 2) that are available to residents of multi-unit dwellings (MUD) with off-street parking. Residential charging can also take the form of Level 2 on-street chargers and DC fast chargers in densely populated urban areas to support at- or near-home charging for customers without off-street parking.

While there is no comprehensive dataset of all residential EV chargers, MassEVIP and the investor-owned utility programs include incentives for residential charging and charging for MUDs. Charger deployment through these programs for residential and MUD customers is summarized in Table 4.5.

Table 4.5 Residential and MUD chargers funded by state and utility incentive programs

Program	Residential	Multi-Unit Dwellings
MassEVIP	-	806
Eversource	3,974	682
National Grid	2,215	417
TOTAL	**6,189**	**1,905**

Considerations for key demographics and vehicle types

Access to EV chargers can be limited or more challenging for some demographics, including environmental justice (EJ) populations, rural communities, and residents of MUDs without off-street parking. Additionally, EV charging for MHD vehicles is not as widespread as EV charging infrastructure for light-duty vehicles.

These groups, EJ populations, rural communities, MUDs without off-street parking, and MHD vehicles, have consistently been identified during the monthly EVICC meetings, Technical Committee meetings, and at the public hearings as requiring particular consideration in the Second Assessment's recommendations and in current and future incentive program design. For examples, see page 7 of the EVICC Assessment Public Hearing Feedback summary, page 5 of the February EVICC Meeting minutes, page 3 of the March 2025 EVICC Meeting minutes, or page 4 of the May 2025 EVICC meeting minutes. Thus, it is important to understand the barriers these groups face and explore innovative solutions to meeting their charging needs in order to build a truly equitable network of EV chargers across the Commonwealth.

This section explores the unique needs of each of these groups and efforts underway to support each group. In addition to this section, Chapter 3 describes MassCEC's On-Street Charging Solutions program and ACT4All 2 projects which address many of the access challenges discussed herein.

Environmental Justice (EJ) populations

Communities with EJ populations have unique challenges and needs for EV charging infrastructure. These populations typically rely on older, cheaper vehicles and, thus, are slower to adopt EVs. EJ populations may also face other challenges including language and charging access barriers, difficulty paying for charging, and older building stock without off-street parking.

As access to affordable EVs grows, it is important to ensure that historically underserved communities, including EJ populations, have access to public EV charging stations as public EV charging stations can promote economic and workforce development and provide health benefits from improved air quality and reduction in noise pollution. To achieve these benefits, EV charging stations must be sited equitably and in alignment with the community's interests. Key access considerations for EV charging infrastructure in communities with EJ populations are summarized in Table 4.6.

Table 4.6. Summary of EV charger access challenges and implications for EJ populations

Access Consideration	Unique Challenge	Deployment Implication
1. Garage Orphans	Residents without access to off-street charging must rely on public charging	Deploy on-street charging infrastructure to give these residents the option to transition to EVs. Deploy DC fast charging infrastructure when on-street charging is impossible or insufficient to meet the need.
2. Language Access	Language barriers to using applications related to EV use and charger station payments	Ensure clear and consistent communication about the availability and pricing of charging stations to encourage use and build trust, including information designed for non-English speakers.
3. Low-Income Communities	Low-income communities may be more price-sensitive and slower to transition to EVs.	Ensure clear pricing transparency and enable cash payment or systems that do not solely require credit cards or a smartphone application. Provide subsidies or tiered pricing for low-income users where possible.
3. Low-Income Communities	Low-income communities may be more price-sensitive and slower to transition to EVs.	Ensure clear pricing transparency and enable cash payment or systems that do not solely require credit cards or a smartphone application. Provide subsidies or tiered pricing for low-income users where possible.
4. Travel Corridors	Chargers installed in EJ communities near travel corridors may bring increased outside traffic to the community	Locations chosen for EV chargers should be carefully considered and incorporate community input.
5. Grid Infrastructure Impact	Charging could result in the need for new electrical infrastructure in overburdened communities	The level of EV charger necessary should be carefully considered. Level 2 charging may be a better choice than Level 3 for on-street charging, public lots and multiunit swellings.
6. Economic Benefits	EV chargers could provide benefits like spending at nearby businesses and job opportunities	Build partnerships with local businesses and EVSE installers; prioritize sites that provide co-benefits.

The Massachusetts Office of Environmental Justice and Equity (OEJE), in coordination with EVICC, recently developed the Guide to the Equitable Siting of Electric Vehicle Charging Stations in Environmental Justice Populations that provides a comprehensive framework for advancing EJ and equity in the planning, implementation, and operation of publicly accessible EV charging stations. The Guide serves to complement the second EVICC Assessment and is primarily intended for state agencies, municipalities, EJ community-based organizations, in addition to members of the public, local businesses, utility providers, and members of the EV industry.

The Guide emphasizes early planning of EV charging infrastructure and provides the following recommendations on best practices to increase equitable and just site selection:

- Conduct Equity-Centered Site Assessments by identifying priority areas, evaluating existing infrastructure, and considering co-benefits
- Prioritize Community-Centered Planning through early and ongoing meaningful engagement
- Collaborate and Engage Stakeholders by involving and engaging with local community leaders and relevant advisory committees
- Ensure Accessibility and Affordability through ADA-compliance, clear and effective multilingual signage, and affordable access
- Address Barriers to Accessing Charging Stations by considering various factors that limit access to the available technology and affordability

Ultimately, the Guide emphasizes the importance of partnerships and engagement with communities with EJ populations, which will be critical to building a more inclusive and sustainable network of public EV chargers in the Commonwealth.

Rural communities

The Initial EVICC Assessment highlighted the importance of expanding access to EV charging to all residents, as well as the challenges of providing sufficient public charging infrastructure in dispersed low-density communities. Rural residents drive the most and have the highest transportation costs, and therefore the greatest potential to save money and reduce emissions with an EV. Moreover, rural communities have greater access to off-street parking than urban and suburban communities, on average, and, thus, have significant potential to utilize at-home charging to meet their charging needs. While the increased potential for off-street, at-home charging means that rural communities require less on-street public EV charging infrastructure, a robust network of public EV chargers in rural communities is still essential as rural residents typically drive longer distances and are more likely to be negatively impacted by EV charging deserts (i.e., gaps in the network of available EV charging infrastructure).

The existence of gaps in the EV charging network in rural areas is largely due to the low utilization rates of EV charging in these areas, which results in lower revenue for charging station owners than revenue at stations with high utilization rates. Lower charger revenue means that targeted financing support (i.e., incentives) is more likely to be required to enable deployment of charging stations. In addition to incentives, the Initial Assessment identified other approaches to support EV charger deployment in rural communities including upfront market research, campaigns that include rural area coverage, and EV dealer engagement. Some of this work was undertaken since the last assessment through dealer support and public events conducted in conjunction with the MOR-EV program. Additional ongoing work related to deployment of publicly available funds for rural charging is being undertaken as part of the infrastructure efforts by the Department of Conservation and Recreation (DCR), who will consider which of their properties in rural locations are optimal sites to expand public charging access.

The Second EVICC Assessment collected feedback through public meetings on key access challenges and deployment implications related to EV charging in rural communities. Table 4.7 summarizes this feedback.

Table 4.7. Summary of EV charger access challenges and implications for rural communities

Access Consideration	Unique Challenge	Deployment Implication
1. Sparse population density	Low traffic volumes deter private investment	Public funding or incentives are often necessary
2. Greater travel distances	Longer drives between destinations increase range anxiety	Strategic placement to support inter-town and long-distance travel
3. Limited electrical infrastructure	Older grid may lack capacity for fast chargers	May require grid upgrades or off-grid solutions (e.g. solar + storage)
4. Fewer public amenities nearby	Charging sites may lack restrooms, food, or shelter	Co-locate chargers with public buildings or businesses offering amenities
5. Low EV adoption rates	Smaller EV user base leads to limited short-term utilization	Emphasize equitable access and long-term planning
6. Connectivity issues	Weak broadband or cellular service can disrupt charging operations	Use chargers with offline capabilities or provide reliable connectivity
7. Emergency and redundancy needs	Few alternative routes or stations in case of charger failure	Ensure high reliability and consider backup power options
6. Economic Benefits	EV chargers could provide benefits like spending at nearby businesses and job opportunities	Build partnerships with local businesses and EVSE installers; prioritize sites that provide co-benefits.

Rural communities face distinct electric grid challenges, including high infrastructure upgrade costs. Low EV adoption and sparse population density reduce charger utilization, which in turn impacts financial sustainability. Public feedback has highlighted the importance of resilient technologies like solar and battery systems, safety and accessibility at charger sites, and the need to address weak cell coverage that can disrupt the user experience. Additionally, education for site hosts about installation costs, pricing, and demand charges is crucial to ensure successful deployment. Together, these factors reflect the unique conditions that must be addressed to ensure equitable and effective EV infrastructure in rural areas.

Multi-unit dwellings without off-street parking

Expanding access to EV charging for residents of MUDs without off-street parking is essential to ensuring equitable participation in the EV transition. While early EV adopters have generally been higher-income homeowners with access to private garages, many residents, especially in urban areas and communities with Environmental Justice (EJ) populations, rely on on-street parking and lack consistent, convenient access to home charging. Since the majority of EV charging occurs at home,[14] this infrastructure gap presents a major barrier to broader EV adoption. Addressing this challenge requires understanding the spatial, regulatory, and logistical constraints unique to dense, residential neighborhoods and the lived experiences of renters and low- to moderate-income households. Table 4.8 below summarizes identified key access considerations for multi-unit dwellings without off-street parking.

[14] Massachusetts Executive Office of Energy and Environmental Affairs, Electric Vehicle Infrastructure Coordinating Council (EVICC) Initial Assessment, August 11, 2023, https://www.mass.gov/files/documents/2023/08/11/EVICC%20Initial%20Assessment%20Final%2008.11.2023.pdf.

Table 4.8. Summary of EV charger access considerations for multi-unit dwellerings (without off-street parking)

Access Consideration	Unique Challenge	Deployment Implication
1. Community outreach	Lack of engagement may result in chargers being sited in areas where local need is low or concerns are unmet	Inclusive outreach, especially in EJ communities is necessary to inform siting and build local support
2. Community education	Residents may not know how to locate or use public chargers, especially in underserved or multilingual areas	Deployment must include clear, accessible, and multilingual educational materials and signage
3. EVSE ownership models	Complex ownership arrangements for curbside and shared infrastructure can complicate responsibilities	Ownership must be clarified (municipal, third-party, utility, or shared), with clear maintenance and access protocols
4. Charger hardware types	Different site conditions and infrastructure constraints affect feasibility of curbside, pole-mounted, or streetlight chargers	Each hardware type has trade-offs in cost, siting flexibility, space usage, and grid connectivity
5. Grid and infrastructure constraints	Existing electrical capacity may be limited or hard to access in older neighborhoods	Siting decisions must account for proximity to grid capacity or consider lower-impact or modular charging solutions
6. Zoning and parking regulations	Overnight on-street parking bans and restrictive zoning can hinder deployment	Municipalities may need to review and adjust zoning and parking policies to enable overnight or extended charging
7. EVSE charging speeds	Lower-powered chargers may not support higher turnover rates in shared public spaces	Charger speed should be aligned with local use cases - overnight vs. short-term and parking rules
8. Carshare pairing	EV affordability limits access even when chargers are available	Pairing EVSE with carshare programs expands EV access to residents without personal vehicles

Rural communities face distinct electric grid challenges, including high infrastructure upgrade costs. Low EV adoption and sparse population density reduce charger utilization, which in turn impacts financial sustainability. Public feedback has highlighted the importance of resilient technologies like solar and battery systems, safety and accessibility at charger sites, and the need to address weak cell coverage that can disrupt the user experience. Additionally, education for site hosts about installation costs, pricing, and demand charges is crucial to ensure successful deployment. Together, these factors reflect the unique conditions that must be addressed to ensure equitable and effective EV infrastructure in rural areas.

Medium- and heavy-duty vehicles

Deploying EV charging infrastructure for MHD, including trucks, buses, and delivery vehicles presents a distinct set of access challenges compared to light-duty vehicles, which are summarized in Table 4.9. These challenges stem from the unique duty cycles of MHD fleets,[15] the intensive energy demands of larger vehicles, and the diverse operational settings ranging from centralized fleet depots to dispersed highway corridors.

Ensuring effective access to MHD charging infrastructure requires a deep understanding of vehicle usage patterns, grid capacity constraints, and how these vehicles interact with both urban freight networks and long-haul routes. Public feedback underscores the need for targeted infrastructure planning that leverages successful truck stop case studies, engages fleet operators, and ensures that charging is co-located with established logistics hubs and amenities.

Table 4.9. Summary of EV charger access considerations, challenges and deployment implications for MHD vehicles

Access Consideration	Unique Challenge	Deployment Implication
1. Vehicle duty cycles	MHD vehicles vary in daily mileage, downtime, and charging needs (e.g., overnight, en route)	Charging infrastructure must match fleet-specific operational schedules and charging windows
2. Depot vs. corridor charging	Depot charging supports return-to-base fleets, while long-haul trucks require travel corridor charging	Deployment strategies must differentiate between local fleets and through-traffic needs
3. High power demand	MHD vehicles require significantly more energy per charge session	Chargers must deliver high kilowatt output (e.g., upwards of 350 kW in some cases), with reliable uptime and minimal queuing
4. Substation capacity and grid impact	MHD charging can place heavy localized load on substations and feeders	Site planning must include detailed grid capacity assessments and potential substation upgrades
5. Co-location with amenities	Drivers need restrooms, food, and rest areas during charging	Travel corridor sites to support on-route charging should be sited at or near truck stops, rest areas, and service plazas

Access to charging infrastructure for MHD EVs is shaped by a unique intersection of vehicle behavior, power demands, and location constraints. These vehicles have diverse duty cycles that dictate when, where, and how charging can occur—ranging from controlled depot environments to unpredictable highway routes. Public and stakeholder feedback emphasizes the importance of grid readiness, especially near local substations, and the strategic value of co-locating chargers with existing truck stops. Ensuring access also means planning for the physical space requirements of large vehicles and learning from early adopter truck stops that have overcome similar challenges. Together, these insights provide a strong foundation for equitable and practical MHD charging deployment.

[15] "Duty cycle" refers to how a MHD vehicle is used, including how long it is in operation, the frequency with which it is used, and any other operational characteristics.

Future EV charger deployment estimates

Projections of future EV charger deployment to support the Commonwealth's climate requirements are helpful in understanding the scale of magnitude of future charger deployment. However, forecasts of future EV charging infrastructure rely on several highly variable inputs and assumptions that may prove inaccurate. Ultimately, the state's priorities for EV charging deployment are more important than any forecast.

This section provides forecasts of the charging infrastructure needed to support the light-duty and MHD EV adoption rates anticipated in the Massachusetts Clean Energy and Climate Plan for 2050, based on charger type and geography. Residential and light-duty public chargers make up the bulk of projected charging needs, concentrated in denser urban areas, but significant EV charging infrastructure will also be needed to support MHD fleet depots and along travel corridors as well. These projections are based on the best available data, but have limitations (See Appendix 7) and will fluctuate depending on actual EV adoption rates.

It is important to view EV charging infrastructure estimates by charger (e.g., single-family, multi-family, public, etc.) and in the context of whether and how much the state or other actors can influence deployment within that category. For example, public EV charging infrastructure likely requires greater support than single-family charging infrastructure, particularly more so than Level 1 charging at single-family homes. Moreover, EV drivers with single-family homes are likely to want a charger at home and to take this into consideration when purchasing their EV, meaning that EV chargers are more likely to be deployed at single-family homes without additional resources or financial support offered by the state or electric utilities.[16]

EV charger estimates - CECP vehicle adoption

The Massachusetts Clean Energy and Climate Plan for 2050 includes a benchmark of 2.4 million light-duty EVs by 2035, with an interim 2030 benchmark of 900,000 EVs.[17] In order to achieve this level of adoption, the number of light-duty EVs across the state will need to increase 16-fold by 2035, from today's EV count of roughly 150,000. Similarly, Massachusetts has a benchmark of converting 74,000 MHD buses and trucks to electric powered vehicles by 2035, more than 100-times greater than the current level of electric trucks and buses.[18]

To support the growing number of EVs, charging infrastructure will also need to expand and grow rapidly. EVs will use a wide range of charging types, including private Level 1 and Level 2 chargers (serving both single-family and multi-family homes), workplace chargers, and public Level 2 and DC fast chargers. MHD vehicles will also need to be supported by Level 2 and DC fast chargers.

By 2035, over 100,000 publicly accessible charging ports may be needed to support light-duty EVs and over 19,000 charging ports could be needed for MHD EVs. Table 4.10 shows a breakdown of the estimated ports by category and charger type in 2030 and 2035.

[16] For clarity, enabling action such as wiring upgrade rebates for Level 2 charging at single-family homes may still be necessary to support at-home charging, but will require significantly less financial support than public charging infrastructure. For example, public charging infrastructure has access to significantly higher incentives through the investor-owned utilities and MassDEP programs (See Chapter 3).

[17] Massachusetts Executive Office of Energy and Environmental Affairs. Massachusetts Clean Energy and Climate Plan for 2050. Commonwealth of Massachusetts, 2022. https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050.

[18] Light-duty vehicles are defined as vehicles with a mass of less than 8,500 pounds. MHD vehicles are defined as any vehicle larger than a light-duty vehicle. Notably, consumer trucks such as the Ford F-150 Lightning are classified as a light-duty vehicle.

Table 4.10. Estimated EV chargers by category and charger type for 2030 and 2035 CECP vehicle projections

Category	Charger Type	Port Count		2035 EV/Port Ratio	Source
		2030	2035		
Single-Family	Level 1	216,000	373,000	5.4	EV Pro Lite
	Level 2	482,000	945,000	2.1	EV Pro Lite
Multi-Family	Level 1	8,000	18,000	22.5	EV Pro Lite
	Level 2	18,000	45,000	8.9	EV Pro Lite
Workplace	Level 2	18,000	47,000	51.7	EV Pro Lite
Public	Level 2	40,000	92,000	26.4	Observed ratios
	DCFC[19]	5,500	10,500	230.4	Observed and modeled ratios
MHD	Level 2		17,000	1.9	Modeled ratios
	DCFC	18,000	2,500	13.9	Modeled ratios
Total		**795,000**	**1,550,000**		

Detailed Results for Chargers for Light Duty Vehicles

EV charging infrastructure will increase across the state over the next 10 years. The following sections show the geospatial results of the charger forecast summarized in Table 4.10. The highest density of chargers for light-duty EVs will be located in population-dense areas, such as Boston and its suburbs, Lowell, Worcester, and Springfield, driven primarily by population, housing types, employment levels, land-use patterns, commuting patterns, and long-distance traffic flows.

Total light-duty chargers in 2030 and 2035

Figure 4.5 and Figure 4.6[20] show the total counts of private residential chargers (Level 1 and Level 2), workplace Level 2 chargers, public Level 2 chargers, and DC fast chargers serving light-duty vehicles. By 2030, Greater Boston will see high levels of EV charger deployment, although most chargers will be residential

[19] In 2030, 45 percent of DC fast chargers will serve multi-family housing and 55 percent will serve long-distance travel. In 2035, 57 percent of DC fast chargers will serve multi-family housing and 43 percent will serve long-distance travel.

[20] All EV charger deployment maps depicting “number of chargers” provide the number of chargers per 0.28 square mile.

Figure 4.5. Combined residential, workplace, and public chargers forecasted to serve 970,000 EVs by 2030.

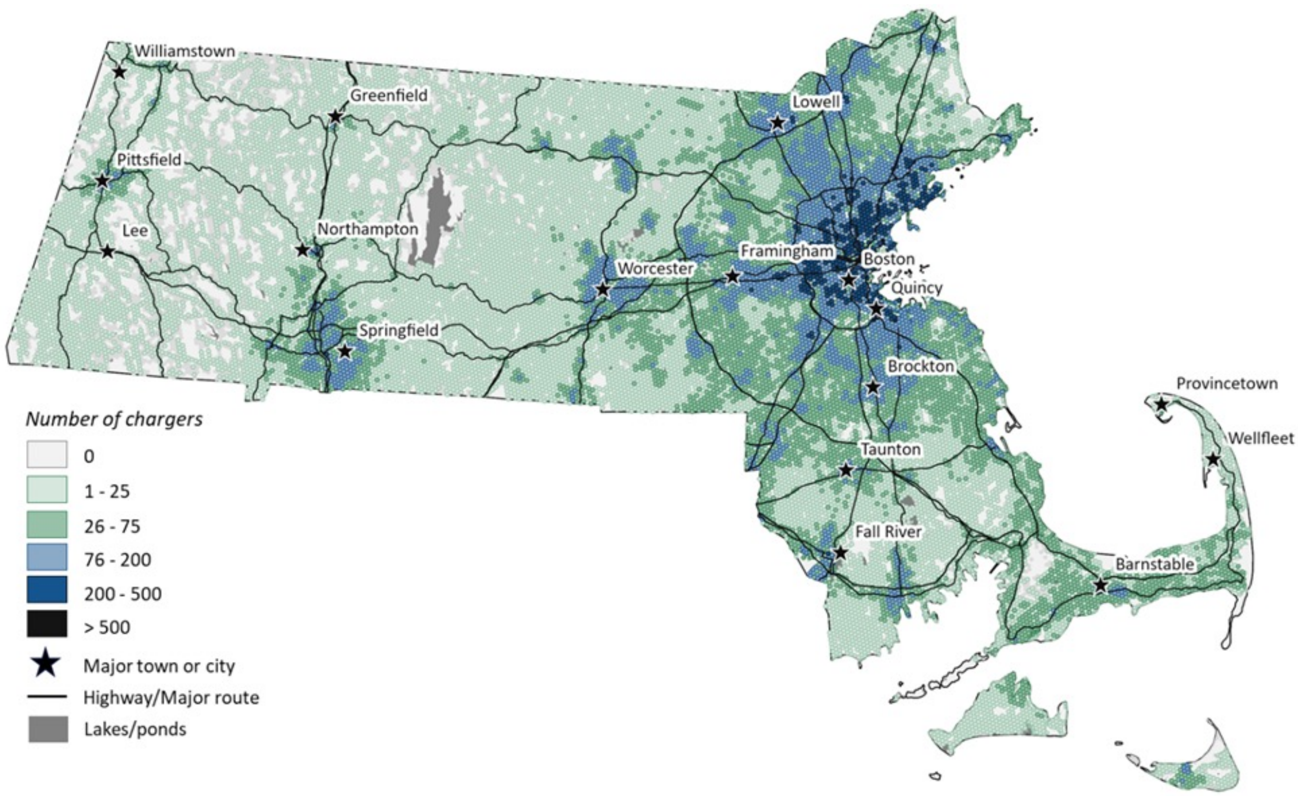
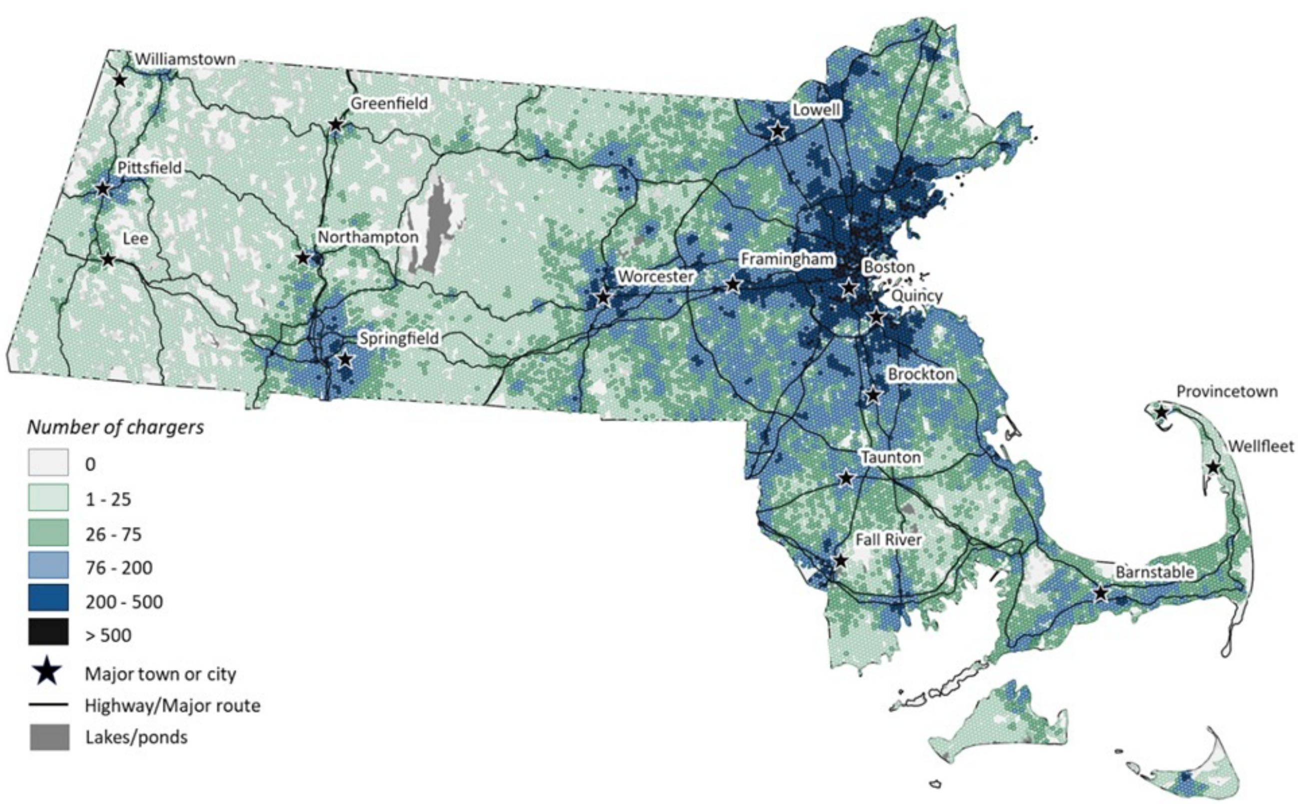


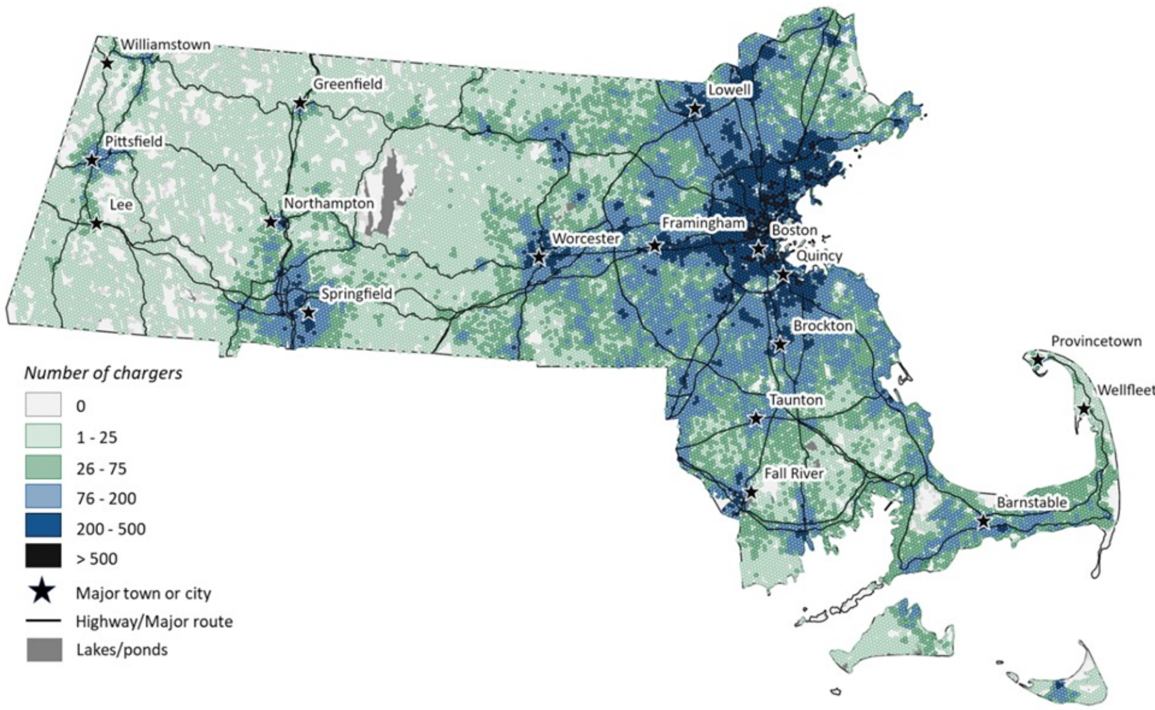
Figure 4.6. Combined residential, workplace, and public chargers forecasted to serve 2.4 million light-duty EVs by 2035.



Residential, workplace, and public Level 2 chargers in 2035

Private residential chargers are projected to make up over 90 percent of all chargers serving light-duty vehicle charging needs in 2035 (Figure 4.7). The highest concentration of private chargers are estimated to occur in urban and suburban areas such as Springfield, Worcester, and Greater Boston.

Figure 4.7. Residential Level 1 and Level 2 chargers forecasted to serve 2.4 million light-duty EVs by 2035



Workplace and public Level 2 chargers are lower in quantity and more highly concentrated in population dense areas (Figure 4.8 and Figure 4.9) relative to privately-owned residential chargers. Public Level 2 chargers can serve several charging use cases, including providing charging within communities to support daily trips and serving multi-unit dwellings without off-street parking.

The estimated number of workplace and home chargers for 2030 differ between the Initial Assessment and this Assessment as the technical consultants updated their assumptions of home charging access and use based on new, Massachusetts-specific data. In the Initial Assessment, the technical consultants assumed 70% of EV drivers would have access to home charging; for this Assessment, the consultants used a Massachusetts-specific value of 87%.[22] This modification increases the estimated number of home chargers and reduces the projected need for workplace charging infrastructure, as less workplace charging is needed if more drivers charge at home. As EV adoption expands beyond early adopters, the technical consultants expect the percentage of EV drivers that have access to at-home charging, i.e., access to off-street parking with EV charging infrastructure, to decrease over time. Thus, the technical consultants assumed that 69% of EV drivers will have access to home charging in 2035.

[22]Default assumptions for Massachusetts, given 2030 EV adoption projections, from the U.S. Department of Energy's EVI-Pro Lite Tool. Ge, Y., Simeone, C., Duvall, A. & Wood, E. (2021). There's No Place Like Home: Residential Parking, Electrical Access, and Implications for the Future of Electric Vehicle Charging Infrastructure. National Renewable Energy Laboratory Report No. NREL/TP-5400-81065.

Figure 4.8. Workplace chargers forecast to serve 2.4 million light-duty EVs by 2035

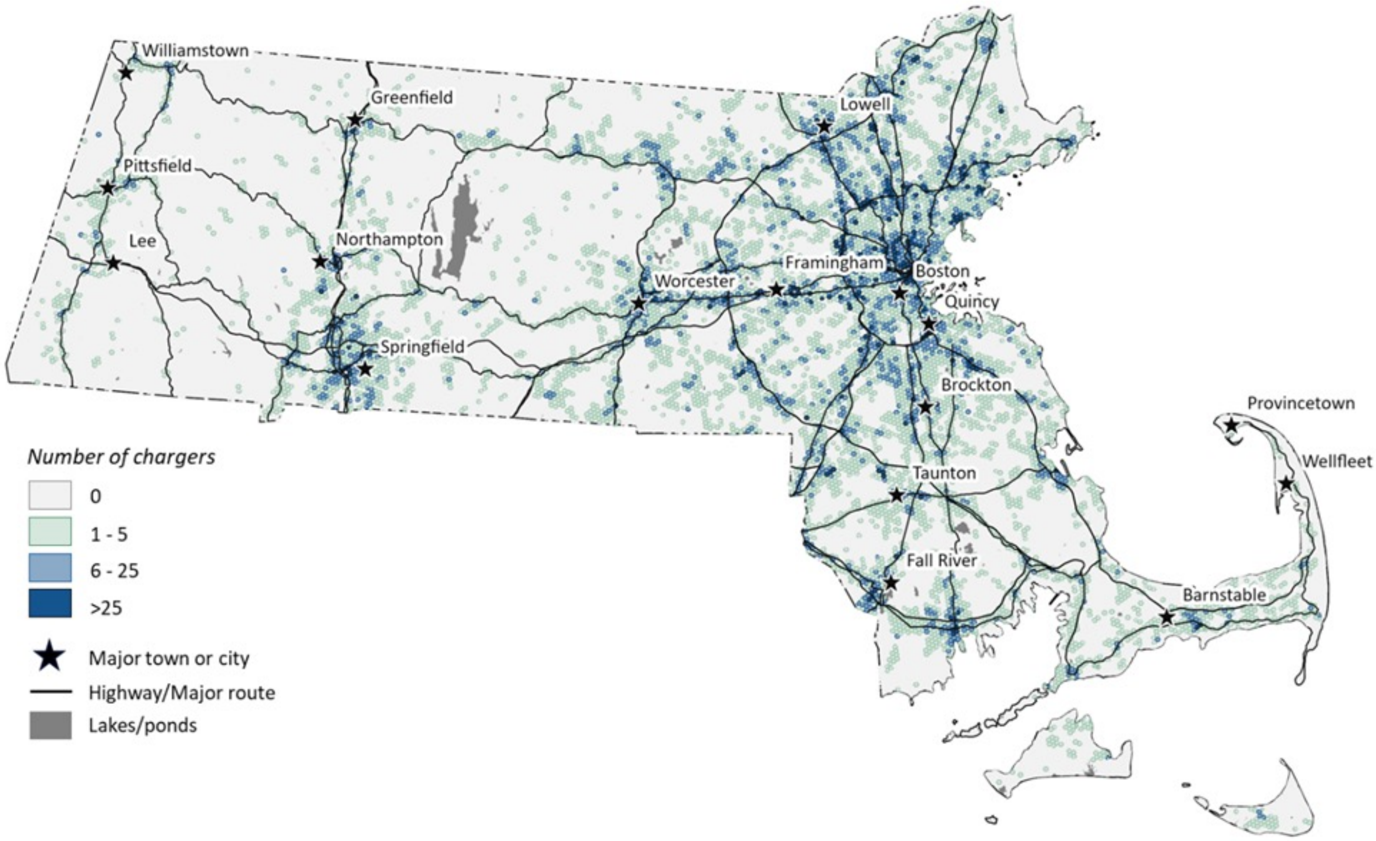
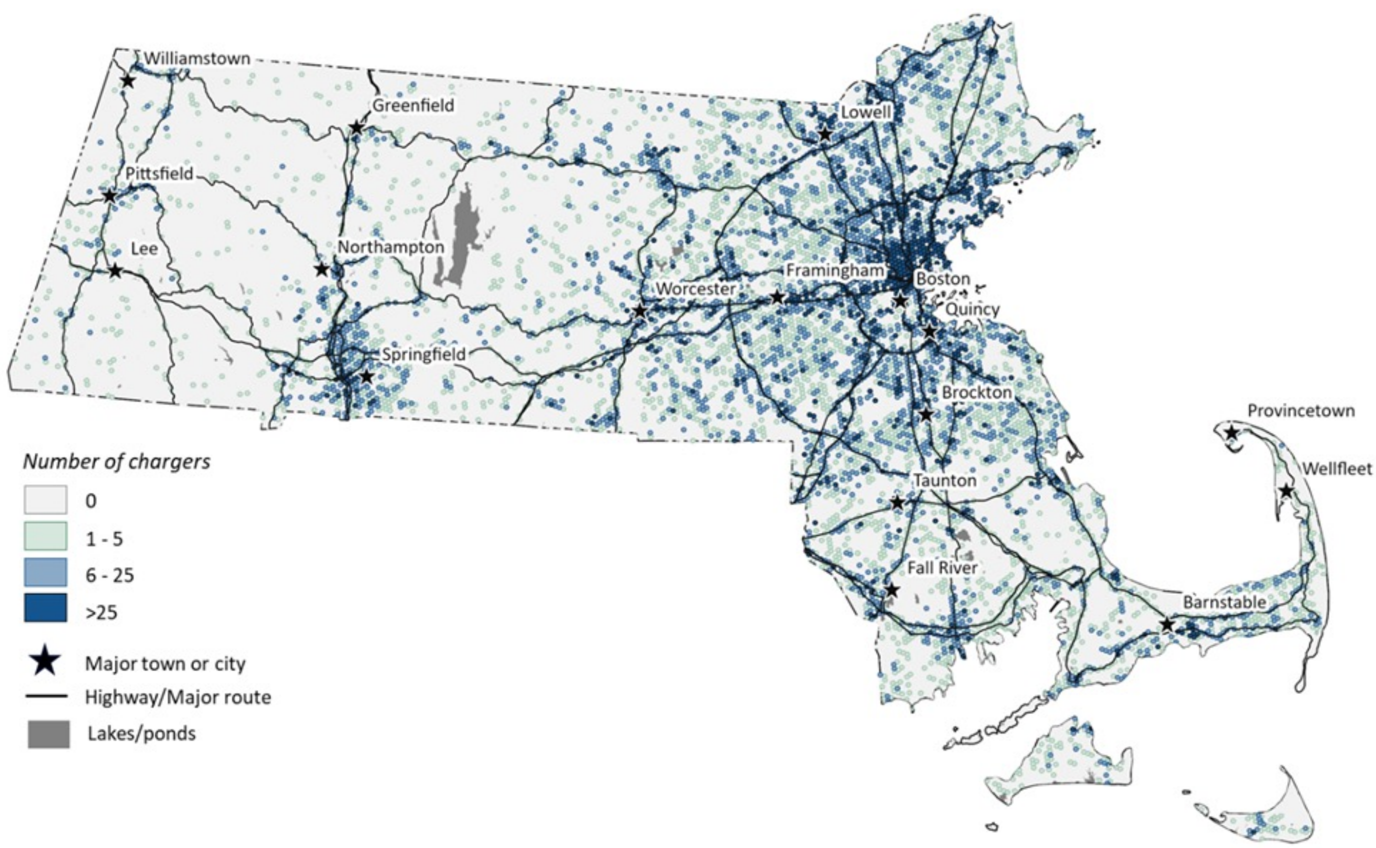


Figure 4.9. Public Level 2 chargers forecast to serve 2.4 million light-duty EVs by 2035



DC fast chargers in 2035

DC fast chargers are particularly important for meeting the state's public charging needs, since they tend to be the most convenient charging option for drivers when charging away from home and can serve multi-unit dwellings, especially those without off-street parking. The availability of DC fast charging along the state's main travel corridors is critical for meeting charging demand and addressing range anxiety and charger availability concerns. As a result of these use types, DC fast chargers tend to be concentrated in population dense areas with more multi-unit dwellings and along travel corridors (Figure 4.10).

Figure 4.10. DC fast chargers forecast to serve 2.4 million light-duty EVs by 2035

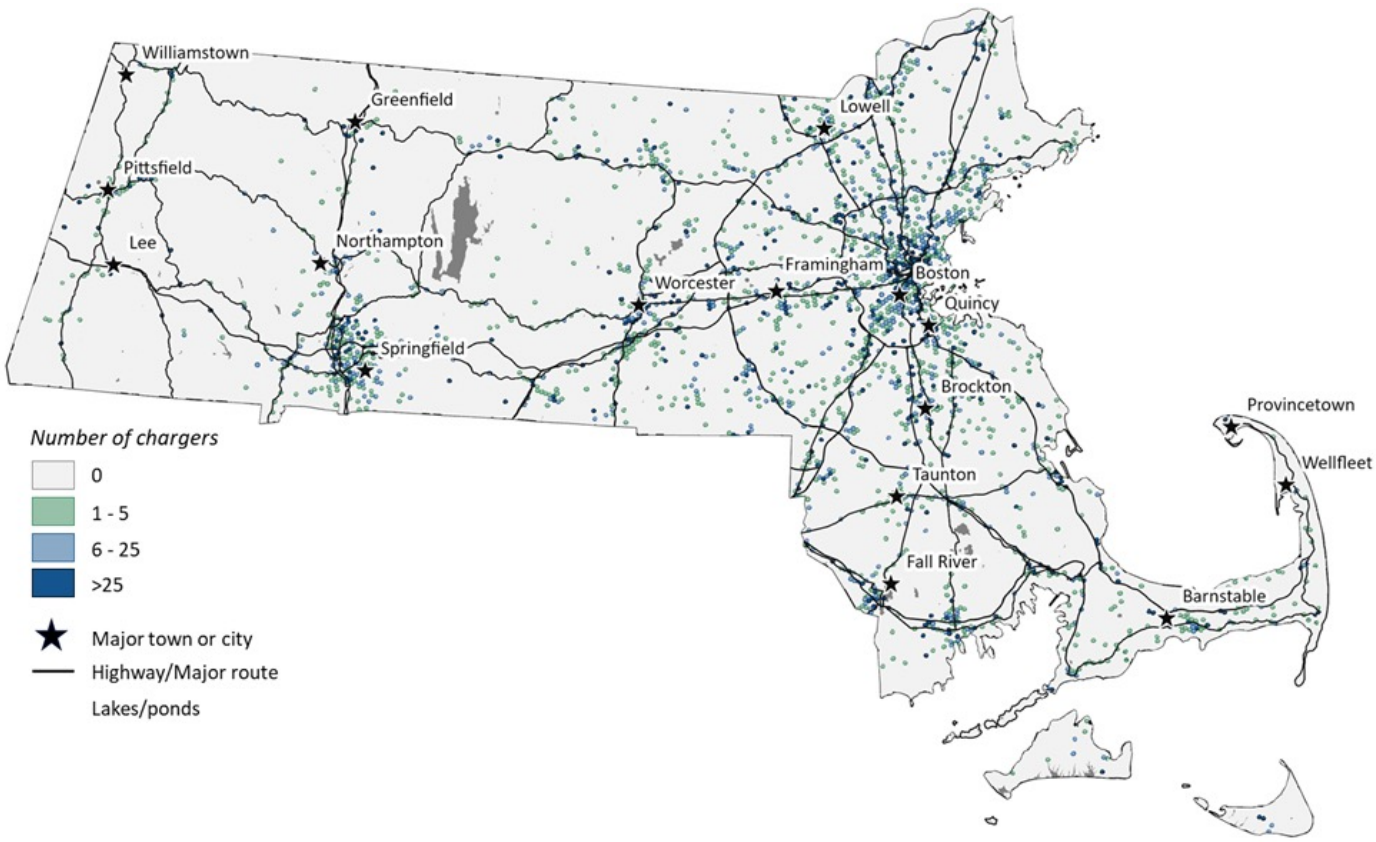
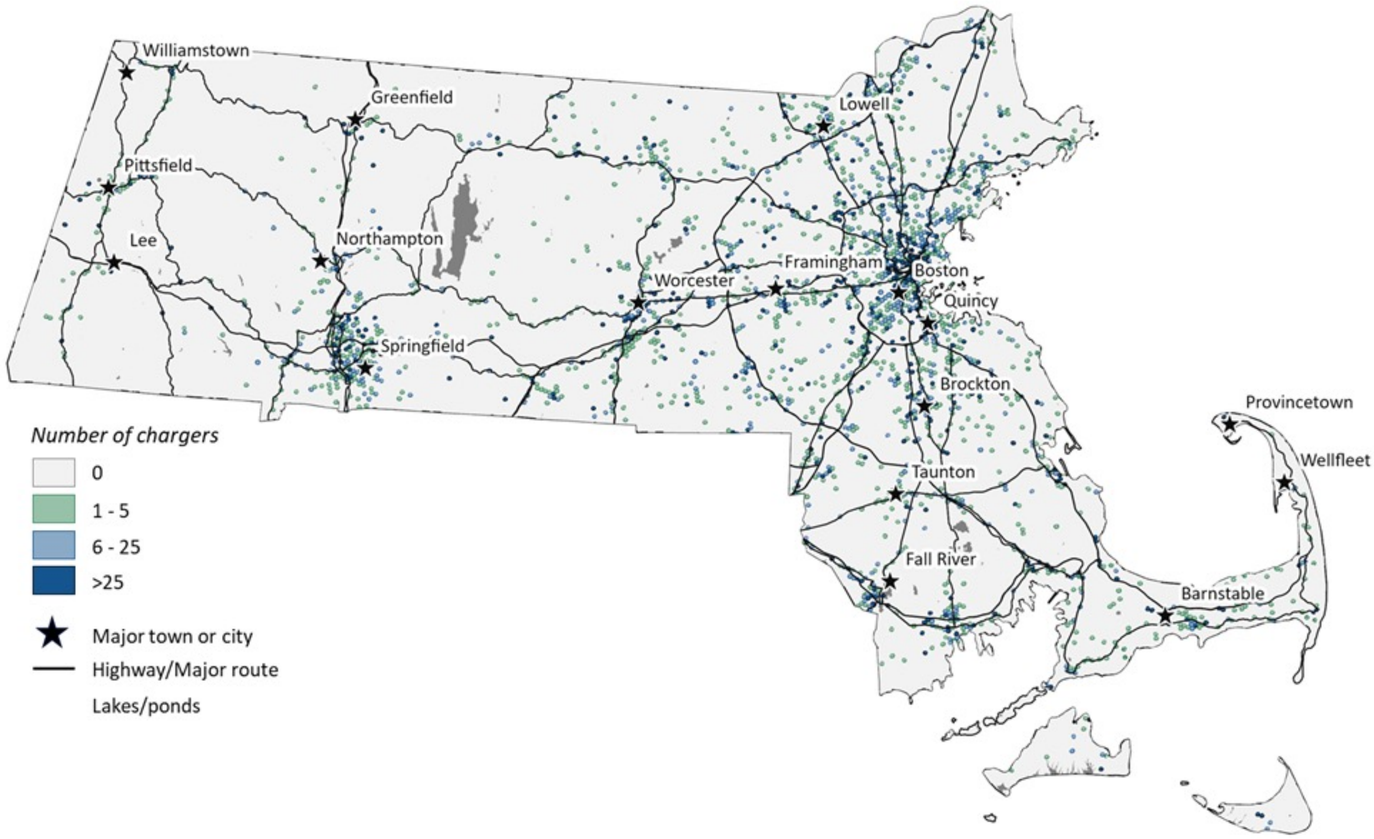


Figure 4.11. DC fast chargers forecasted to serve light-duty EVs and electric MHD vehicles in 2035



The number of estimated DC fast chargers is highly sensitive to several variable inputs. Increasing charging speeds (e.g., higher kW chargers) and larger vehicle battery capacity and range (e.g., cars that can drive longer without charging) decrease the number of DC fast chargers needed. A greater amount of workplace charging could also reduce the necessary number of DC fast chargers, especially those supporting vehicles without off-street parking. Finally, a larger number of plug-in hybrids (relative to battery EVs) will reduce the number of required DC fast chargers, as these types of vehicles can use gasoline-powered drivetrains for long-distance travel (instead of DC fast chargers).

Conversely, a greater number of chargers per EVs are needed during the early phases of the adoption curve (i.e., more public chargers need to be available for the first EVs on the road). Additionally, public charging infrastructure, including DC fast charging, will become more important as EV adoption moves away from higher-income residents with single-family homes to later stage adopters who are less likely to have charging at home (i.e., multi-unit dwellings without off-street parking and rentals).

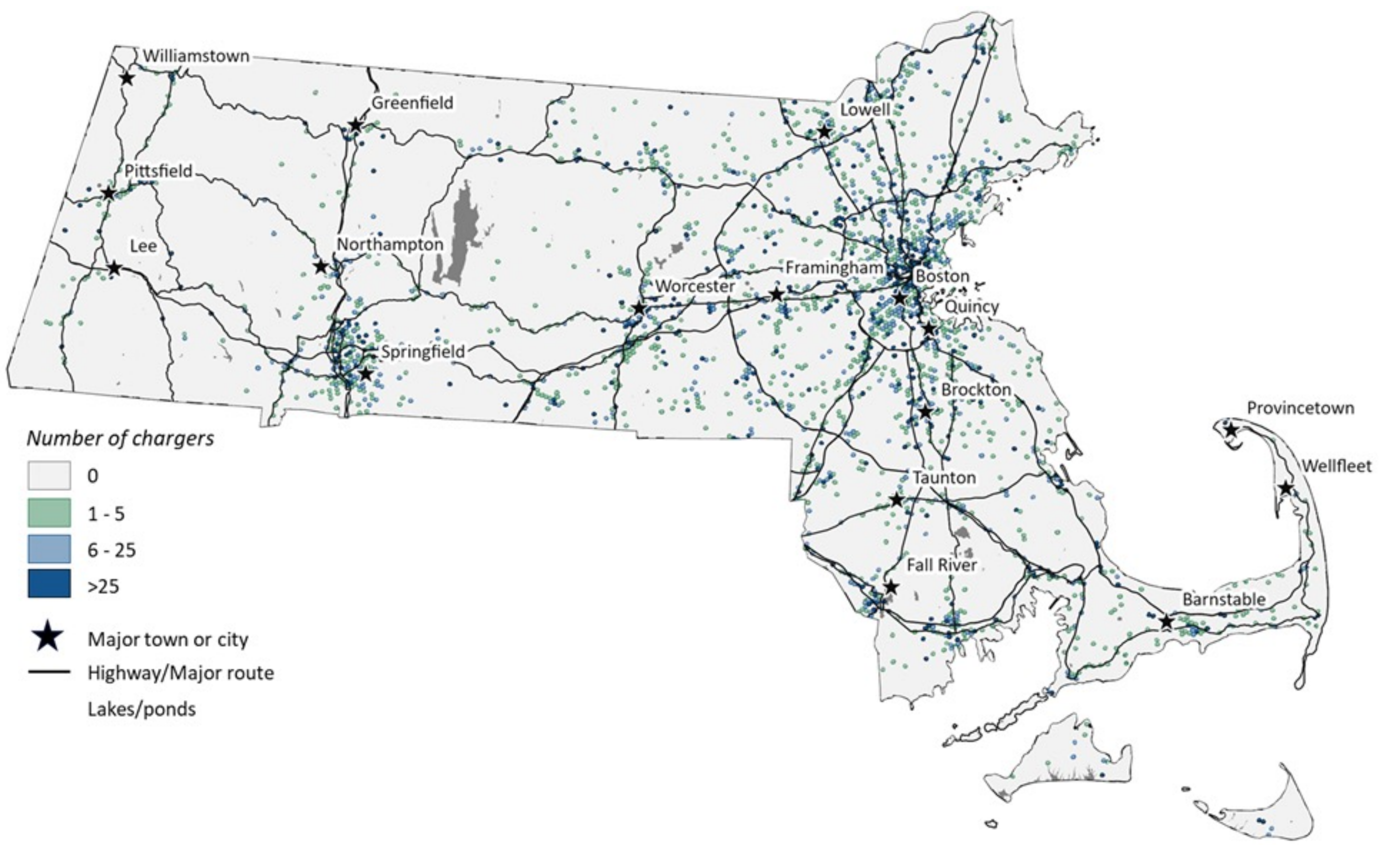
This Assessment forecasts fewer DC fast chargers for 2030 than the Initial EVICC Assessment. This is primarily due to a higher share of plug-in hybrid EVs in the short term (informed by recent trends in vehicle sales) and increased battery EV battery sizes and charging speeds (more vehicles are capable of charging at higher speeds/higher kW chargers). Ultimately, many of the dynamics listed above are highly uncertain, especially as we look further into the future.

Detailed results for chargers for MHD vehicles

As of April 1, 2025, approximately 400 MHD EVs out of a total MHD fleet of over 200,000 vehicles are registered in Massachusetts (Massachusetts Vehicle Census). Deployment of MHD EVs increased significantly over 2024 with 208 new MHD EVs registered in Massachusetts in 2024 compared with 43 in 2023. The total number of MHD EVs in the Massachusetts Clean Energy and Climate Plan for 2050 (2050 CECP) is forecast to increase significantly to around 25,000 EVs in 2030, and 75,000 EVs in 2035. This level of MHD EV adoption would require roughly 6,500 Level 2 and 800 DC fast chargers by 2030.

MHD EVs represent a much smaller share of Massachusetts' overall transportation electrification goals than light-duty vehicles.[23] As a result, even with the significant increases in charging needs by 2035, the forecast number of chargers remains relatively small: 19,500 chargers in 2035 for MHD vehicles out of a total number of chargers of over 1.5 million. Level 2 charging equipment installations for MHD EVs are expected at fleet locations across the state, while DC fast chargers for trucks are projected to be needed most at fueling stations along transportation routes. An additional supply of DC fast chargers will also be needed at bus and truck depots.

Figure 4.12. Level 2 and DC fast chargers forecasted to serve electric MHD vehicles in 2035.



[23]As noted earlier in this Chapter, MHD vehicles accounted for more than a quarter of Massachusetts' transportation sector emissions in 2019, despite representing less than 4% of registered vehicles.

EV Charger Estimates - Alternative EV Adoption Projections

This section provides estimates of public EV charging infrastructure needs in 2030 and 2035 utilizing both historical vehicle adoption rates[1] and projected, future vehicle adoption rates from Bloomberg New Energy Finance (BNEF). These alternative public EV charging infrastructure estimates are intended to complement the projections completed by the EVICC technical consultants and provide greater context on the amount of EV charging infrastructure that may be needed in 2030 and 2035. These additional estimates illustrate: (1) the variation in EV charging infrastructure estimates based on EV adoption assumptions; and (2) the differences between current EV charging infrastructure deployment rates and the deployment rates needed to meet the CECP benchmarks for EV charger ports needed in 2030.

The comparison between current EV adoption trends and the adoption rates needed to meet the state's targets illustrates the magnitude of the challenge ahead for the Commonwealth, particularly given current federal and market uncertainties. EVICC will continue to take steps, within its authority, to support the adoption of EVs and deployment of EV charging infrastructure in line with the state's climate requirements.

Current EV adoption rate

As of January 1, 2025, approximately 140,000 EVs were registered in Massachusetts, with roughly 36,000 new light-duty and 200 new MHD EVs registered in 2024. Assuming this rate of new EV registrations continues, Massachusetts would have 500,000 light-duty and 2,400 MHD EVs on the road in 2035. Applying the EV-to-port ratios used to calculate the publicly accessible and MHD EV charger port estimates in Table 4.10, approximately 21,000 publicly accessible charging ports and 750 MHD charging ports would be needed to support 500,000 light-duty and 2,400 MHD EVs in 2035. The geographic dispersion of these chargers is likely to be similar to the charger estimates completed by the EVICC technical consultants using the 2050 CECP EV adoption forecast analysis as those estimates rely on current traffic and EV adoption patterns.

Table 4.11 summarizes the EV adoption and public EV charging infrastructure estimates under current EV adoption trends.[2]

Table 4.11. Estimated public and MHD EV chargers by charger type for 2030 and 2035 using current EV adoption

Category	Charger Type	EV Count		Port Count	
		2030	2035	2030	2035
Public	Level 2	355,000	500,000	15,000	19,000
	DCFC	355,000	500,000	2,000	2,200
MHD	Level 2	1,550	2,400	400	650
	DCFC	1,550	2,400	50	100

[1]EV adoption rates are likely to grow rather than continue at historical rates as technology adoption rates typically increase after a certain level of total adoption.

[2]As of January 1, 2025, Massachusetts had 8,800 public EV charger ports. Massachusetts deployed approximately 2,000 public EV charger ports in 2024. Applying this deployment rate through 2030 yields 21,010 public EV charging ports. Notably, this exceeds the estimate of 17,000 and 21,000 public EV charger ports needed in 2030 and 2031, respectively.

Bloomberg New Energy Finance (BNEF) EV adoption rate

BNEF provides projections of future EV adoption across the globe.[3] Using their EV estimates for the United States and allocating EVs to Massachusetts based on the Commonwealth's current share of EVs,[4] yields an estimated 950,000 light-duty and 30,000 MHD[5] EVs on the road in 2035. Applying the EV-to-port ratios used to calculate the publicly accessible and MHD EV charger port estimates in Tables 4.10 and 4.11, approximately 40,000 publicly accessible charging ports and 9,100 MHD charging ports would be needed to support 950,000 light-duty and 30,000 MHD EVs in 2035. The geographic dispersion of these chargers is also likely to be similar to the charger estimates using the 2050 CECP EV adoption forecast analysis as those estimates rely on current traffic and EV adoption patterns.

Table 4.12 summarizes the EV adoption and public EV charging infrastructure estimates utilizing BNEF's EV adoption forecast.

Table 4.12. Estimated public and MHD EV chargers by charger type for 2030 and 2035 using BNEF EV adoption rates

Category	Charger Type	EV Count		Port Count	
		2030	2035	2030	2035
Public	Level 2	450,000	950,000	19,000	36,000
	DCFC	450,000	950,000	2,500	4,000
MHD	Level 2	12,000	30,000	3,200	8,000
	DCFC	12,000	30,000	450	1,100

[3]Bloomberg New Energy Finance, 2024 Electric Vehicle Outlook.

[4]BNEF EV estimates were allocated to Massachusetts using total vehicle sales projections from the U.S. Energy Information Administration (EIA)'s Annual Energy Outlook 2025 (Annual Energy Outlook 2025 – Table 39 – Light-Duty Vehicle Stock by Technology Type) and current Massachusetts EV registrations from the Alternative Fuels Data Center. U.S. Energy Information Administration (Alternative Fuels Data Center: Vehicle Registration Counts by State).

[5]The BNEF EV adoption forecast does not include MHD fleet vehicles. The ratio of light-duty EV adoption under the BNEF EV forecast to the CECP light-duty EV adoption forecast in 2030 and 2035 were applied to the CECP MHD EV adoption forecast to calculate 12,000 MHD EVs in 2030 and 30,000 in 2035, respectively.

[6]As of January 1, 2025, Massachusetts had 8,800 public EV charger ports. Massachusetts deployed approximately 2,000 public EV charger ports in 2024. Applying this deployment rate through 2030 yields 21,010 public EV charging ports. Notably, this exceeds the estimate of 17,000 and 21,000 public EV charger ports needed in 2030 and 2031, respectively.

EV charger estimate comparison - CECP, Status Quo, and BNEF EV adoption rates

Figure 4.13 compares the rate of charger deployment using CECP EV adoption rates for 2025 through 2030 with the public EV charging infrastructure that would be needed if recent EV adoption rates continue and if the BNEF EV adoption rates are realized. While the 2050 CECP models an increasing rate of charger deployment as the industry matures, it also assumes that the pace of deployment will increase over time, meaning that the estimates of public EV charging infrastructure shown in Figure 4.13 do not meaningfully diverge until later in this decade.

Figure 4.13. Illustrative comparison of public charging infrastructure needs in 2030 using 2050 CECP, current EV adoption rates, and BNEF EV adoption rates

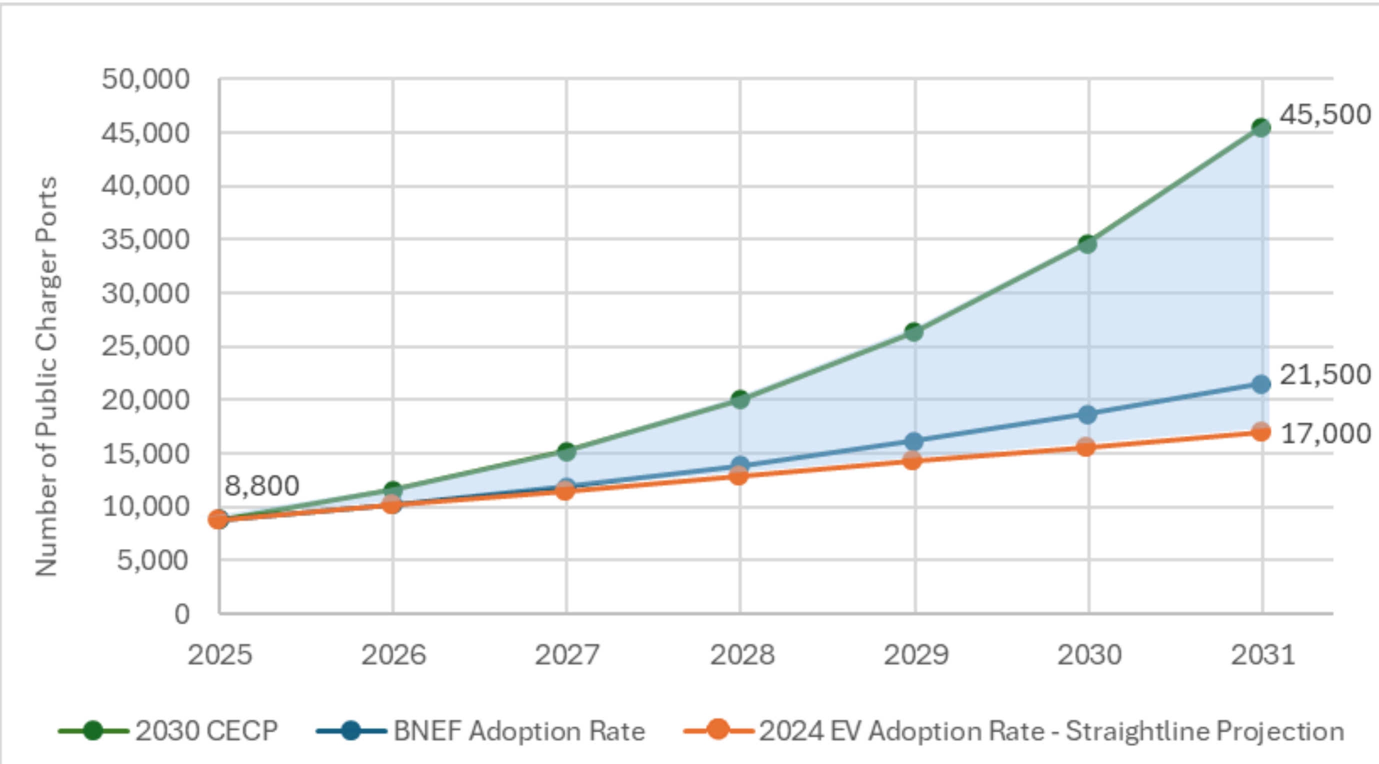
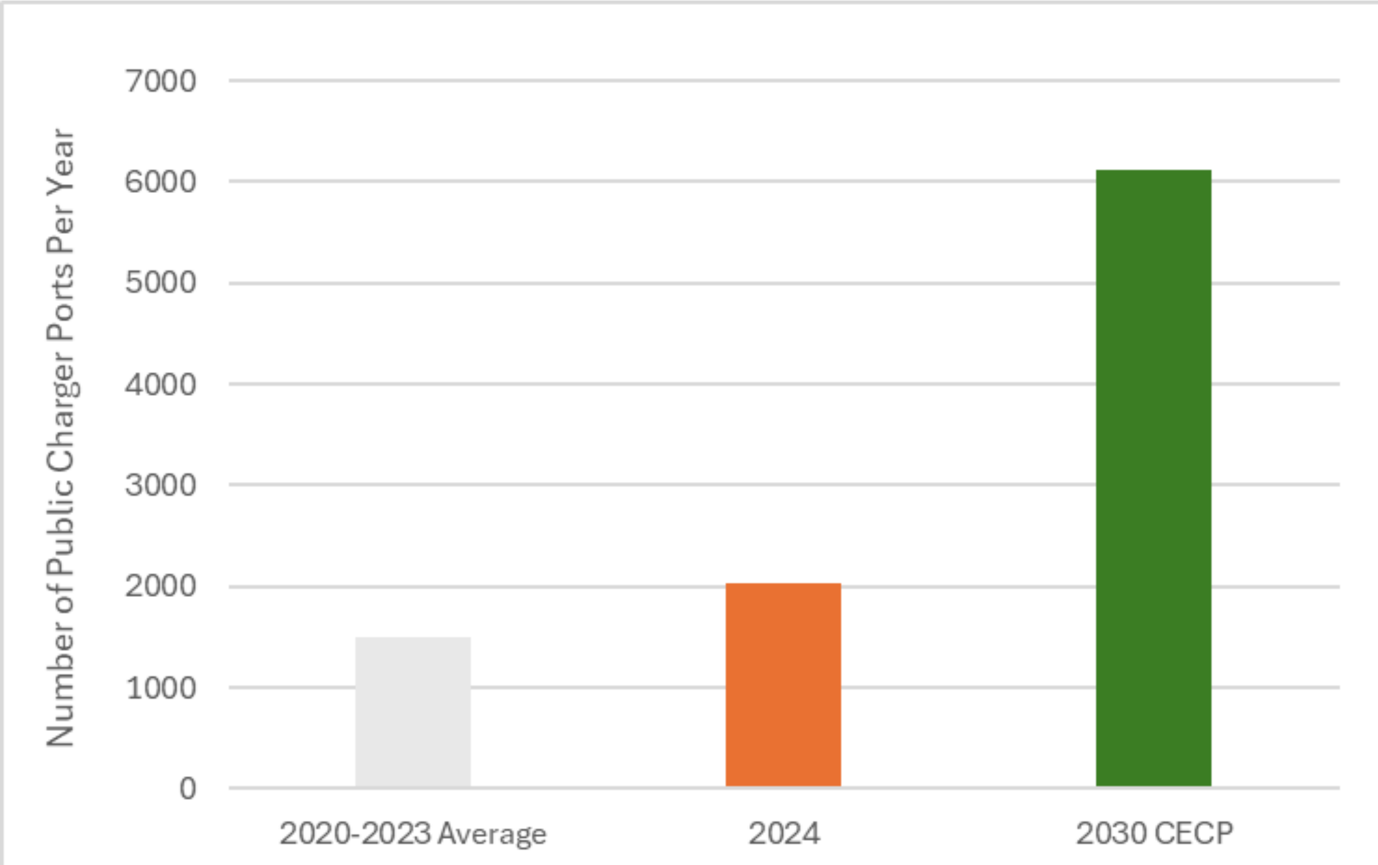


Figure 4.14 compares the average, annual deployment rate required to deploy the public EV charging infrastructure estimated to be needed in 2030 under the 2050 CECP vehicle forecast with the 2024 public EV charging infrastructure deployment rate used in Figure 4.13, as well as the average, annual EV charging infrastructure deployment rate between 2020 and 2023.[7] Figure 4.14 shows that the average annual deployment rate of public EV charging infrastructure will need to increase by 3 times through 2030 to meet the CECP EV charger port benchmarks.

[7]Alternative Fuels Data Center, "Alternative Fueling Station Locator," U.S. Department of Energy. https://afdc.energy.gov/stations#/analyze?region=US-MA&show_map=true&country=US&access=public&access=private&fuel=BD&fuel=CNG&fuel=E85&fuel=HY&fuel=LNG&fuel=LPG&fuel=ELEC&lpg_secondary=true&hy_nonretail=true&ev_levels=all.

Figure 4.14. Historical, annual public EV charger deployment versus annual deployment needed to meet 2050 CECP



Future EV charging estimates conclusion

EV charging infrastructure will need to expand and grow rapidly in Massachusetts in the coming years to not only meet the Commonwealth's climate goals, but to serve the growing number of EVs on the road. EVs will use a wide range of charging types, including private Level 1 and Level 2 chargers (serving both single-family and multi-family homes), workplace chargers, and public Level 2 and DC fast chargers. MHD vehicles will also need to be supported by Level 2 and DC fast chargers.

The precise amount of EV charging infrastructure needed in the future is uncertain and highly dependent on future EV adoption, which will be shaped by policy developments, market conditions, and consumer behavior. Other factors will also impact the amount of EV charging infrastructure needed and actual deployment including, EV and EV charging technology improvements (e.g., longer duration batteries and higher capacity chargers), changes to federal EV charging programs and incentives (e.g., CFI, tax credits, etc.), and market and other macroeconomic factors (e.g., supply chain constraints, cost increases, etc.), among others.

Facing this uncertainty, EVICC and the state must focus deployment of charging infrastructure in areas that provide the greatest value for EV drivers and give consumers confidence to transition to EVs.

Priority deployment areas and existing gaps

To effectively serve increased EV adoption, Massachusetts' efforts to advance EV charging infrastructure must become more targeted, focusing on deployment of EV charging infrastructure that provides the greatest value to Massachusetts drivers. This approach and understanding of where the state, utilities, and private sector can be most effective in deploying high value EV charging infrastructure is key to ensuring continued and sustained progress amid federal policy and market uncertainties.

This section identifies the EV charging infrastructure opportunities that new and existing EV charging programs in the Commonwealth should prioritize moving forward. It begins by detailing the need for new and existing state-funded efforts to be more targeted and principles for becoming more targeted. It then outlines the highest value EV charging opportunities for light-duty passenger vehicles and fleet vehicles and how state-funded programs can best support deployment of EV charging in these segments. It then analyzes whether Massachusetts' existing programmatic offerings sufficiently support high-value opportunities, identifying potential gaps and providing additional analysis and commentary. It concludes by summarizing the EV charging infrastructure opportunities the Commonwealth should prioritize moving forward.

Need for and approach to prioritization

Moving forward, new and existing programs funded by the state budget or charges assessed to electric utility customers should focus on the highest value opportunities for both light-duty passenger and fleet EVs.[8] Modifying existing programs to be more targeted in their eligibility and developing new initiatives to target specific EV charging opportunities will allow funding sources to be leveraged to the greatest extent possible, funding higher value projects at lower costs. Fully leveraging public funding is important in both the short- and long-term. In the short-term, it will help counteract current economic and federal policy headwinds. In the long-term, it will enable the Commonwealth to increase the deployment of EV charging infrastructure to support more new EVs on the road.

Programs and initiatives should specifically focus on use cases and/or barriers where state or funding intervention can impact the outcome. In other words, funding should not be spent on activities or outcomes that will occur without intervention or are unlikely to be impacted by intervention. As noted at the beginning of this Chapter, the types of EV charging infrastructure that have the highest value and on which EVICC and the state can have the greatest impact are EV charging accessible to all members of the public (i.e., "public" EV charging), including on-street charging for residential customers, and EV charging for MHD fleet vehicles.

Regardless of the segment targeted by a specific EV charging program or initiative, all state-funded programs should consider whether, if, and how the program can also support other segments and uses (e.g., fast charging along major corridors should also consider supporting charging for

[8] Importantly, this should guide future state and utility program actions and should not be applied retroactively. Moreover, it will take time for new and existing programs to adapt and careful consideration to ensure effective implementation.

residents of multi-unit housing without off-street parking). All state-funded efforts should also seek the equitable buildout of EV infrastructure across the Commonwealth, particularly in areas or for customers that have historically had limited access to EV charging infrastructure (i.e., rural communities, communities with Environmental Justice populations, tenants of multi-unit dwellings without off-street parking, and MHD vehicles).

Each region of the Commonwealth and each municipality will require a slightly different mix of EV charging infrastructure to support the high-value use cases outlined below. Therefore, it is important to complement any state-funded programs with resources for regional planning agencies and municipal governments to support deployment of the appropriate EV charging infrastructure in a given region and municipality. Future EV charging infrastructure deployment plans, including the next EVICC Assessment, and EV charging programs designed to deploy specific, high-value charging use cases must take regional and local needs into account.[9]

High-Value EV charging opportunities

This section identifies the highest value EV charging opportunities for light-duty passenger vehicles and fleet vehicles and how EVICC and state-funded programs can best support deployment of EV charging within these use cases. These use cases were identified, defined, and prioritized based on public comments, EVICC public meeting discussions, the analysis included in this Assessment, and state agency and EEA staff expertise.

These categories and their relative importance may change over time as EV charging infrastructure is deployed, EV and EV charging technology evolves, and as the economics of transportation electrification, particularly heavy-duty EVs, continues to improve. The next EVICC Assessment offers an opportunity to reevaluate these categories and their relative importance.

Light-duty passenger EVs

High-value EV charging infrastructure deployment use cases for light-duty passenger EVs can be categorized into four buckets and broken into two tiers based on level of importance.

The first tier includes: (1) **at- or near-home charging** as roughly 80% of charging occurs at home;[10] and, (2) supporting charging for longer-distance travel and longer daily communities, i.e., to **address range anxiety**. Historically, EV charging deployment programs have focused on the first tier.

The second tier includes: (3) charging infrastructure that supports **common daily trips**, e.g., shorter commutes and local trips; and, (4) at rural or remote destinations that are unlikely to have utilization rates to justify the investment in EV charging infrastructure. Deploying EV charging infrastructure at second tier use cases provides EV drivers confidence in the availability of charging infrastructure where they frequent most and plan to travel. Charging infrastructure at these locations will become increasingly important as Massachusetts continues to build out a robust network of chargers.

[9]For example, state support for on-street charging for MUD residents without off-street parking is likely more impactful in urban and dense residential suburban areas than in rural communities. Conversely, state support for a robust network of fast charging stations and charging at city centers in rural areas may have a greater impact than in urban and suburban areas as chargers are likely to have lower utilization rates in rural areas and a greater, proportionate impact on rural EV drivers and their communities.

[10]Jeff St. John, "5 charts that shed new light on how people charge EVs at home," Canary Media, October 25, 2022, https://www.canarymedia.com/articles/ev-charging/5-charts-that-shed-new-light-on-how-people-charge-evs-at-home

Typical solutions for all four light-duty passenger high-value EV charging infrastructure use cases and opportunities for EVICC and state-funded programs to impact deployment at these use cases are outlined below:

- **At- or near- home charging:** The type of EV charging infrastructure used to serve this use case depends on the type and location of housing, whether the EV owner has off-street parking and whether EV charging is available at their off-street parking, and how frequently the EV is used.
  - **Single family homes:** While typically not necessary to provide drivers with the level of charge needed for daily travel as Level 1 chargers can provide 40-50 miles of range overnight, Level 2 chargers provide EV drivers with the peace of mind that their vehicle can be fully charged in a manner of hours.
    - **Potential for Impact:** Current program offerings for wiring upgrades and Level 2 rebates for low-income customers appropriately address existing barriers to adoption. EVICC should consider collecting municipal and utility data to monitor the deployment of EV chargers under these use cases. Ultimately, this is a lower priority use case for additional intervention by state-funded programs given, among other factors, that consumers typically commit to deploying and paying for at-home charging infrastructure when they make the decision to purchase an EV.
  - **Multi-unit dwellings with off-street parking:** Level 1, Level 2, or Level 3 charging is sometimes provided as an amenity by landlords or building owners.
    - **Potential for Impact:** EVICC understands that the current program offerings under MassEVIP and from the investor-owned utilities appropriately address existing barriers to adoption. EVICC will continue to monitor the deployment of EV chargers under this use case and may recommend expanding programs for these segments if deployment in this segment requires greater support.
  - **Multi-unit dwellings without off-street parking:** Level 2 on-street charging or fast charging stations located within a 5-minute walk, particularly in densely populated areas.
    - **Potential for Impact:** This use case provides an opportunity for EVICC and state-funded programs to have a significant impact as on-street charging is still a nascent use case and is vital to providing near-home charging for residents without off-street parking. The existing MassCEC offering is key to getting municipal on-street charging programs off the ground. The guidebook that the program will develop will be crucial to standing up even more on-street charging programs. Effectively leveraging the guidebook will be the key to successful on-street charging deployed at scale in Massachusetts. Identification of strategic DC fast charging opportunities to support residents without off-street parking is another opportunity for EVICC to influence deployment of high-value EV charging infrastructure.
- **Longer-distance travel/commutes:** Fast charging stations with minimum rated capacity at or above 120 kilowatts (kW) located near primary and secondary travel corridors.

- **Potential for Impact:** EVICC understands that fast chargers along travel corridors still require financial assistance to be deployed. However, once sufficient charging is deployed along major and secondary corridors, it may be appropriate for incentives for fast chargers along travel corridors to be phased out as these charging stations are likely to yield high utilization rates and, thus, earn sufficient revenue to justify deployment without an incentive. As detailed below, existing programs could be more targeted to ensure public funds support chargers closest to primary and secondary travel corridors and travel corridors that currently have fast charging gaps.

- **Common daily trips:** Level 2 or lower capacity fast charging stations (e.g., below 120 kW) at municipal and transportation parking lots, near shopping and dining, recreation and community centers, and education facilities, among others.
  - **Potential for Impact:** EV charging infrastructure at locations convenient for every day car trips such as city centers, grocery stores, and big box stores is less abundant than anticipated. It is unclear whether incentives are insufficient to encourage deployment or if other barriers exist. To unlock the potential of these locations for EV charging infrastructure, that state could work with these entities to better understand key barriers and to bring existing incentives together in a way that is convenient for these businesses to utilize.

- **Destination charging:** Level 2 or lower capacity fast charging stations (e.g., below 120 kW) at ski resorts, public parks, and hotels not near major or secondary travel corridors or other EV charging infrastructure.
  - **Potential for Impact:** EV charging infrastructure at popular destinations such as hotels and resorts in the Berkshires and on Cape Cod is less abundant than anticipated. It is unclear whether incentives are insufficient to encourage deployment or if other barriers exist. To unlock the potential of these locations for EV charging infrastructure, that state could work with these entities to better understand key barriers and to bring existing incentives together in a way that is convenient for these businesses to utilize.

Light-duty and MHD fleet EVs

High-value EV charging infrastructure deployment opportunities for light-duty and MHD fleet EVs can be evaluated in three buckets:

- DC fast charging or Level 2 charging at or near where light-duty and MHD fleet vehicles are housed
- DC fast charging in areas highly trafficked by light-duty and MHD fleet vehicles
- DC fast charging along major corridors for longer haul MHD fleet vehicle trips

EV charging near where fleet vehicles are housed is the most important high-value fleet use case for EVICC and state-funded programs to focus on as it offers the best opportunity for EV charging infrastructure to be fully utilized and enables fleets to share EV charging infrastructure.

Charging in areas highly trafficked by fleets is the next most important use case in the short-term as fleets often require on-route charging. This use case is less important for EVICC and state-funded programs to focus on since public EV charging infrastructure that support light-duty passenger EVs can also support on-route fleet charging so long as public chargers are designed to accommodate both light- and medium-duty vehicles. Moreover, EV charging infrastructure to support on-route fleet charging requires greater analysis for fleets to identify optimal locations and coordination amongst fleets, if the infrastructure will be shared, to ensure optimal charger utilization.

In the short-term, EVICC and state-funded programs should focus last on EV charging infrastructure to support longer haul, heavy-duty EVs as the economics of heavy-duty vehicle electrification are currently challenging. However, corridor charging remains critical for enabling full fleet electrification and should be pursued strategically alongside other high-value use cases when the opportunity arises.[11] Moreover, as noted above, **all fast charging along major corridors should be designed and deployed with MHD vehicles in mind** so that they can serve all types and sizes of vehicles. This will require chargers along these corridors to provide higher capacity charging (i.e., 350 kW+) at parking spaces that offer enough space for MHD EVs and/or allow EVs to pull through like most gas stations.

Gaps in existing programs

Massachusetts' existing programs broadly cover the above listed high-value use cases. However, this section identifies the following gaps in the coverage of high-value EV charging use cases:

Light-duty passenger EVs

- **At- or near-home charging:** Scaling on-street charging, particularly in municipalities without existing on-street charging programs.
- **Addressing range anxiety:** Fast charging along secondary travel corridors.
- **At- or near-home charging:** Fast charging near dense housing where on-street charging will be insufficient.
- **Common daily trips:** Proliferation of charging at convenient locations such as grocery stores and box stores.storage
- **Destinations:** Proliferation of charging at popular destinations (e.g., hotels and resorts in the Berkshires and on Cape Cod).

Light-Duty and MHD Fleet EVs

- **Near where fleets are housed:** Building MHD fleet charging at or near where fleet vehicles are housed, both for individual fleets and at depots to serve multiple fleets.

Scaling MassCEC's On-Street Charging Solutions program and deploying DC fast charging along secondary travel corridors are the two most important gaps for light-duty passenger EVs to address moving forward as they support the most important EV charging use cases for these vehicles. EVICC and state-funded programs

[9]For example, the recent selection of a new operator for the MassDOT Service Plazas offers an opportunity to ensure that long-term planning for EV charging infrastructure is required of and conducted by the new service plaza operators. EV charging infrastructure accessible to heavy-duty EVs will be required in the medium- and long-term at the MassDOT Service Plazas to support the state's clean transportation goals.

should also prioritize deploying EV charging infrastructure at MHD fleet depots as MHD fleet EV charging needs to be scaled more than other charging infrastructure to meet the state's clean transportation goals and MHD fleet vehicles have a higher impact on transportation emissions.

Light-duty passenger EVs

Table 4.13 provides a comprehensive list of the high-value use cases for light-duty passenger EVs and the existing program offerings that support deployment of EV charging for these use cases. Table 4.13 also provides a detailed evaluation of the high-value light-duty passenger use cases not covered by existing program offerings and potential next steps to address the identified gaps.

Table 4.13. Summary of high-value MHD passenger EV charging use case gaps in existing programs

Priority Tier	Use Case	Typical Charger Solutions	Programs Addressing Use Case	Existing Gap	Potential Next Step(s)
1	**At- or near-home**	Housing with off-street parking: Level 1 or Level 2	For off-street parking: MassEVIP Multi-Unit Dwelling program, Investor-Owned Utility programs (single-family wiring rebates; Make-Ready and charger incentives for multi-unit dwellings)	N/A	N/A
		Housing without off-street parking: Level 2 curbside charging or fast charging	When off-street parking isn't available: On-Street Charging Solutions program and Act4All 2 Equal Energy Mobility Project	Scaling on-street charging, particularly in municipalities without existing on-street charging programs in dense residential areas	10.81
	Long-distance travel and longer daily commutes, i.e., addressing range anxiety	Fast charging along primary and secondary travel corridors	NEVI, Investor-Owned Utility Programs (Make-Ready and fast charger incentives)	Fast charging along secondary travel corridors	Explore analysis and/or programs to support fast charging along secondary corridors

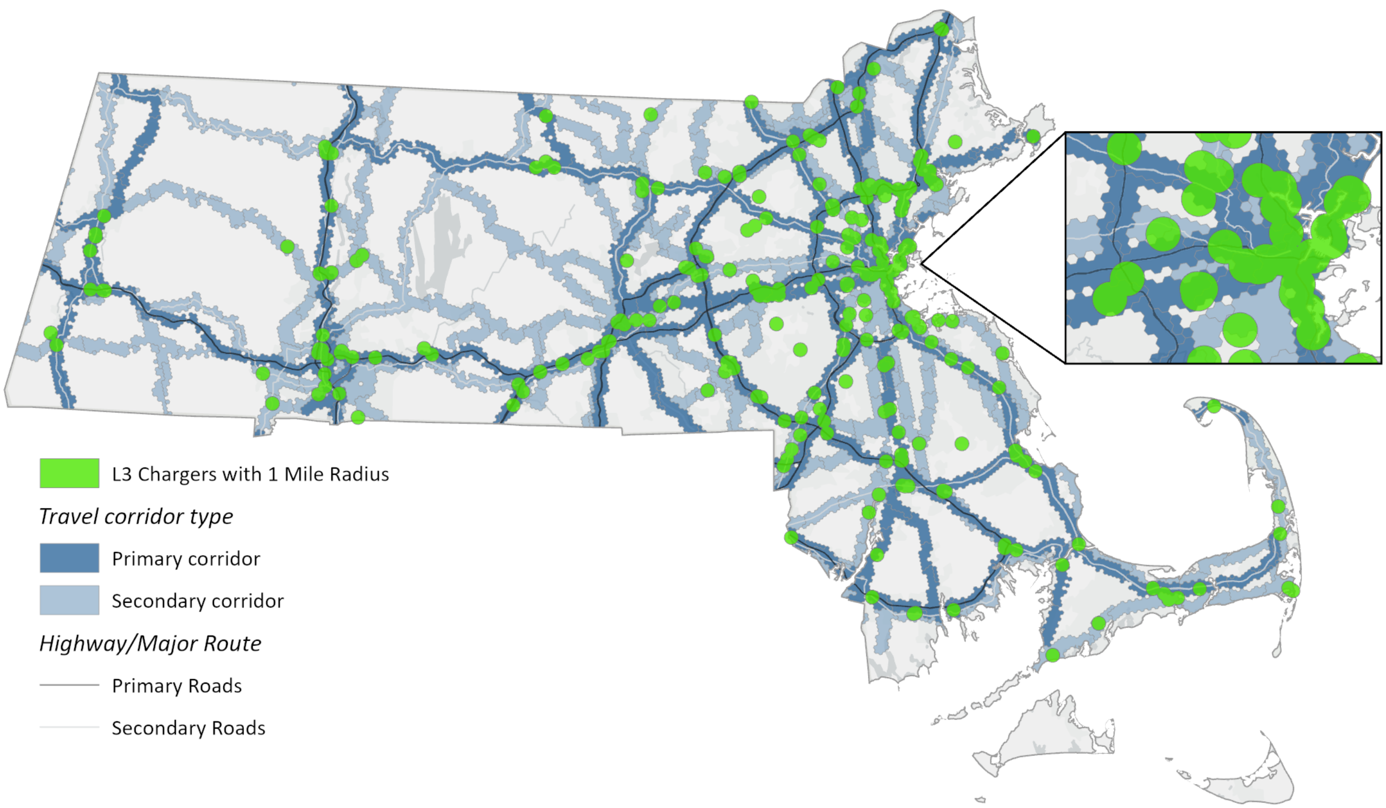
Priority Tier	Use Case	Typical Charger Solutions	Programs Addressing Use Case	Existing Gap	Potential Next Step(s)
2	**Common daily trips such as shorter commutes and local trips** (e.g., chargers at municipal and transportation parking lots, recreation and community centers, and education facilities and near shopping and dining)	Level 2 or lower-power fast charging	MassEVIP Public Access Charger program, Investor-Owned Utility Programs (Make-Ready and Level 2 charger incentives for public access chargers)	Proliferation of charging at convenient locations such as grocery stores and big box stores	Explore outreach and packaging existing incentives for (i) grocery stores, (ii) big box stores, and (iii) small businesses in city centers
	Rural or remote destinations (e.g., chargers at ski resorts, public parks, and hotels	Level 2 or lower-power fast charging	MassEVIP Public Access Charger program, Investor-Owned Utility Programs (Make-Ready and Level 2 charger incentives for public access chargers), Department of Conservation and Recreation's (DCR) Public Access EV Charging Program	Proliferation of charging at popular destinations (e.g., hotels and resorts in the Berkshires and on Cape Cod)	Explore outreach and packaging existing incentives for popular destinations

Fast charging along secondary corridors

The identified gap in DC fast charging infrastructure along secondary travel corridors is validated by Figure 4.15, which shows sections of primary and secondary travel corridors in Massachusetts that are within one mile of a public DC fast charging location. The map highlights that fast charging stations are more numerous along primary corridors and in the eastern half of the state, but that large sections of Western Massachusetts, particularly along secondary corridors, lack DC fast charging availability. These qualitative and quantitative findings are consistent with stakeholder feedback gathered at EVICC meetings and public hearings, where Western Massachusetts was consistently identified as lacking sufficient DC fast charging capacity.

[12] DCR's Public Access EV Charging Program is funded through the Charging and Fueling Infrastructure (CFI) Grant Program administered by the U.S. Department of Transportation's Federal Highway Administration. DCR continues to have access to its CFI funding. See Chapter 3 for more information on the program.

Figure 4.15 Primary and secondary travel corridor segments within 1 mile of a DC fast charging station



EVICC plans to use the Section 103 process (See Appendix 8) to explore the appropriate distance between DC fast charging infrastructure, the ideal power capacity and number of fast charger ports,[13] and ideal locations for DC fast charging along secondary travel corridors. These outputs will inform future state-funded offerings designed to ensure a baseline of DC fast charging along secondary travel corridors.

Light-duty and MHD fleet EVs

Several efforts are already underway to support the high-value EV charging infrastructure deployment opportunities for fleet EVs including, but not limited to: the MassDOT Service Plaza Operator Request for Proposals (See Chapter 3); the MassCEC's Medium- and Heavy-Duty Charging Solutions program (See Chapter 3); and MassEVIP's expansion of its workplace and fleet charging incentives to MHD fleets.

Charging for MHD fleet vehicles is a particularly important consideration for Massachusetts' charging network as electrification of MHD vehicles will reduce emissions from the transportation sectors more than electrification of light-duty passenger vehicles.[14] Validating this importance of EV charging for MHD vehicles, the General Court directed EVICC to explore MHD charging in this Assessment (See Mass. Acts Ch. 239, §§ 102, 103).

Unfortunately, chargers accessible to MHD vehicles are not as widespread as light-duty

[13] For example, the Massachusetts' NEVI program is designed to ensure that there are at least four DC fast chargers of at least 150 kW located every 25 miles along primary travel corridors. These parameters may or may not be appropriate for the future EV charging needs along secondary corridors.

[14] As noted earlier in this Chapter, MHD vehicles accounted for more than a quarter of Massachusetts' transportation sector emissions in 2019, despite representing less than 4% of registered vehicles.

vehicle chargers. The U.S. Department of Energy's Alternative Fuel Data lists only 6 public charging stations with 15 ports for medium-duty vehicles and 2 public charging stations with 4 ports for heavy-duty vehicles. Many MHD fleet vehicles likely rely on charging infrastructure at their own depots, rather than public chargers, which are not reflected in the U.S. Department of Energy's data. Moreover, Table 4.1 indicates that more than 1,800 charger ports have been deployed through state-funded programs to support fleets, which very likely include several charger ports serving MHD fleets.

Regardless of the actual number of EV charger ports available to MHD EVs, it is clear that more needs to be done to ensure that MHD fleets have sufficient resources and charging infrastructure to confidently transition to EVs. This is particularly true for MHD fleets where the transition to EVs can offer financial savings, e.g., last mile delivery and service industry vehicles. These fleets also provide an opportunity for early electrification "wins" and to build familiarity with EVs with MHD fleet owners and operators.

In particular, charging at MHD fleet hubs should be prioritized as it will provide the greatest value for MHD fleets and biggest impact for public funding. New models that allow MHD fleets housed near each other, e.g., at the same depot, to share EV charging infrastructure should be tested and scaled to allow for public funding of MHD chargings to be further leveraged. This model would also address the upfront cost barrier of EV charging for MHD fleet electrification.

EV charging deployment priorities conclusion

State-funded EV charging programs must become more targeted to address the areas of greatest value and leverage public funding to the greatest extent possible. As discussed throughout this Chapter, the types of EV charging infrastructure that have the highest value and on which EVICC and the state can have the greatest impact are EV charging accessible to all members of the public (i.e., "public" EV charging), including on-street charging for residential customers, and EV charging for MHD fleet vehicles.

This section identified several gaps in existing program offerings for high-value EV charging infrastructure. EVICC recommends discrete actions to address each gap at the conclusion of this Chapter and in Chapter 8; however, EVICC recommends that addressing the following gaps be prioritized as they serve the highest value light-duty passenger and fleet EV use cases:

- Ensure a baseline of **DC fast charging along secondary travel corridors**;
- **Scale on-street charging throughout the Commonwealth** by leveraging the lessons learned from the MassCEC On-Street Charging Solutions program; and,
- **Deploy MHD fleet charging at or near where fleet vehicles are housed**, both for individual fleets and at depots to serve multiple fleets.

The above priorities assume that existing state and utility programs and initiatives continue to support the deployment of other high-value EV charging opportunities. Massachusetts' EV charging deployment priorities may require

[15]Importantly, these priority areas serve as guideposts for future actions and should not be applied retroactively. Moreover, it will take time for new and existing programs to align with these priorities and careful consideration of how best to align with these priorities to ensure effective implementation.

modification if deployment lags in these other segments. EVICC will actively follow deployment across all high-value EV charging opportunities and will recommend changes to the priorities identified in this report if and when necessary, including in the next EVICC Assessment.

Ultimately, the continued progress and deployment of high-value EV charging infrastructure within existing programs and the additional actions outlined in this section to address gaps in existing EV changing efforts will allow the Commonwealth to build an equitable, interconnected, accessible, and reliable EV charging network throughout Massachusetts.

Recommendations

Public Comments

During the monthly EVICC public meetings in 2024 and 2025 and at the public hearings on the Second EVICC Assessment, EVICC members and members of the public provided feedback on EV charging needs across the state. Key themes from those comments are highlighted below.

- There is a need for additional DC fast charging across the state, particularly in Central and Western MA (especially west of Springfield, along Rt 2, Rt 9, and I-90) and in rural areas off of main travel corridors.
- Additional Level 2 charging stations are needed to serve dense residential areas, especially for people who may not have charging at their home. Innovative solutions like curbside charging models could help meet this need.
- More Level 2 charging is needed at common, local travel destinations like workplaces, transit hubs, and commuter parking areas.
- Vacation and recreation areas, like the Berkshires, Cape Cod, and State parks, would benefit from more fast charging options, in addition to some Level 2 charging in locations like hotels and recreation areas where people may spend longer periods of time.
- Both DC fast charging and Level 2 charging should be co-located with grocery stores, big box stores, downtown areas, etc.

Participants at the public hearings also provided feedback and ideas included in the section on considerations for key demographics and vehicle types. Those comments have been incorporated directly into the recommendations.

A summary of comments provided during the public hearings on the Second EVICC Assessment are available on the EVICC website. Similarly, the minutes from prior EVICC public meetings can be found on the EVICC website.

EVICC Recommendations

EVICC recommends the following actions to address the analysis and key themes highlighted in this Chapter and to support the building out of EV charging infrastructure to ensure an equitable, interconnected, accessible and reliable EV charging network in Massachusetts.

- **Agency Action:** Explore creation of an initiative focused on deploying fast charging stations along secondary travel corridors and areas along Alternative Fuel Corridors and secondary corridors that could also serve as fast-charging hubs for residential customers without off street parking. (EEA, MassDOT, DOER, MassDEP, and the EDCs)
- **Agency Action:** Develop an initiative to support medium- and heavy-duty EV charging including potentially establishing hubs near fleet depots and industrial zones and piloting MHD charger-sharing reservations paired with other solutions to reduce common EV charging barriers. (EEA, DOER, MassDEP, MassCEC, and the EDCs)
- **Agency Action:** Establish partnerships with state, municipal, and stakeholder organizations to conduct tailored outreach and ways to package existing incentive programs to high value locations for EV charging infrastructure including (i) grocery stores, (ii) big box stores, (iii) small businesses in city centers, (iv) popular destinations (e.g., hotels and resorts in the Berkshires and on Cape Cod), and (v) MHD fleets that could financially benefit from electrifying (e.g., last mile delivery and vocational vehicles). (EEA, MassDEP, DOER, and municipal governments)
- **Agency Action:** Collaborate with the legislature and relevant stakeholders to explore ways to standardize local EV charger permitting, including model ordinances and enabling authority to reduce deployment delays across municipalities. (EEA and DOER)
- **Agency Action:** Create a Municipality Resource Committee that will meet on an ad hoc basis to support the development of resources targeted at reducing barriers for municipalities, potential EV charging site hosts, and other EV charging stakeholders similar to the Public Level 2 EV Charging Station Fees and Policies Guide. EEA will work with DOER's Green Communities Division and the Metropolitan Area Planning Council to identify potential members of the committee and others who can help review developed materials. (EEA, DOER, and MAPC)
- **Agency Action:** Create and maintain a public inventory of EV chargers in Massachusetts, to the greatest extent practically possible, to inform the bi-annual EVICC Assessment. This inventory will leverage existing data sources and future DOS registration processes. (EEA)

Electric Grid Impacts and Managed Charging

As EV adoption accelerates in Massachusetts, growing electricity demand will challenge the state's electric transmission and distribution (T&D) grid - necessitating upgrades, careful planning, and load management strategies to ensure reliability, resilience, and cost-effective integration.

This section examines the expected impacts of EV charging on the Commonwealth's electric grid, including stress points in the existing infrastructure and the regulatory and operational processes for addressing them. It also explores the role of managed charging - especially through active and passive utility programs, time-of-use rates, and smart technologies - as a critical tool to mitigate grid constraints, shift load to off-peak hours, and reduce overall system costs. This chapter highlights current utility practices, emerging best practices, and areas for improvement, while identifying both near- and long-term actions needed to ensure a reliable, cost-effective, and equitable EV charging ecosystem.

Summary of transmission and distribution impacts, challenges, alternatives

Transmission and distribution impacts

The cumulative effects of EV charging demand across the Commonwealth and in specific locations present growing challenges for the state's T&D grid. While overall system load increases steadily, the more pressing concern is where and when this load occurs. Clusters of residential and commercial chargers, especially those with high power ratings can stress local transformers, feeders, and substations.These impacts vary widely depending on local grid conditions, making proactive grid planning and forecasting essential to maintaining the reliability of the electric grid and avoiding costly, reactive infrastructure upgrades.

Transmission and distribution impacts refer to the physical and operational stress placed on the electric grid as new demand sources—like EVs—are added. The electric transmission system carries high-voltage electricity over long distances, while the electric distribution system delivers it to homes and businesses. EV charging, especially when uncoordinated, can lead to localized overloading of transformers or require upgrades to feeders and substations. Without timely upgrades or demand management strategies, these stressors can degrade service reliability and increase costs for ratepayers.

Challenges

The growing demand for EV charging presents a range of grid-related challenges that extend beyond overall electricity consumption. One of the most complex is the localized and often unpredictable nature of new EV charging development, which can outpace traditional utility planning and investment timelines. High concentrations of charging, particularly at commercial fleet depots and highway corridor fast-charging stations create high-capacity demands that can strain distribution circuits, transformers, and even upstream transmission infrastructure. These pressures are often most severe in areas with aging grid assets, limited available capacity, or long upgrade lead times, all of which can slow the equitable and efficient deployment of charging infrastructure.

In addition to challenges posed by location-specific loads, other barriers include uncertainty in the timing and pace of EV adoption, changes to charging behavior, mismatches between utility upgrade schedules and charger deployment timelines, and constraints such as workforce shortages, equipment availability, or permitting delays. Addressing these issues will require more flexible and proactive utility planning, improved data coordination among stakeholders, and policy alignment that integrates grid needs with the Commonwealth's broader transportation electrification goals.

Alternatives

Electric utilities understand the impact of increased EV adoption and charging station deployment and incorporate EV adoption forecasts in their grid planning processes, working with EV charging infrastructure developers to plan grid infrastructure construction. Building electric grid infrastructure is expensive, however, and alternative solutions to T&D grid infrastructure development will be critical in ensuring decarbonization of the transportation sector is done in the most cost-effective manner possible. The most notable alternative solutions are EV load management mechanisms.

> EV load management involves programs, policies, and rate designs that impact the timing of EV charging. Managing EV load and enabling EV load shifting allows charging to occur off-peak, resulting in more efficient use of existing grid infrastructure and deferring the costly grid infrastructure upgrades.

Major examples of EV load management mechanisms include both active managed charging programs (i.e., utility directly controls EV charging), passive managed charging (i.e., an incentive is provided for not charging at certain times), advanced rate designs, and demand response programs. Other alternative solutions exist such as the dynamic use of battery energy storage systems and other distributed energy resources to mitigate grid constraints caused by EV charging. Last, other solutions exist to leverage the energy stored in EVs to provide grid and resilience benefits, namely vehicle-to-everything (V2X) programs and microgrids that rely on EVs for back-up power. When these strategies are complementary to each other, they become valuable components of a comprehensive approach to managing EV load.

Overview of relevant T&D infrastructure upgrade processes

High volumes of simultaneous EV charging can increase existing peaks or create new peaks on the local electric distribution system and can increase overall T&D system peaks. Increases in peak demand require transmission and distribution system planners and engineers to design and deploy new grid assets to meet this new demand and to ensure safe and reliable operation of the electric grid.

Overview of electric distribution company infrastructure upgrade processes and regulatory structures

Electric distribution company overview

To satisfy their responsibility of providing safe and reliable service, electric utilities plan ahead to ensure that the electric grid has sufficient capacity to support new loads and higher peaks. Utilities develop near-term and long-term electric demand forecasts to assess whether their existing grid infrastructure, i.e., substations, distribution lines, and transformers, is capable of hosting this growing demand. These forecasts guide decisions about when and where grid upgrades are needed. Since grid infrastructure upgrades require significant capital investment, utilities use demand forecasts to shape their capital expenditure strategies.

In addition to electric demand assumptions, revenue and return on equity (ROE) expectations play significant roles in shaping utility capital expenditure strategies. Electric utility customers pay for the costs of grid infrastructure through their electric bills. For customers of investor-owned utilities, these costs include both infrastructure costs and the cost of capital. The cost of capital consists of both the cost of any debt and the ROE for utility investors. In the Commonwealth, there are three investor-owned utilities, Eversource, National Grid, and Unitil, which are also known as the electric distribution companies (EDCs). The Massachusetts EDCs serve over 90% of the state's electric customers.[1]

Because the EDCs earn a return on capital investments, regulatory oversight is necessary to ensure utilities are not over-investing in unnecessary infrastructure.[2] Regulatory oversight includes ensuring that demand forecasts accurately reflect actual system needs and capacity so that equitable and least-cost outcomes to meet both grid reliability and the state's electrification needs can be met. The Massachusetts Department of Public Utilities (DPU) has regulatory oversight over the state's three EDCs.

[1]Office of Energy Transformation. Financing the Transition: Background. Massachusetts Executive Office of Energy and Environmental Affairs. Accessed June 10, 2025. https://eml.berkeley.edu/~train/regulation/ch1.pdf. https://www.mass.gov/doc/background-financing-the-transition/download.

[2]Train, Kenneth E. Regulation: Chapter 1 – Introduction. University of California, Berkeley. Accessed May 22, 2025. https://eml.berkeley.edu/~train/regulation/ch1.pdf.

New Customer Connection Focused Process

EV chargers, like all electric loads, must be connected to the grid to provide the electricity required for charging. To initiate this load connection process, EV charger project owners submit "load letters" to their utility detailing the project's location, basic specifications, and projected electric capacity needs. The utility then coordinates with the project owner to advance the required construction, permitting, and safety steps.

Load requests may not immediately receive approval from the utility if the utility lacks available hosting capacity; this is more common for larger load requests, such as fast chargers for EV fleets. In these cases, the utility will add the request to its connection queue and study the project to assess grid capacity constraints and identify necessary grid infrastructure upgrades. The costs of grid upgrades needed to accommodate a specific project are passed onto that project.

The load interconnection process can be lengthy. Project owners can face long wait times, sometimes leading to project delays or cancellations. Further, the opaqueness of the load connection process can cause uncertainty for EV charger developers and fleet operators hoping to electrify. The Commonwealth is working with the utilities and stakeholders to evaluate and improve the load connection process, aiming for greater transparency and efficiency. A streamlined and clearer process will aid the timely deployment of EV charging infrastructure while advancing grid reliability and affordability goals.

Regulatory Processes

As transportation and building electrification advances, multiple regulatory processes have emerged to proactively plan for increasing demand on the electric grid. Key among them are the Electric Sector Modernization Plans and the 2024 Climate Act's transportation demand forecasting directive (Section 103 of the 2024 Climate Act), each playing important roles in shaping the future of the grid and ensuring that EV load can be energized. The ESMPs and processes required under Section 103 of the 2024 Climate Act are discussed in further detail in Appendix 8.

Utility load forecasting and customer engagement efforts

As part of the grid planning processes outlined above, the electric utilities engage a broad range of stakeholders to inform their load forecasts and ensure that grid planning reflects state policy goals and community needs. The electric utilities also incorporate data from load letters into their load forecasts. Utilities often engage in early discussions with these customers to understand the scale and timing of their anticipated demand. Sometimes, these anticipated large loads are factored into the utilities' forecasts.

Deliberate stakeholder engagement is critical to ensuring EV adoption and charger planning reflects the needs of all Commonwealth residents. The utilities should continue working with stakeholders to meaningfully incorporate community feedback into their plans for the electric grid.

Managed Charging Programs

Managed charging refers to strategies that incentive a shift in or control the timing of EV charging to reduce grid impacts.

Active managed charging involves real-time utility or aggregator control of EV charging.

Passive managed charging uses time-based price signals to encourage customers to charge during off-peak periods, i.e., times of the day when the transmission or distribution system's load is low. For EV owners, off-peak charging generally means waiting to charge their vehicles until later in the evening rather than charging immediately upon coming home from work when system peaks occur.

Managed charging and load shifting programs

The EDCs - National Grid, Eversource, and Unitil - and more than one-quarter of Massachusetts' 41 municipal light plants (MLPs) currently offer or plan to offer EV managed charging programs and/or EV rates. A summary of these programs is provided in Table 5.1. National Grid is the state's only EDC that currently offers a managed charging program. While National Grid has not yet published an assessment of its fleet managed charging program, National Grid asserts that its residential managed charging program has seen significant success in both attracting customers and reducing peak load, enrolling around 6,000 customers in 2023[3] and shifting over 80% of weekday EV charging loads to off-peak periods.[4] Eversource and Unitil have recently proposed comparable residential managed charging programs.[5]

Table 5.1: Summary of National Grid, Eversource, and Unitil's Managed Charging Programs

	National Grid	Eversource	Unitil
Program Status	Existing	Proposed	Proposed
Eligible Customer Classes	• Residential • Fleet	Residential	Residential
One-Time Enrollment Incentive	$50	$50	$50
Incentive	• $0.05 per kWh for the summer months (June 1- September 30) • $0.03 per kWh for the non-summer months (October 1-May 31)	$10/month	$10/month
Peak Periods	1:00-9:00 pm	1:00-9:00 pm	1:00-9:00 pm

[3]See D.P.U. 24-196, Exh NG-MTM-1 at 23

[4]D.P.U. 23-44 Exhibit NG-MM-9, Consideration 3: Develop incentives for weekend charging, and D.P.U. 22- 63 Exhibit NG-MM-10, Finding 2: The off-peak rebate resulted in more weekday charging.

[5]These proposals are awaiting DPU approval in the open D.P.U. 24-195 and 24-197 EV Midpoint Modification dockets. See Appendix 3 for additional information on the EV Midpoint Modification dockets.

Advanced rate design

Rate design and ratemaking regulatory mechanisms serve as valuable load management tools, including for EV charging. Specifically, time-varying rates (TVR), such as time-of-use (TOU) rates and critical peak pricing (CPP), can provide price signals and encourage customers to shift their EV charging to off-peak periods.

To explore TVR implementation, the Interagency Rates Working Group (IRWG), a collaboration between the Department of Energy Resources (DOER), Attorney General's Office (AGO), and the Executive Office of Energy & Environmental Affairs (EEA) issued a Long-Term Rates Strategy in March 2025 that outlines recommendations for specific TVRs that advance the Commonwealth's grid modernization and affordability goals. To further investigate the implementation of these recommendations, DOER convened a Massachusetts Electric Rate Task Force, a stakeholder group which will issue a more granular set of rate design and ratemaking regulatory mechanism recommendations.

Opt-in EV time-of-use rates can be an effective mechanism to reduce load on the grid. EV TOU rates operate similar to passive managed charging programs and offer customers the opportunity to save money by charging lower rates during off-peak hours when demand on the grid is low and by charging higher rates during peak hours when demand on the grid is high. Like managed charging programs, opt-in EV TOUs can have various designs that can be limited or enhanced by the metering technology utilized by the utility. Due to the similarities between managed charging and opt-in EV TOUs, it is important to carefully consider whether and how specific managed charging programs and opt-in EV TOU rates complement each other. It is also important to consider to what extent the value of having both programs is offset by the administrative cost of maintaining two offerings and the potential customer confusion two EV-specific rate programs may create.[6]

As Massachusetts modernizes its grid, thoughtful rate design will be essential in aligning EV charging behavior with system needs. Ensuring the successful implementation of whole-home TVRs will help reduce peak demand, lower system costs, and achieve the state's broader clean energy goals, including those related to EV adoption and charger deployment.

Vehicle-to-everything (V2X)

Vehicle-to-everything (V2X) technologies and programs enable vehicle-grid integration by allowing EVs to communicate with other infrastructure, including homes (V2H), commercial buildings (V2B), and the electric grid itself (V2G).

EVs are capable of providing services back to the grid, such as peak shaving, load shifting, and demand response. V2G uses bidirectional charging, allowing plugged-in EVs to send energy back to the grid during times of high demand on the grid and may be able to ease grid constraints. EV owners who participate in these programs are compensated for their contributions to grid capacity. V2G can also enable EVs to improve customer and system resiliency, as they can provide backup power during blackouts and emergencies.

The scalability of V2X will likely vary by vehicle

[6]The 2022 Act Driving Clean Energy and Offshore Wind directed Eversource and National Grid to file residential EV Time of Use rate proposals with the DPU. The DPU is currently reviewing utility and intervenor briefs and is statutorily required to issue at least one order on these proposals no later than October 31, 2025.

class. For example, electric school bus fleets are considered strong candidates for V2X due to their predictable routes, consistent charging availability, and centralized depot charging. Highland Electric Fleets, a Massachusetts-based electric school bus service provider, partners with school districts across the country to electrify their school bus fleets and utilize buses as revenue-generating grid assets.

Scaling V2X for light-duty EV owners is more nascent. In Massachusetts, MassCEC used EVICC-awarded funds to launch its V2X Demonstration Projects Program. This program aims to expand access to V2X technology and demonstrate the viability of bidirectional charging in the Commonwealth.

V2X is an emerging concept, so its full capabilities remain to be seen, particularly for non-fleet light-duty EVs. However, when scaled, it can create significant benefits for the grid, including cost savings for all residents, even those without EVs. The Commonwealth should continue exploring it as a viable grid service opportunity.

Best practices for EV load management

Active and passive managed charging and other load shifting programs have many benefits. First, they promote EV charging when capacity is available on the grid by providing rebates or other incentives for charging at off-peak times. Second, they create opportunities to delay grid infrastructure upgrades, which can minimize ratepayer costs. Finally, they support emissions reduction goals by both reducing the costs associated with EV ownership, thus incentivizing EV adoption, and electricity demand during periods when fossil generation is being used most.

Effective programs and rates send clear price signals to incentivize off-peak charging, which results in efficient use of existing grid infrastructure. Well-designed price signals are predictable, capable of influencing EV charging behavior, and create opportunities for participants to reduce their electric bills. These programs and rates should also be paired with effective customer education and straightforward enrollment processes and designed to allow for participation with as many types of EVs and EV chargers as possible. Additionally, they should be capable of dynamically responding to technological innovations and evolving grid conditions. Managed charging and load-shifting programs should also be integrated with other load-management offerings, like whole home TOU rates, to meaningfully reduce grid constraints and maximize ratepayer savings.

Long-term, some combination of active and passive managed charging and whole home TOUs, along with opportunities for V2X and other programs that can leverage the ability of EV to provide power back to the grid, provide a comprehensive framework for minimizing the grid impacts of EV charging and maximizing its value.

Analysis of Impact of EV Charging on the Electric Grid

By 2035, Massachusetts is expected to host an extensive EV charging network of private residential chargers, public chargers, and chargers specifically for medium- and heavy-duty vehicles. Future EV growth in line with the state's Clean Energy and Climate Plan could add nearly 4,000 MW to peak demand by 2035. By 2030, EV load could reach 1,500 MW during peak periods.

EV growth will necessitate additional capacity in some areas of the grid. EVICC estimates that up to 24 percent of feeders could overload by 2035 from EV charger adoption, without considering building electrification. Addressing the impact of EV charger installations will require a mix of cost-effective and comprehensive solutions, including managed charging solutions, distributed solar, energy storage, and feeder and substation upgrades where required.

Methodological Approach

As described in Chapter 4, consultants Synapse Energy Economics, CSE, and RSG modeled EV charging needs to determine the number and distribution of EV chargers to serve future EVs across the state. The consultant team also analyzed the impact that EVs will likely have on the electricity system and on distribution equipment across the three EDCs. This analysis can be considered a tool to help the Commonwealth and its utilities prioritize the feeders and areas that need further evaluation of potential grid impacts and may warrant targeted interventions to manage load.

The Synapse consultant team estimates that Massachusetts will need to host nearly 800,000 EV chargers in 2030, and approximately 1.55 million chargers in 2035, to support the CECP projections of EV adoption. These are displayed in Table X of Chapter 4.

Synapse modeled four separate scenarios to represent the range of possible EV load increases in 2030 and 2035. Scenario 1 are EV loads without any managed charging programs and are shown in Figure 1. This scenario has the highest EV loads among all four scenarios and the most widespread grid implications.

Scenario 2 is referred to as the "flat charging" scenario and serves as a hypothetical scenario investigating how the steady, as-even-as-possible charging of vehicles would impact loads. Scenario 2 represents a hypothetical charging program that encourages low-level flat charging during overnight or workday periods.

The third scenario was built using current off-peak charging program data and participation rates from Massachusetts utilities in 2024. Scenario 3 assumes that these programs' charging management and participation rates will continue in the future.

The final scenario (scenario 4) explores the outcome of fully managed flexible load. In this scenario, almost all home, work, public level 2, and private DC fast chargers serving both light-duty and medium- and heavy-duty EVs are assumed to participate in robust and advanced managed charging programs that move load off grid peaks.

For public DC fast chargers serving light-duty and medium and heavy-duty vehicles, an estimated 10 percent of the load during peak hours is assumed to be managed and redistributed to other hours of the day. This scenario is used to better understand which feeders host inflexible load, and which areas have the greatest potential for targeted managed charging programs.

Although not all EV chargers will be used at once, the consultants estimate that by 2035, the load from EV chargers will increase the summer peak demand by nearly 4,000 MW during afternoon/early evening peak periods, if unmanaged. This represents 30 percent of forecasted load for Massachusetts in 2035. If existing load management programs continue at current participation rates and levels, new load from EV chargers could be reduced by roughly 19 percent, representing an afternoon/early evening peak of 3,225 MW in 2035. With nearly complete management of flexible load, 2035 EV load could be reduced by nearly 88 percent relative to unmanaged load, representing an afternoon/early evening peak of 477 MW in 2035. As seen in Figure 2, management of almost all flexible load leads to much lower loads, particularly in the greater Boston area, Worcester, Lowell, and Springfield. In all scenarios, between 2030 and 2035, total EV load is expected to roughly double (Table 5.2).

Table 5.2. 2030 and 2035 demand from EVs during peak hours

Year	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential (MW)
2030	1,547	1,035	1,440	241
2035	4,001	2,699	3,255	477

[7] Massachusetts Phase III EV Program Year 1 Evaluation Report National Grid, DPU 24-64 Exhibit NG-MMJG-1

Figure 5.1. Scenario 1, Unmanaged 2035 EV loads during grid peaks

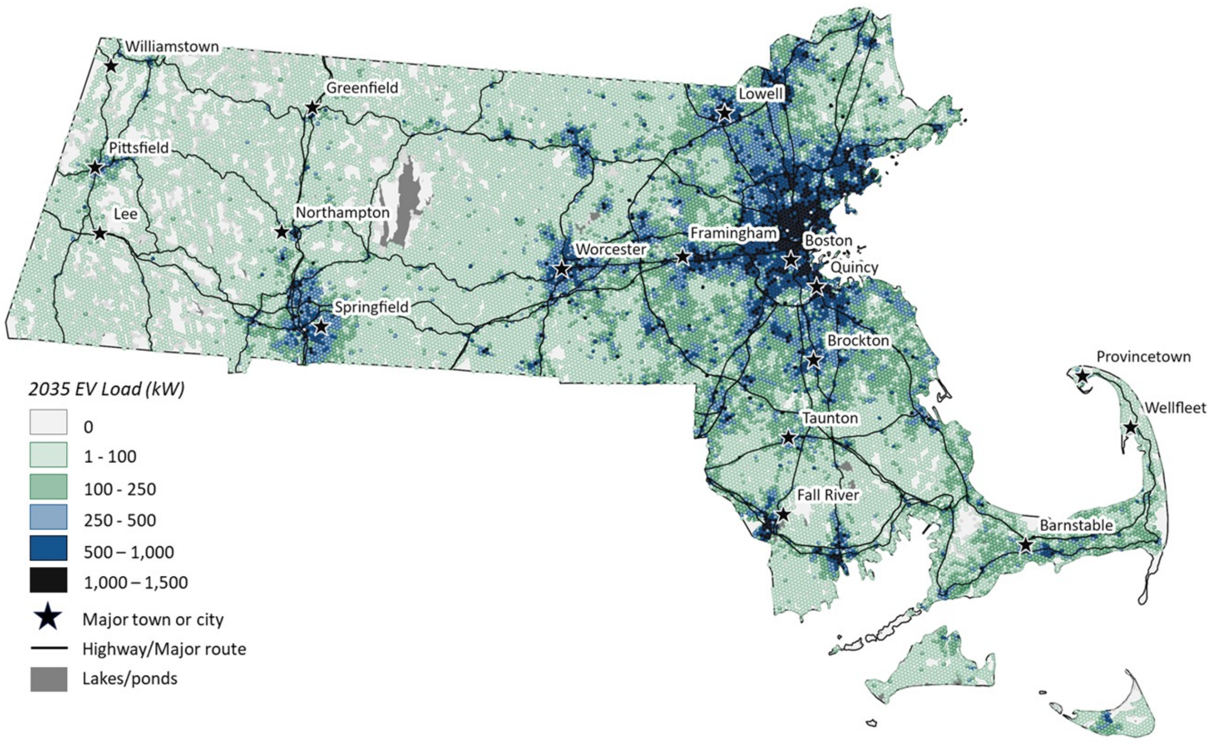
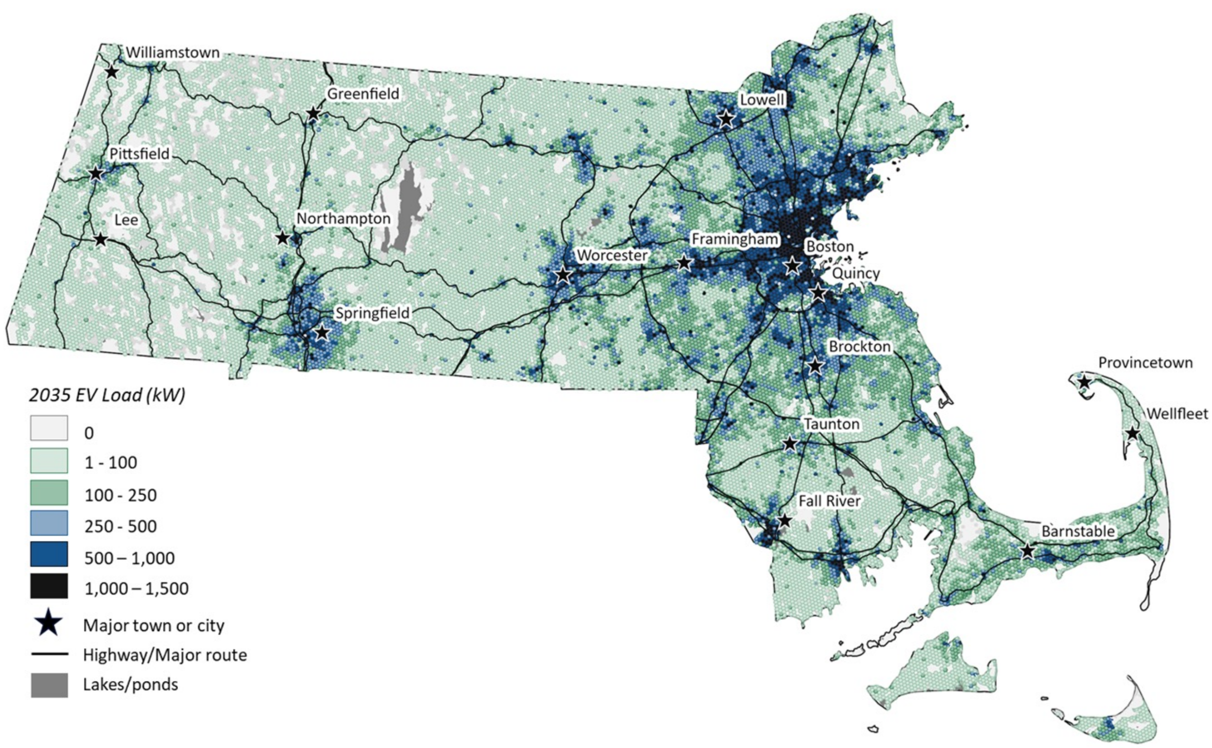


Figure 5.2. Scenario 4, Technical potential 2035 EV loads during grid peaks



The consultant team mapped EV load onto maps of the EDC's distribution grids to identify areas that may need further study, targeted load management, and/or grid upgrades. The team assessed both feeders and substations. Feeders are low- to medium-voltage distribution lines that carry electricity from a substation to a customer, such as a residential building or an industrial facility. Feeders typically serve several hundred to thousands of customers. Feeders connect to substations, where high-voltage electricity from the transmission system is converted to lower-voltage levels for the distribution system. Several feeders often connect to a single substation. The need for grid upgrades depends not only on the existing and new load on each feeder and substation, but also the existing capacity of those distribution assets.

Utilizing available 2022 peak load and capacity rating data for each feeder, the consultant team identified feeders that are projected to carry peak loads equal to or greater than 80 percent of their nameplate capacity in 20230 and 2025. Eighty percent of the nameplate capacity is the industry standard for planning for a grid upgrade as utilities reserve the top 20 percent margin as a safety buffer for unexpectedly high load events or emergencies, such as a nearby feeder going offline or extreme weather. For simplicity, feeders with a load-to-capacity ratio equal to or greater than 80 percent are referred to as "overloaded"; feeders with a load-to-capacity ratio greater to 110 percent are referred to as "severely overloaded".

Analysis Results

Feeders

This Assessment isolates the grid impacts associated with EV adoption and charger deployment. Other types of load growth, such as building electrification, were excluded and feeders already overloaded in 2022 were also excluded.

While this analysis focuses on grid impacts in 2035, we also present 2030 overloaded feeder results to capture the shorter-term grid outlook.

Feeders that overload near term (by 2030) are likely already under scrutiny from utilities in their ESMPs, which have a 5-year planning horizon. Table 5.3 summarizes the results of the grid impact analysis in 2030 and 2035, and Figure 3 shows the magnitudes of feeder overloading in 2030 and 2035.

[9]Peak load refers to the maximum 2022 demand on that feeder, which may not be coincident with the overall system peaks.The feeder rating refers to the upper limit on how much electricity can be carried on that feeder. Headroom is the difference between the capacity of the feeder and peak load. Dividing the peak load by the capacity rating gives a load-to-capacity ratio.

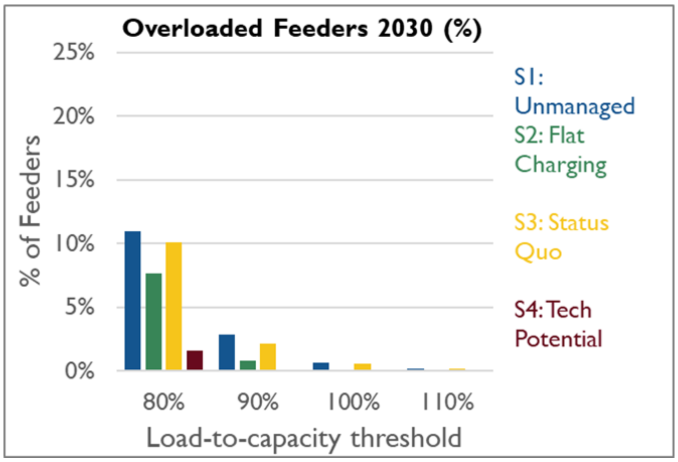
[10]EPRI. 2023. EVs2Scale2030 Grid Primer: An Initial Look at the Impacts of Electric Vehicle Deployment on the Nation's Grid. Available at: https://www.epri.com/research/products/000000003002028010. Some utilities use thresholds higher or lower than 80% to grid grid upgrades.

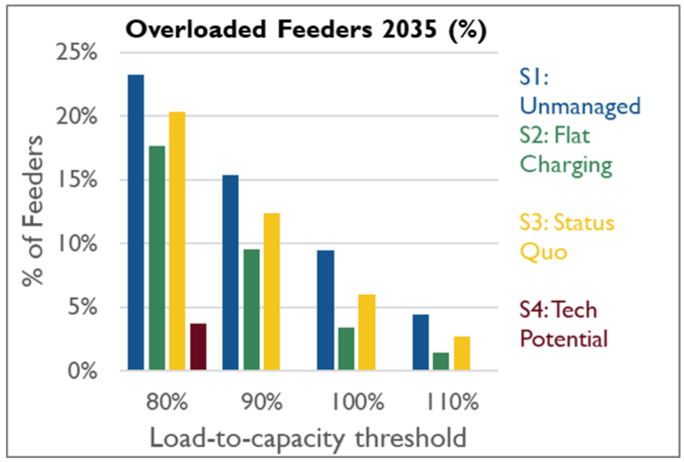
Table 5.3. Overloaded Feeders in 2030 and 2035

	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential (MW)
2030 count	287	199	264	41
% of Total Feeders*	11%	8%	10%	2%
2035 count	613	466	537	7
% of Total Feeders*	234%	18%	20%	4%

* Total feeders = 2,634

Figure 5.3. Overloading on feeders in 2030 and 2035





In the next five years, between 14 and 24 percent of Massachusetts feeders could overload. By 2035, the number of feeders overloading from unmanaged EV load could increase to nearly a quarter of all Massachusetts feeders. Feeders that overload with load-to-capacity fractions above 80 percent should be subject to additional monitoring and are possible candidates for targeted load management programs.

Overloading is strongly dependent on the EV charger load, existing load, as well as the capacity of the feeder (i.e., how much load the feeder can serve). Overloading is seen across a variety of sizes of feeders in 2035, rather than clustered on smaller feeders.

Figure 5.4 through Figure 5.7 show the spatial distribution of feeder overloading across Massachusetts in 2035. The greatest concentration of feeder upgrades is in the greater Boston area, Worcester, Lowell, and portions of Springfield and the Berkshires, where EV adoption is projected to be the largest relative to other areas in Massachusetts. Additionally, Figure 5.6, and Figure 5.7 show the spatial distribution of feeder overloading across Massachusetts in 2035.

Figure 5.4. Scenario 1 – Unmanaged 2035 grid impact results

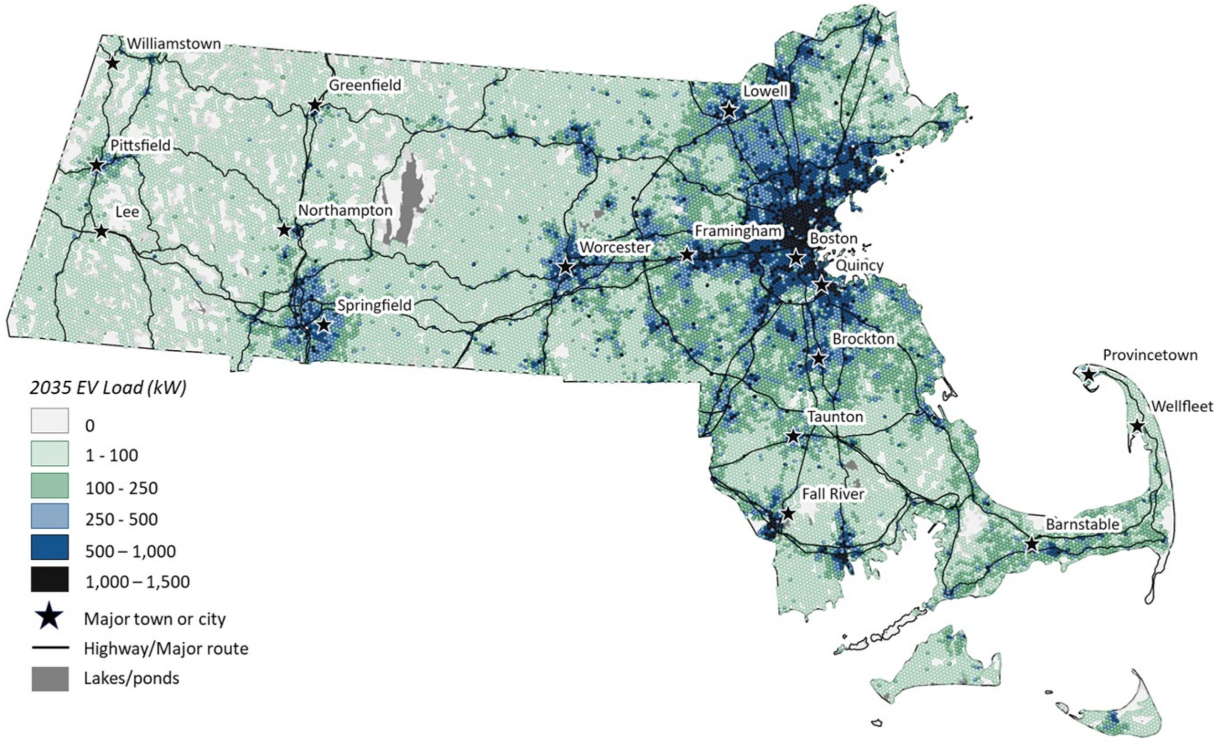


Figure 5.5. Scenario 2 – Flat charging 2035 grid impact results

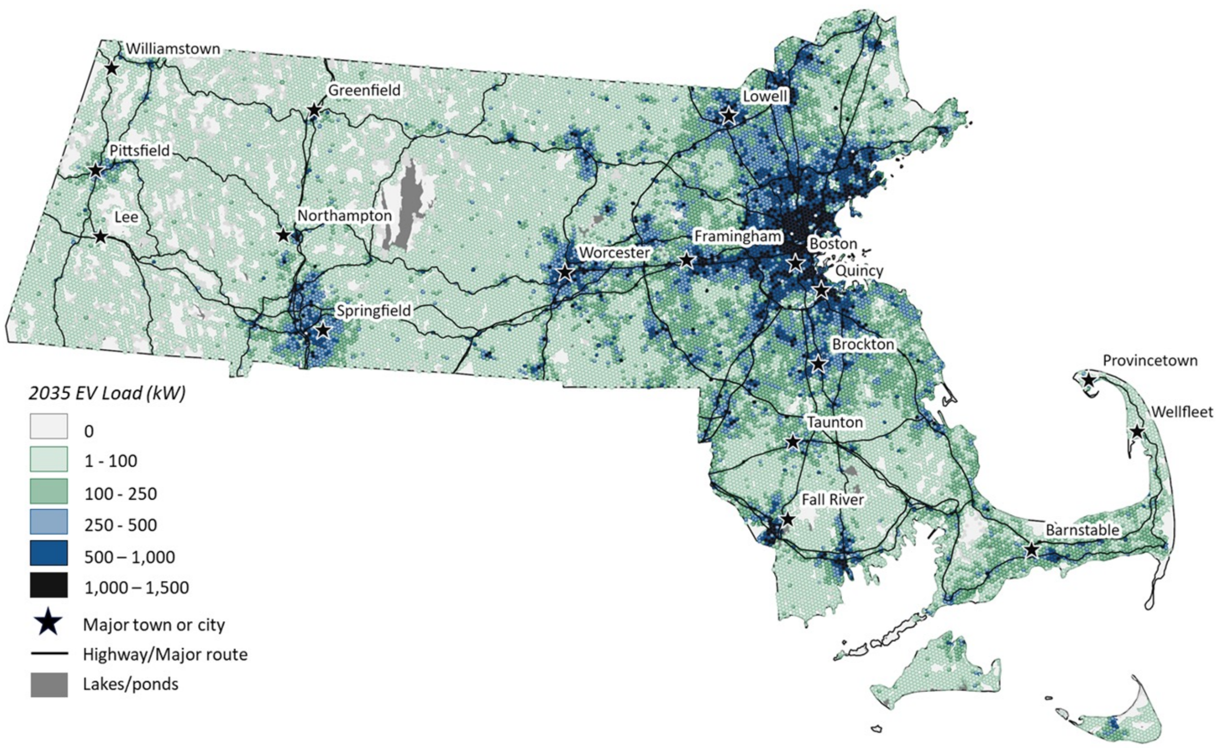


Figure 5.6. Scenario 3 – Status quo 2035 grid impact results

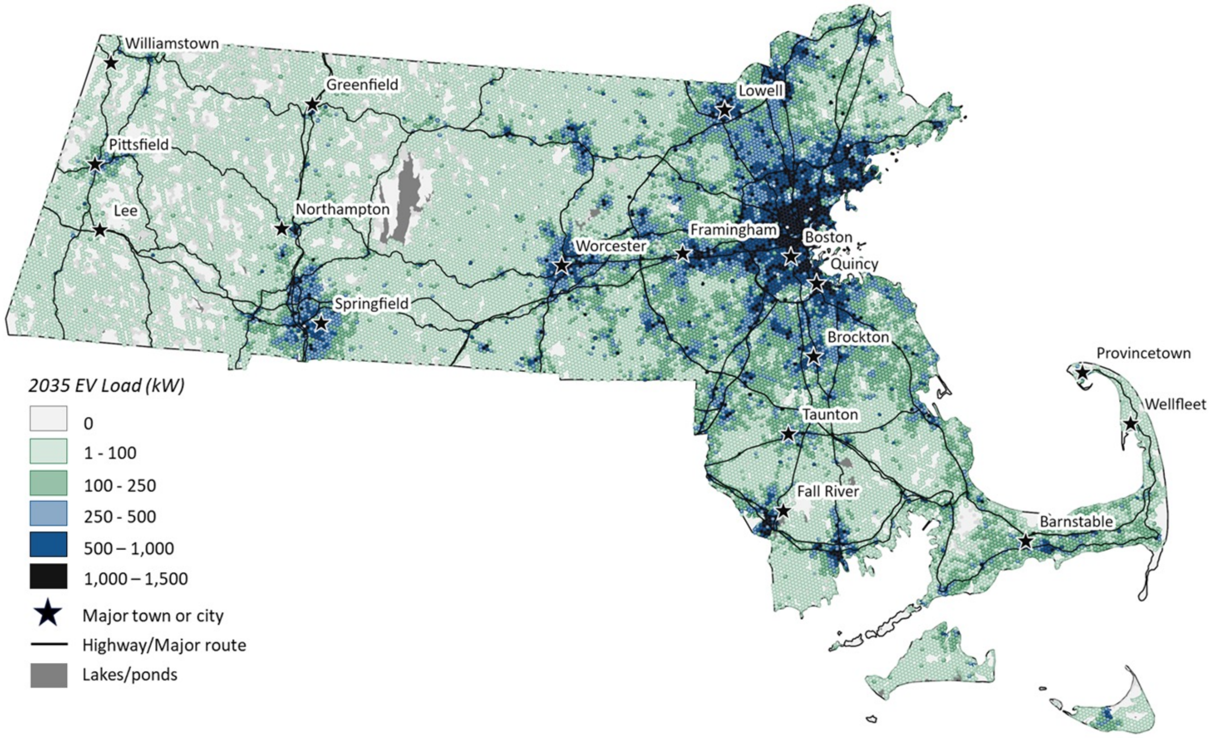
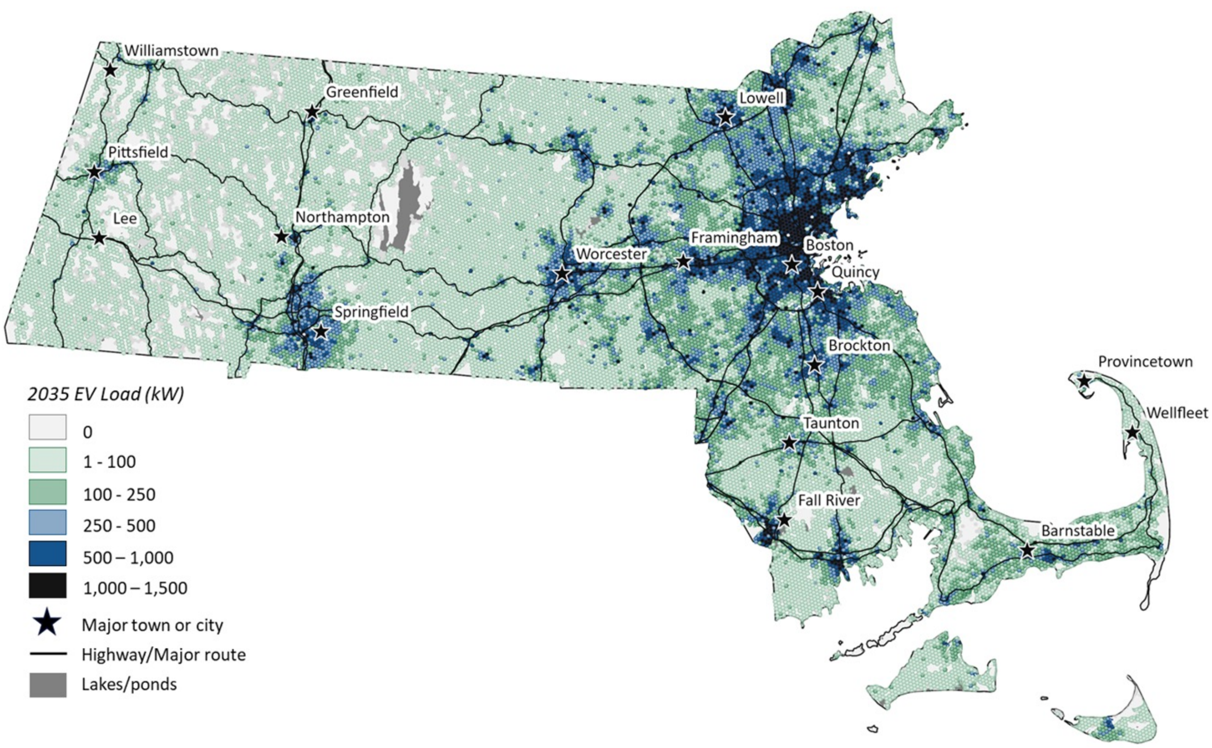


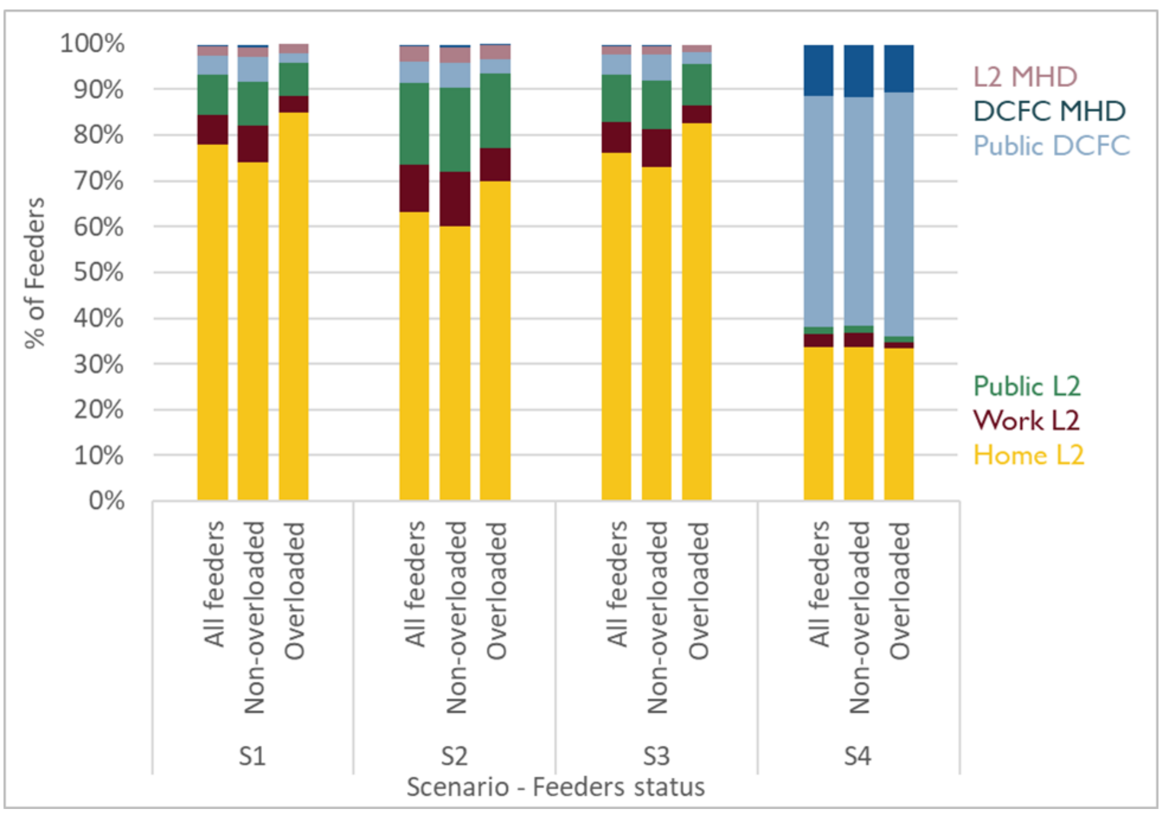
Figure 5.7. Scenario 4 – Technical potential 2035 grid impact results



This analysis finds that public Level 2 and DC fast chargers cause the most feeder overloading in 2035 as other EV charger types are considered more flexible. Specifically, residential chargers are more easily managed than public chargers, especially compared to DC fast chargers along transportation corridors and chargers serving multi-family units without off-street charging. Roughly 90 percent of EV chargers installed in Massachusetts in 2035 are expected to be residential Level 1 and Level 2 chargers, typically serving single-family homes. In scenarios with no management (scenario 1) or some management (scenarios 2 and 3), the overloaded feeders are dominated by home Level 2 chargers, as seen with the yellow bars in Figure 5.8. However, with high participation rates in robust and highly effective management programs (scenario 4), almost all home and public Level 2 charging is managed. This result suggests that management programs targeting home chargers could help avoid the need for grid upgrades on certain feeders at risk of overloading. This is especially important in areas with large numbers of residential chargers, such as suburban areas (as seen in Figures 5.4-5.7).

Public DC fast chargers serving light-duty and medium- and heavy-duty vehicles are harder to manage. Vehicles using these types of chargers typically need to charge immediately and do not have as much flexibility to shift to different time periods or reduce charging speeds. Approximately 54 percent and 10 percent of the overloaded feeders in scenario 4 are dominated by public DC fast chargers and medium- and heavy-duty DC fast chargers, respectively.

Figure 5.8. Dominant charger types at peak times on 2035 feeders, by status of feeder



As discussed further in Appendix 8, Section 103 of the 2024 Climate Act requires the EDCs to identify distribution system upgrades necessary to meet ten-year EV charging demand in coordination with EVICC and aligned with the EVICC Assessment. As part of that process, EVICC plans to provide the EDCs with a list of electric distribution feeders and substations to evaluate for potential system upgrades to accommodate transportation electrification in 2030 and 2035. To develop this list, the EVICC technical consultants performed an additional analysis of which feeders and substations are most likely to require upgrades even under lower levels of EV adoption. More specifically, the EVICC technical consultants utilized the Massachusetts-specific forecast developed from the BNEF EV adoption forecast outlined in Chapter 4 to evaluate which feeders and substations are estimated to exceed the load-to-capacity thresholds outlined in this Chapter under the status quo managed charging scenario.[11]

[11]For context, roughly 9 percent of all Massachusetts feeders (245 total) and substations (34 total) are estimated to be overload in 2035 in the status quo managed charging scenario using the Massachusetts-specific forecast developed from the BNEF EV adoption forecast.

Substations

A load-to-capacity ratio of 100 percent was used to assess substation overloading.[12] About 10 percent of all substations could be overloaded from EV load by 2030 and 28 percent by 2035, as shown in Table 5.4. Substations that are projected to overload by 2030 may already be flagged for upgrades in utility ESMPs, which have a 5-year planning horizon.

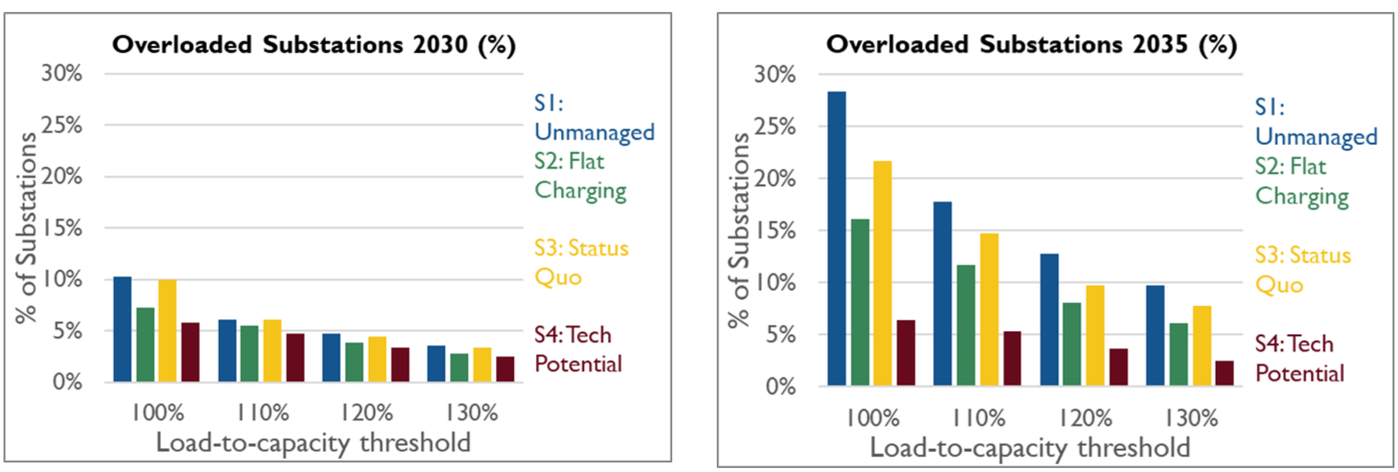
Figure 5.9 shows the magnitude of substation overloading in 2030 and 2035 and these results are shown geospatially in Figure 5.10 and Figure 5.11. Substation overloading is concentrated in eastern Massachusetts, specifically greater Boston, where most EV chargers are expected to be required.

Table 5.4. Overloaded substations in 2030 and 2035

Overloaded Substations	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential (MW)
2030 count	37	26	36	21
% of Total Substations*	10%	7%	10%	6%
2035 count	102	58	78	23
% of Total Substations*	28%	16%	22%	6%

* Total substations = 346

Figure 5.9. Overloaded substations in 2030 and 2035



[12]While an 80 percent load-to-capacity ratio is also typically utilized to plan for substation upgrades, the consultant team was unable to verify the coincidence of the feeder loads connected to each substation. Thus, the team took a more conservative approach is evaluating which substations would be "overloaded" using the projection of EV charging needs based on the CECP EV adoption benchmarks.

Figure 5.10. Scenario 1 – Unmanaged load 2035 substation grid impact results

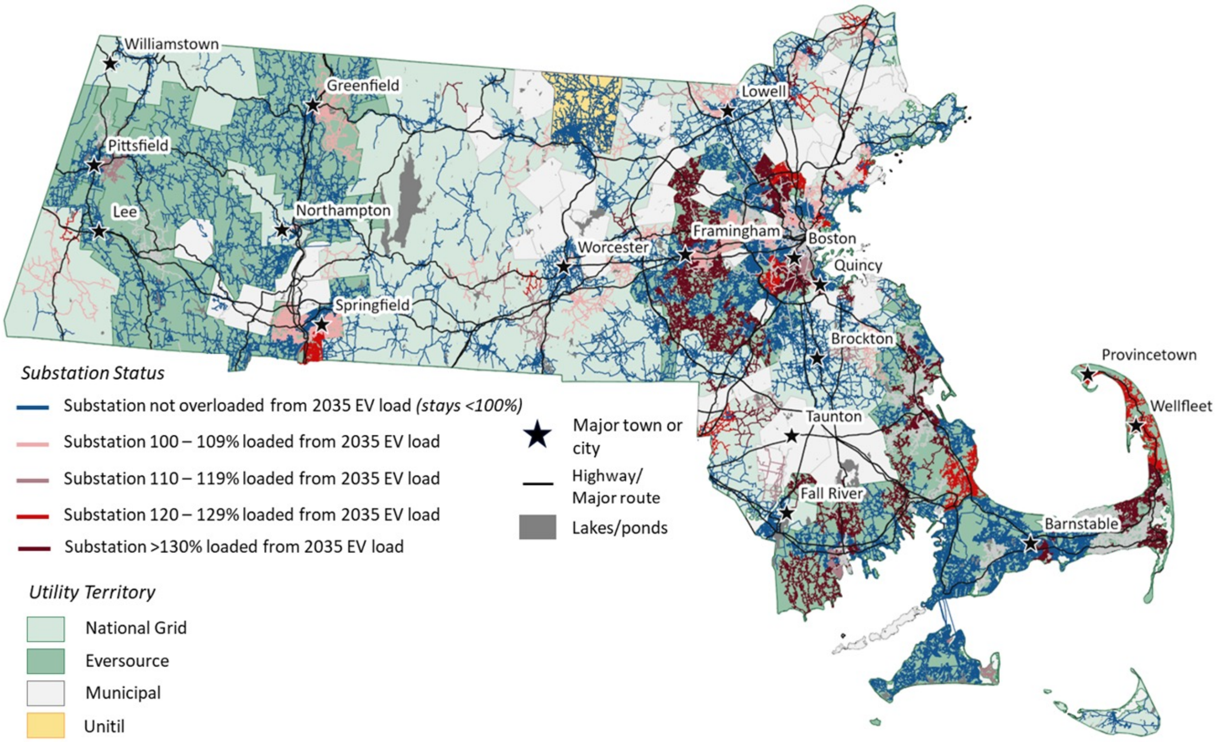
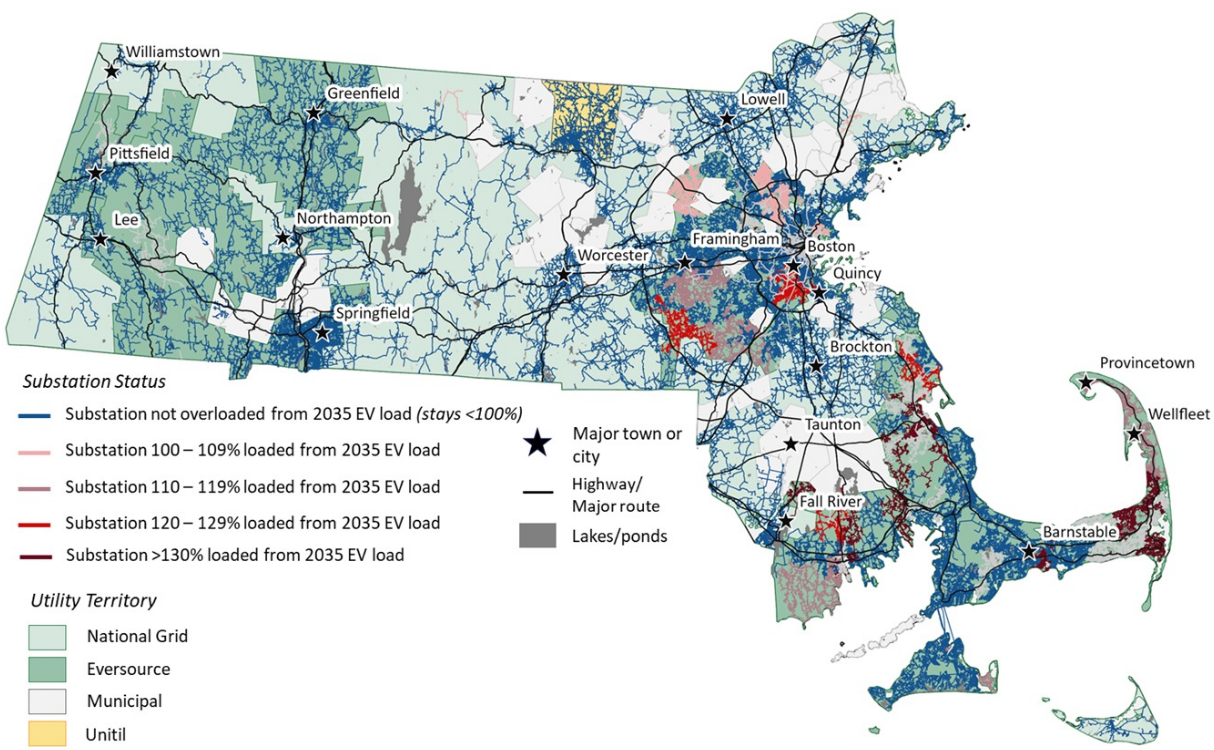


Figure 5.11. Scenario 4 – Technical potential 2035 substation grid impact results



Environmental Justice Populations Grid Impact Case Study

Environmental Justice (EJ) populations[12] are a focus of the Second EVICC Assessment. Due to the multiple benefits of EV ownership including bill savings and reduction in local air pollution, EJ populations can often benefit the most from switching to an EV.

Despite comprising 50 percent of the Massachusetts' population, EJ communities host 70 percent of the state's distribution feeders (see Figures 5.12 and 5.13). These communities also bear a disproportionate share of system stress; 80 percent of overloaded feeders are located within EJ areas. While managed charging programs reduce the number of overloaded feeders statewide, their benefits are less pronounced in EJ communities, likely because these feeders serve a higher proportion of inflexible loads which are harder to shift through traditional managed charging strategies.

As shown in Table 5.5, the share of overloaded feeders in EJ areas increases under scenarios 3 and 4. This pattern suggests that feeders in EJ communities may be supporting a higher proportion of inflexible load types—such as public DC fast chargers serving both light-duty and medium-/heavy-duty EVs—limiting the effectiveness of managed charging interventions in these areas.

Table 5.5. Overloaded feeders in Environmental Justice populations (2035)

Overloaded Feeders	Scenario 1 – Unmanaged (MW)	Scenario 2 – Flat Charging (MW)	Scenario 3 – Status Quo (MW)	Scenario 4 – Technical Potential (MW)
Total	608	463	533	96
EJ communities	498	355	472	82
% in EJ communities	82%	77%	89%	85%

[12] Executive Office of Energy and Environmental Affairs – Office of Environmental Justice & Equity, 2025. Environmental Justice Populations in Massachusetts. Available at https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts

Figure 5.12. Scenario 1 – Unmanaged load 2035 grid impact results for EJ populations

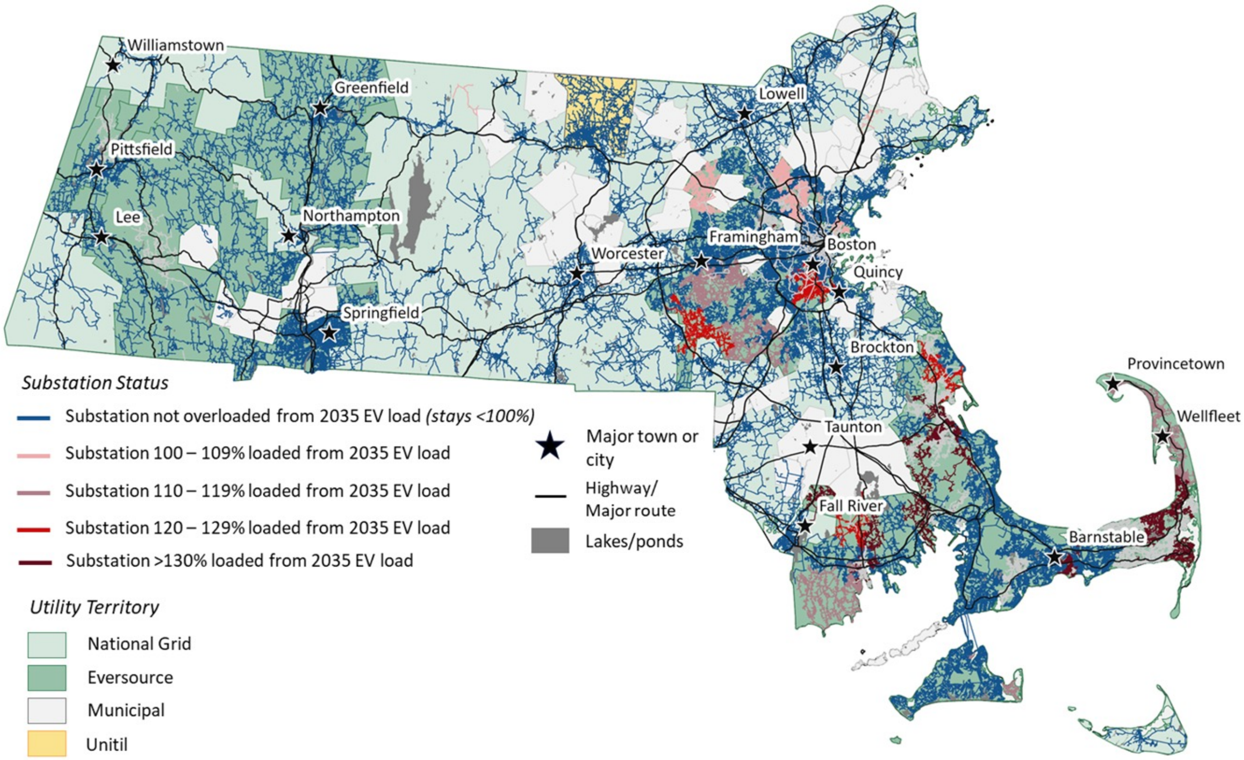
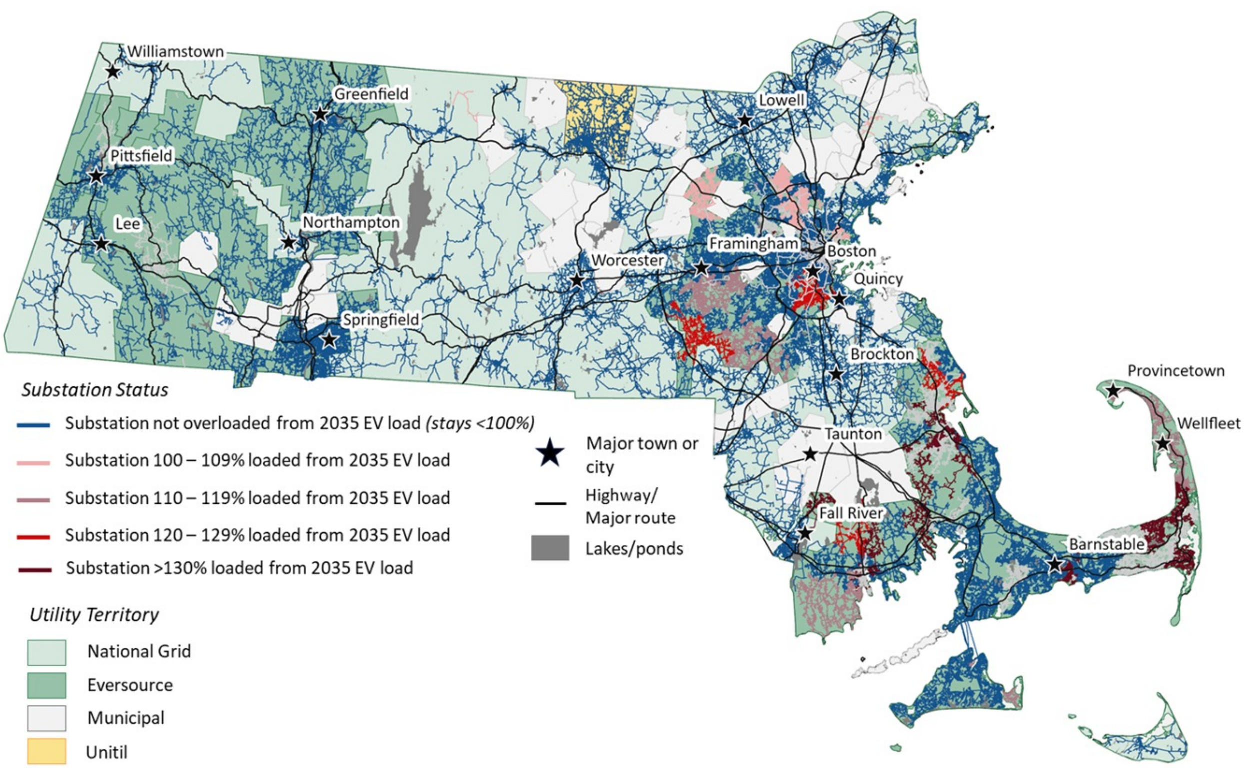


Figure 5.13. Scenario 4 – Technical potential 2035 grid impact results for EJ populations



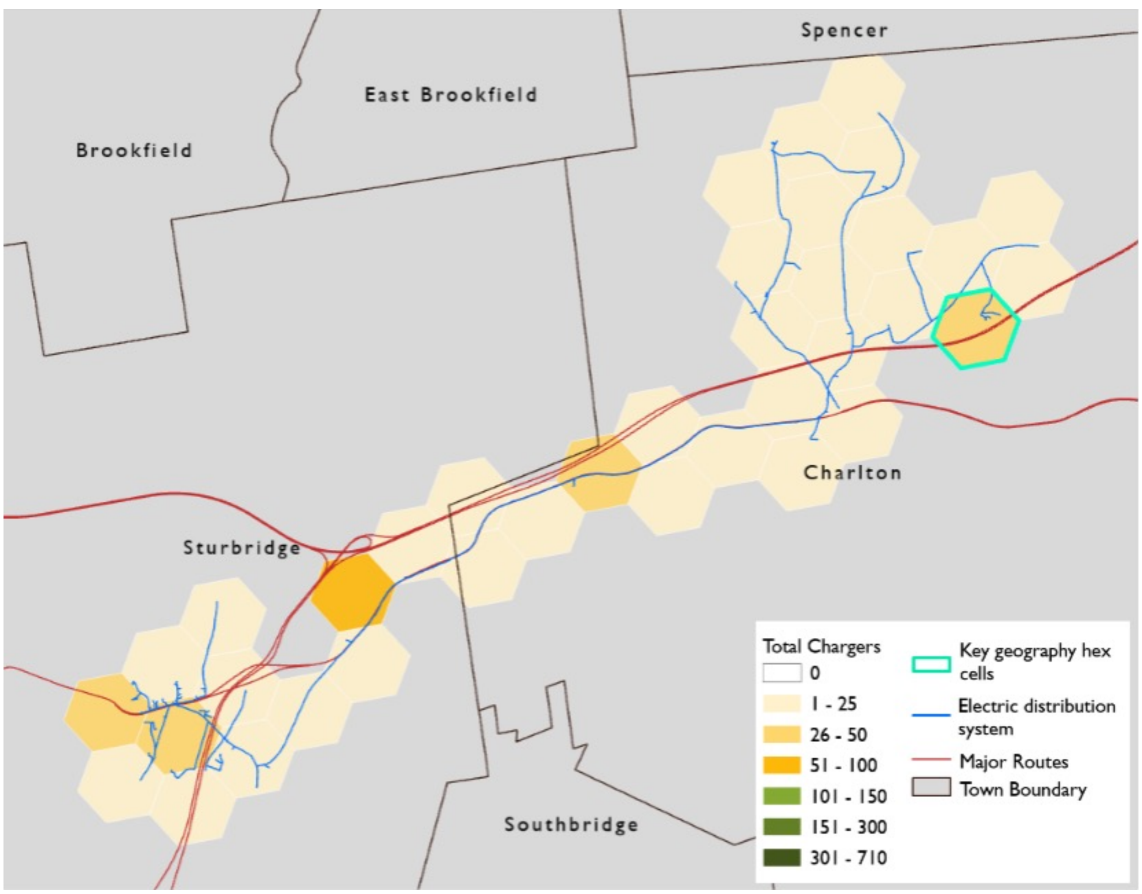
Key Geographies Case Studies

In a separate analysis using charger counts from the Initial EVICC Assessment, Synapse quantified 2030 grid impacts at six different types of key geographies across Massachusetts.[13,14]

Travel Corridors

At service plazas serving travel corridors, future EV load tends to be high, concentrated, and inflexible. For example, the Charlton rest plaza along Interstate-90 is expected to host a high number of DC fast chargers serving long-distance travel. Light-duty DC fast chargers alone could take up 27 percent of available feeder headroom (0.8 MW). When considering all chargers in the feeder area, the new EV demand could fill 86 percent of the remaining feeder headroom. Managed charging programs have limited effectiveness at the Charlton rest plaza, since DC fast charger load is considered inflexible. Figure 5.14 shows the Charlton rest plaza feeder and estimated future charger counts.

Figure 5.14. Charlton service plaza total charger count, 2030



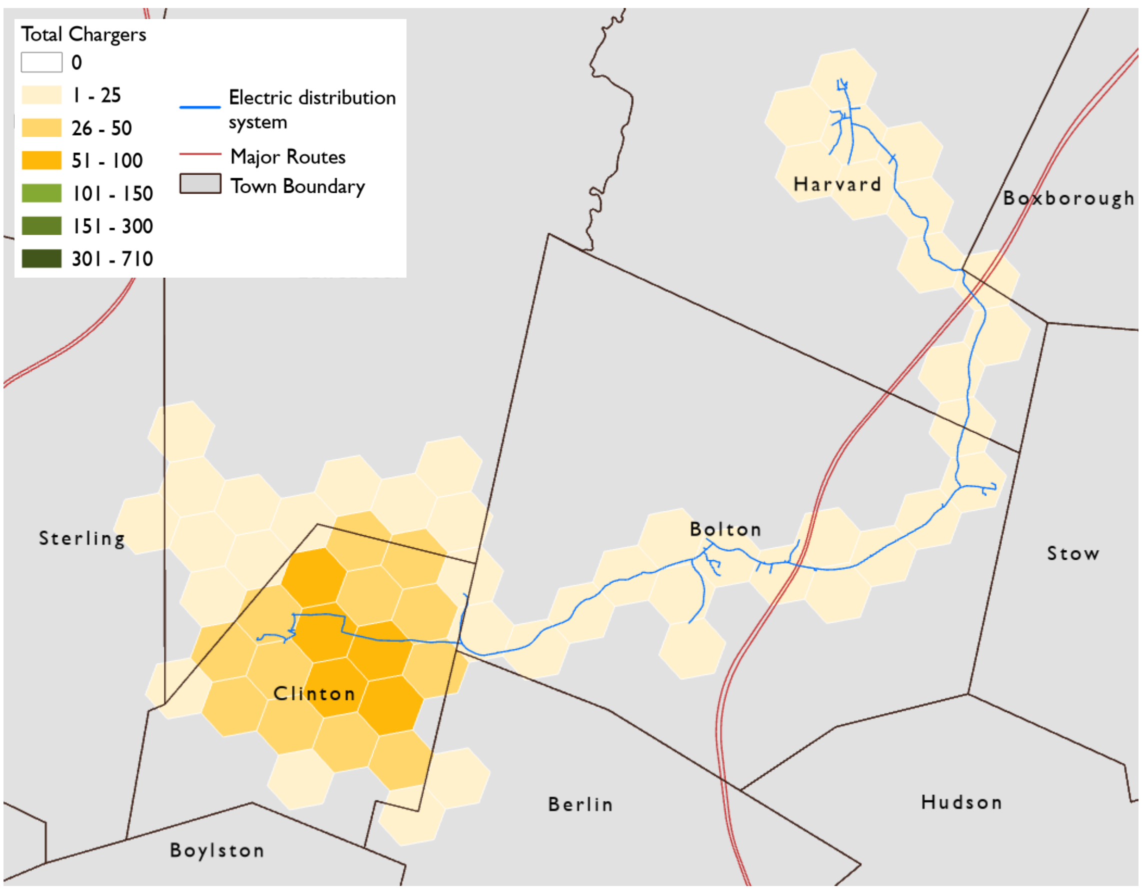
[13]Charger counts between the Initial EVICC Assessment and Second EVICC Assessment changed. The results from the case studies are from the Initial EVICC Assessment.

[14]To see the full presentation, visit https://www.mass.gov/doc/evicc-meeting-deck-april-2-2025/download

Rural Areas

About half of Massachusetts is considered rural.[15] In rural areas, there are fewer and more dispersed EV chargers, putting less stress on the distribution grid. For example, the town of Harvard is served by a National Grid feeder that extends to nearby towns of Bolton and Clinton (see Figure 15.5). There are over 600 chargers anticipated to connect to this feeder by 2030. Over 80 percent will be residential chargers. This feeder has a relatively high amount of headroom, roughly 5 MW. EV charging could occupy between 5 to 30 percent of the available headroom, depending on the level of charging management. The trend observed in Harvard is consistent across other rural areas of Massachusetts; rural feeders generally have more available headroom to accommodate future EV load. However, when rural areas experience grid constraints it can take longer for the constraint to be addressed.

Figure 5.15. Harvard total charger count, 2030

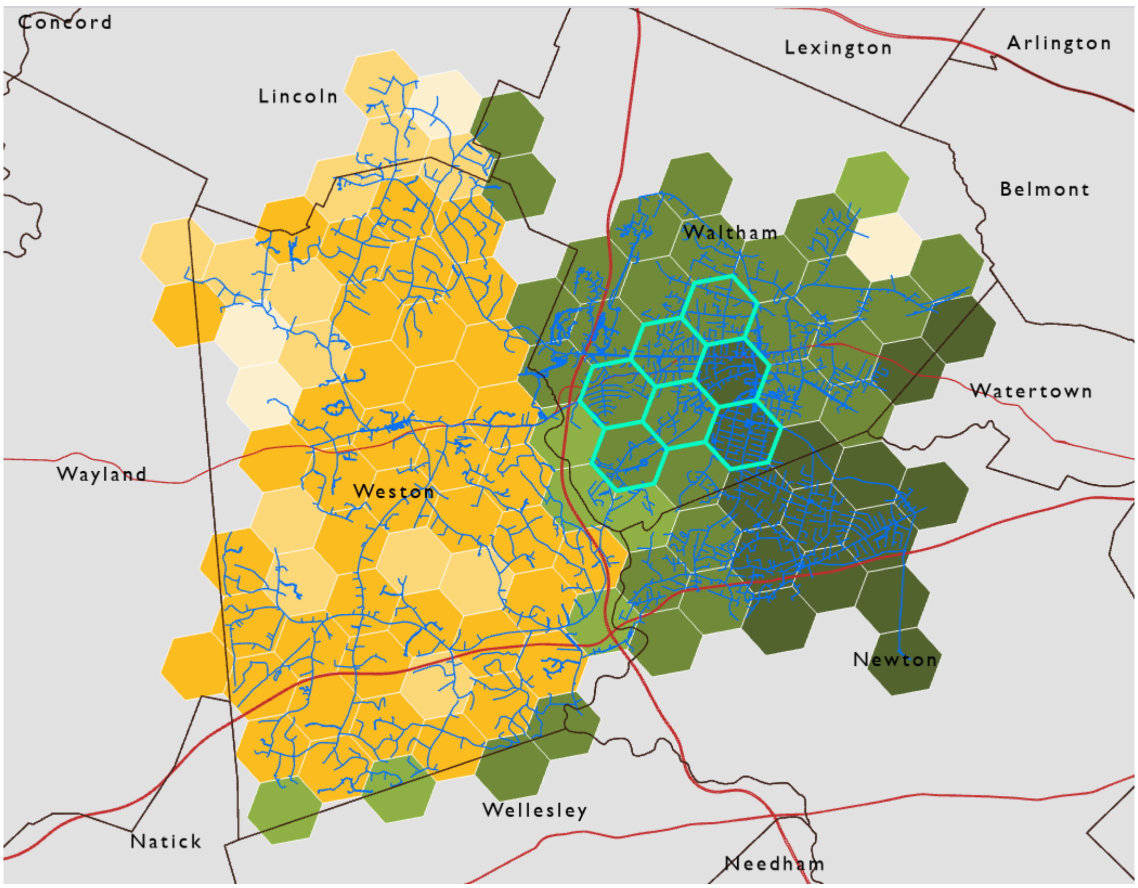


[15]Massachusetts Department of Public Health, 2017. Chapter 1 – Population Characteristics. Available at https://www.mass.gov/files/documents/2017/10/04/MDPH%202017%20SHA%20Chapter%201.pdf

Suburban Areas

In suburban areas, a single large substation tends to serve multiple towns. For example, the Boston suburb of Waltham is served by one substation, which also serves nearby Weston (see Figure 5.16). This substation could host up to 16,000 chargers by 2030, with most chargers being residential Level 1 and Level 2. If unmanaged, these chargers would overload the substation and take up over 130 percent of the available headroom. Under an advanced charging scenario, only 17 percent of available substation headroom would be used by new chargers during peak hours.

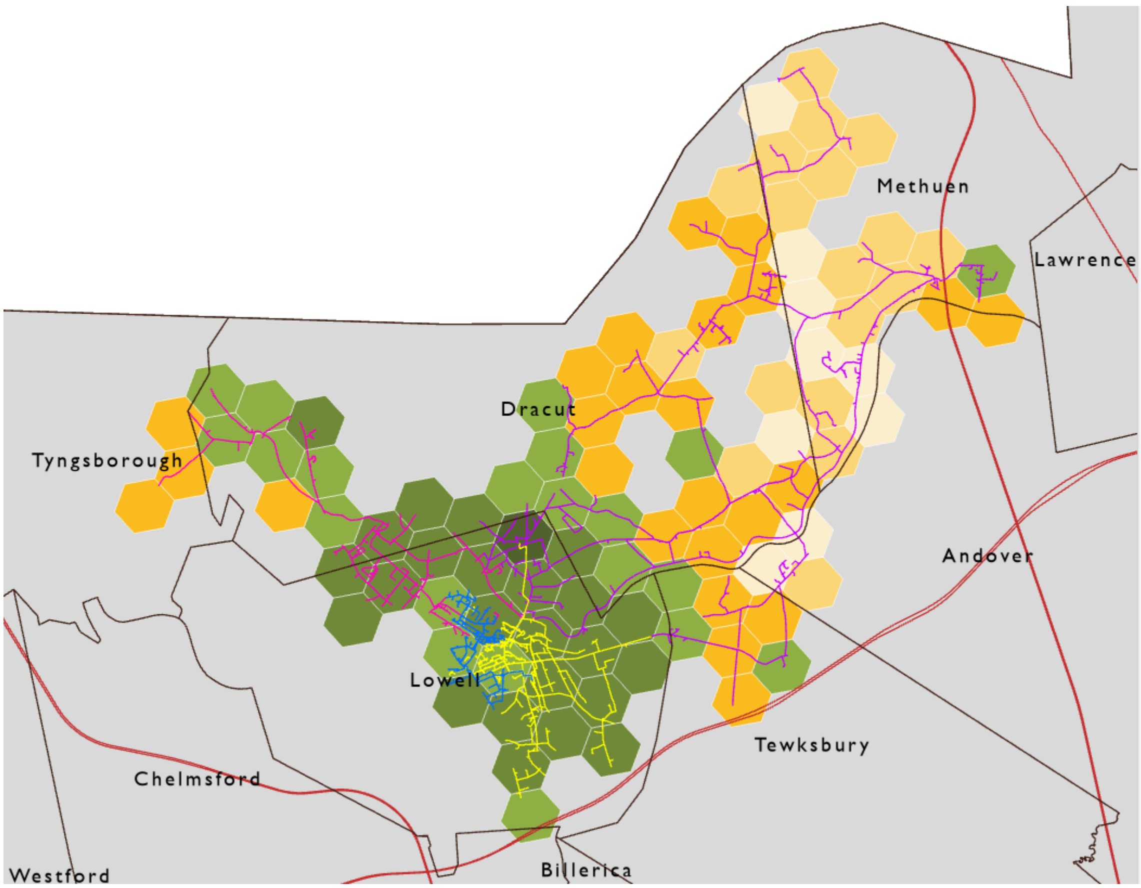
Figure 5.16. Waltham total charger count, 2030



Urban Areas

Multiple substations often serve a single urban area, as is the case with Lowell. More than four substations serve the city of Lowell and surrounding suburbs (see Figure 5.17). Together, these four substations are expected to host up to 10,600 chargers by 2030. Given the large amount of headroom on these substations, chargers are only expected to take up 20 percent of the cumulative available substation headroom.

Figure 5.17. Lowell total charger count, 2030



Addressing an overloaded distribution system

Utilities should engage in comprehensive planning to meet future electric vehicle load growth. This means using non-wires alternatives in tandem with physical grid upgrades for cost-effective and time-sensitive solutions to support EV charger buildout across the state.

When feasible and cost-effective, existing loads should first be reduced through demand side management programs, such as energy efficiency, managed charging programs, time-of-use rates, demand response, and distributed energy resources (DERs). For instance, DERs like solar photovoltaics and battery storage systems placed strategically to reduce grid impacts associated with large DC fast charger banks can help avoid grid upgrades on those feeders or substations. These solutions can usually be implemented on a faster timeline than upgrades to feeders and substations, which take between 2 to 10 years depending on the size of the upgrade, giving the utilities time to evaluate whether load could be reconfigured, phases could be balanced to shift unmanageable load, or if a traditional infrastructure upgrade is needed. If a traditional upgrade is needed, the utility would still evaluate how best to utilize these approaches to mitigate the size, cost, and timing of the grid upgrade and to ensure that the appropriate managed charging approach is deployed for that portion of the grid.

The first step in managing future EV load will be to take full advantage of alternative grid upgrades. However, feeder and substation grid upgrades will be inevitable and necessary in many locations, especially as EV penetration grows past the levels expected in 2035, and as electrification of other sectors puts more demands on the grid. Table 5 summarizes some of these distribution system upgrades. Multiple levels of grid upgrades exist, including reconfiguring existing feeder load, reconductoring existing lines, and promoting overloaded feeders to higher voltages. High EV load growth, especially paired with other non-EV electrification load, may require the construction of new feeders and substations.

Table 5.6. Solutions to Address Grid Impacts

Potential Solution	Description	Timeline	Relative cost
Reduce loads (EVs and buildings) on feeders	Use demand side management (e.g., energy efficiency, demand response, active load management) to reduce building and EV loads	varies	varies
Distributed battery storage and distributed solar	Battery solutions at the substation- ,feeder-level, or site-level to manage peaks (holistically planned with considerations of distributed solar)	varies	varies
Reconfigure feeder load	Shift load to neighboring feeders, where possible/feasible	3-8 months[16]	$
Balance phases	Redistribute load across single-phase lines (within three-phase lines) on the same circuit	3-12 months[8]	$
Reconductoring	Replace existing conductors with higher amperage cables	3-12 months[8], 10-14 months[17]	$$
Voltage conversion of feeders	Promote overloaded feeders to higher voltage (e.g. 4.16 kV to 13.2 kV feeders)	3-12 months[8]	$$
New feeder construction	Construct new distribution feeders	12-26 months[9]	$$$
Distribution substation upgrades	Upgrade substation transformers and other equipment as necessary to increase substation and feeder capacity	12-18 months[8], >24 months[9]	$$$
New distribution substation construction	Construct new substations	24-48 months[8,9]	$$$$

[16] Borlaug et al., 2021. Heavy-duty truck electrification and the impacts of depot charging on electricity distribution systems. Nature Energy. Available at https://doi.org/10.1038/s41560-021-00855-0

[17] Black & Veatch, 2022. 10 Steps to Build Sustainable Electric Fleets – Optimal Charging Networks Ensure Triple Bottom Line Benefits. Available at https://webassets.bv.com/2022-08/22CCx10StepsFleetEbook%20%281%29.pdf

Recommendations

Public Comments

Stakeholders have shared feedback about grid impacts and managed charging solutions at regular EVICC meetings, the Second Assessment public hearings, and through other engagement opportunities. A summary of those comments are included below.

- In general, grid constraints were considered a major barrier to charger deployment in rural areas, since infrastructure upgrades can be costly. Stakeholders expressed a need for more education and awareness for owner/operators around demand charges and either technological or programmatic innovations to reduce demand charge impacts.
- Feedback included calls for more widespread options for pairing EV charging with battery storage, particularly in EJ communities and rural areas, to potentially mitigate demand charges.
- For rural communities, EVSE supported by solar energy and battery storage was suggested as a solution for making rural charging more resilient in the face of more frequent grid outages.

A summary of comments provided during the public hearings on the Second EVICC Assessment are available on the EVICC website. Similarly, the minutes from prior EVICC public meetings can be found on the EVICC website.

EVICC Recommendations

EVICC recommends the following actions to address the key themes highlighted in this Chapter and to minimize the electric grid impacts of EV charging in the future.

- **Agency Action:** Explore novel incentive structures and customer engagement strategies, such as active managed charging or campaigns to increase participation rates in existing managed charging programs, in residential areas projected to face grid constraints by 2030 or 2035 with the objective of fully leveraging EV charging load management in these areas to avoid grid upgrades. (EDCs, DOER, and the EEA)
- **Agency Action:** Develop a long-term managed charging strategy, defining program benefits, cost-effectiveness metrics, and incentive structures, and integrating lessons from pilot projects into broader implementation. Such strategy should include relevant metrics that provide meaningful insight into their progress in developing and implementing the comprehensive strategy. (EDCs, DPU, as appropriate, DOER, and EEA)
- **Agency Action:** Incorporate anticipated load reductions resulting from managed charging programs into distribution system planning efforts and plans. (DPU, as appropriate, DOER, EEA, and the EDCs)

- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV load management planning and vehicle-to-everything (V2X) load dispatch capabilities. (DPU, as appropriate, DOER, MassCEC, EEA, and the EDCs)
- **Agency Action:** Create a planning framework for integrating EV infrastructure projections into electric distribution system planning through the requirements outlined in Section 103 of the 2024 Climate Act, including identifying potential grid constraints that may be caused by transportation electrification in 2030 and 2035 for further investigation by the EDCs. (EEA, DOER, DPU, as appropriate, and the EDCs)
- **Agency Action:** Assess grid resilience and infrastructure needs for EVs, before, during, and after major weather events and other emergencies, identifying key reliability gaps and backup power solutions to inform future planning. (EVICC and emergency management agencies)
- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV charger interconnection processes and transportation electrification inputs and strategies for the next Clean Energy and Climate Plan (CECP). (EEA, DPU, as appropriate, DOER, MassDEP, MassCEC, and the EDCs)

Consumer Charging Experience

EVs are rapidly gaining popularity among consumers. More than 35,000 new EVs (including PHEVs) were newly registered in Massachusetts in 2024, bringing the total EVs registered in the state to nearly 140,000.[1] Despite the growing popularity of EVs, consumers remain anxious about charging access and reliability. Addressing these concerns is critical to continued satisfaction of EV users and growth of the EV user community.

This section describes key consumer considerations related to EV charging, summarizes available resources, and details current and proposed charger reliability, registration, data sharing, and operational standards that will facilitate a smooth charging experience as the number of EV consumers continues to grow.

User Experience Objectives

Positive consumer experience with EV charging infrastructure is key for all stakeholders. A successful EV charging network experience considers the complementary stakeholder needs:

- For **drivers**, an accessible, reliable, and seamless charging process enhances satisfaction and encourages EV adoption. Complicated interfaces or unreliable services can deter potential users.
- For **station owners**, positive user experiences attract repeat customers and build brand loyalty, potentially increasing revenue.
- For **policy makers**, ensuring accessible and user-friendly charging supports adoption goals by promoting EV usage.

Summary of Existing Consumer Resources

A host of resources exist to help consumers navigate the EV charging experience. These resources take many forms and work to facilitate the consumer's experience of finding functional, well-maintained charging stations, understanding charger availability, and incorporating charging stops into route planning. The broad categories of consumer resources are detailed in Table X.

[1] Massachusetts Executive Office of Energy and Environmental Affairs. "2024 Massachusetts Climate Report Card – Transportation Decarbonization." Mass.gov. Accessed May 22, 2025. https://www.mass.gov/info-details/2024-massachusetts-climate-report-card-transportation-decarbonization.

Table X. Consumer Resources for Understanding and Utilizing EV Charging Networks

Resource	Description	Examples
Charging Network Apps	Provide real-time information on charger locations, availability, and user reviews.	PlugShare, ChargePoint
Navigation System Integration	Enables seamless route planning with charging stops.	Tesla, Google Maps, Apple Maps
Subscription Services	Offer discounted rates and exclusive access to networks.	Electrify America Pass
Customer Support Lines	Provide assistance for technical issues or billing questions.	MassCEC Support Line
Education Materials	Help new EV drivers understand charging processes and options. Examples include how-to guides, tutorials, etc.	MassCEC Clean Energy Lives Here webpage Green Energy Consumer's Alliance Drive Green Webpage

Government Resources and Incentives Information

The Massachusetts Clean Energy Center is developing comprehensive information hub webpages that aim to accelerate EV adoption amongst residential customers, commercial entities, dealerships, and MLP communities. The webpages will include rebate and incentive information and will offer a customer support line for navigating purchasing and equipment decisions. The full set of resource webpages will include resources for the following audiences:

- Residential Consumers (webpage is live as of Spring 2025)
- Commercial and Private Entities (to be published at a future date)
- Vehicle Dealers (to be published at a future date)
- Municipal Light Plant Residents (to be published at a future date)

EVICC Resource Guides

The EVICC Technical Committee has also created an EV Charging Station Owner-Operator Resource Guide, which provides guidance for owner-operators of public Level 2 charging stations on setting EV charging rates to deliver optimal usage and a positive customer experience. The Guide also includes a supplemental document on determining an appropriate energy-based charging fee, which provides an example calculation for setting fair and sustainable energy-based fees for EV charging stations.

In partnership with the Executive Office of Environmental Justice and Equity, EVICC has also developed a Guide to the Equitable Siting of Electric Vehicle Charging Stations in EJ Populations, to steer equitable and accessible EV charging infrastructure in EJ communities across the commonwealth.

EVICC plans to develop additional resource guides for various audiences in the future, including expanding the Charging Station Owner-Operator Resource Guide to encompass direct current fast charge (DCFC) chargers.

Key Consumer Experience Considerations

The resources described above facilitate the EV user's charging experience, however, many real-world factors influence consumers' EV charging network experiences and must be considered in programming and policy decisions. The following are concerns consistently shared by stakeholders during meetings and Public Hearings conducted for the Second EVICC Assessment.

Reliability

Charger reliability is perceived as a major barrier to EV adoption and many stakeholders raise reliability regulations as a key solution for improving consumers' charging experiences. A charger's hardware components (ports, cables, and connectors), charging software (port interfaces, applications, and payment systems), and charging network must all be functioning properly to maintain reliable service. These factors are represented through 'uptime' measures, which calculate the percentage of time that an EV charging station is functioning such that a driver can arrive, connect their vehicle, and successfully charge. In order to accurately track charger reliability, EVICC is tasked with developing reliability regulations for EV charging stations,[2] which will include definitions and standards for uptime. EVICC is in the process of developing these regulations in 2025, with input from EVICC members and the Technical Committee. The EVICC Technical Committee includes OEMs, some of which track uptime internally and/or have experience reporting data from individual chargers to customers and regulators. Current OEM data and functionalities and the reliability standards required for NEVI, which came into effect March 30, 2023 and include a 97% uptime requirement,[3] will be used to inform the development of reliability standards.

Data Sharing

Consumers pointed to data sharing and interoperability requirements as a consideration when opting to drive an EV, citing the number of apps currently required not only necessary to locate charging stations that are actually available. To maintain a reliable, efficient EV charging network that provides a positive customer experience, data from charging stations, utility systems, vehicles and payment programs must be integrated seamlessly and provided publicly, while also protecting customer privacy and commercially sensitive information. Additionally, Section 5 of the 2024 Climate Act

[2] An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 5, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[3] Federal Highway Administration, National Electric Vehicle Infrastructure Standards and Requirements, 88 Fed. Reg. 13450 (February 28, 2023), https://www.federalregister.gov/documents/2023/02/28/2023-03500/national-electric-vehicle-infrastructure-standards-and-requirements.

requires real-time data sharing, which will help improve customer charging experiences.[4] Vehicle and consumer data are currently aggregated through platforms such as Google, Apple Maps, and Plugshare to provide drivers with details of charger locations and availability. Data from charging stations is often aggregated by OEMs, but is not consistently shared outside of the company for a variety of reasons. However, while some charging data is shared through APIs—typically in periodic, automated updates—much of it remains siloed within OEMs, and status updates (including charger availability) may not be updated in real time due to technical or practical constraints within the OEMs or the platforms themselves. This fragmented approach results in inconsistent or incomplete information, leaving consumers to navigate a disjointed system.

Charger Registration

Part of ensuring charger reliability and being able to enforce reliability regulations is having a registry of chargers across the Commonwealth. Based on concerns about charger reliability, the 2023 EVICC Initial Assessment included a recommendation that the state pass legislation requiring publicly accessible charging stations to register with the Division of Standards (DOS) so that they can be regularly inspected by that agency. In February 2024, EVICC provided the Massachusetts Division of Standards (DOS) with American Rescue Plan Act (ARPA) funding to create the Electronic Vehicle (EV) Charger Testing Program, which will establish a uniform inspection and testing system for public EV charging stations.[5] Subsequently, the 2024 Climate Act included requirements of DOS related to EV charging, which include overseeing consumer protection measures such ensuring the accuracy of pricing and volumes of electricity purchased and minimum requirements for the communication and display of pricing information.

The 2024 Climate Act is a good first step towards ensuring charger registration as a vital consumer protection measure; however, more work is necessary to clarify DOS's role and to empower the division to make enforcement decisions.

Consumer Disclosure and Payment

User payment experiences at EV charging stations is varied, and was cited as a consumer frustration. Charging stations are generally privately owned, with each operator leveraging a different form of payment—ranging from proprietary apps to credit cards or "plug & charge" technology. EVICC currently provides an EV Charging Station Owner-Operator Resource for public Level 2 EV Charging Stations, with guidance about fees and policies and determining the best balance for maximizing use and customer satisfaction.[6] However, EVICC is aware of the strong public desire for a streamlined approach, with a preference for a traditional gas pump station approach, where customers pay with a credit card at a charging station. Beyond the resource, this preference could be incorporated into requirements for station owners receiving state or utility resources or the future regulations developed by DOS.

[4] An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 5, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[5] Massachusetts Executive Office of Energy and Environmental Affairs, "Healey-Driscoll Administration Announces $50 Million Investment in Electric Vehicle Charging Infrastructure," Mass.gov, February 7, 2024, https://www.mass.gov/news/healey-driscoll-administration-announces-50-million-investment-in-electric-vehicle-charging-infrastructure.

[6] Massachusetts Executive Office of Energy and Environmental Affairs, Electric Vehicle (EV) Charging Station Owner/Operator Resource: Public Level 2 EV Charging Station Fees and Policies Guide, accessed May 22, 2025, https://www.mass.gov/doc/electric-vehicle-ev-charging-station-owner-operator-resource-public-level-2-ev-charging-station-fees-and-policies-guide/download.

Operational Standards

Setting clear operational standards is key for improving EV consumer experience, particularly given ongoing challenges with charger interoperability. These challenges arise due to variations in both charger types and vehicle connector standards. There are three main types of EV Chargers: Level 1 chargers use a standard 120-volt household outlet and are typically used for overnight charging. Level 2 chargers operate at 208 to 240 volts and are common in public and residential charging scenarios. Their charging speed can vary based on electrical capacity and grid conditions. Level 3 chargers, also known as DCFC, offer the fastest charging speeds but require vehicles to have compatible DC charging inlets.

Connector types further complicate the landscape. Most non-Tesla vehicles use the J1772 connector for Level 1 and Level 2 AC charging, while Combined Charging System (CCS) and CHAdeMO are used for DCFC, although CHAdeMO is being phased out. Tesla uses the North American Charging Standard (NACS), though most manufacturers are not transitioning to NACS for standardization. The NEVI final rule, implemented March 30, 2023, establishes interoperability requirements for charger-to-EV communication, charger-to-charger network communication, and charging network-to-charging network communication to ensure that chargers are capable of the communication necessary to perform smart charge.

Other Consumer Protections

Public feedback included concerns about EV charger engagement experience for individuals with disabilities. ADA space considerations for charging units is important and the USDOT has recommendations[7] for ADA compliance for EV charging spots, this is not yet incorporated into federal regulations. Space considerations - width and length of parking spaces must be considered in addition to ensuring accessibility from various points on the vehicle as charging port location varies significantly by vehicle model. Additionally, MassEVIP requires ADA accessibility standards, such as parking spaces of 20 feet long and other specifications to be met.[8] Legislation in the State of California requires at least one van-accessible charger in all locations where new chargers are installed.[9]

Consumer access to information about EV chargers outside of an application or their vehicle is also part of the EV charging experience. While driving, consumers should not be navigating apps on their phone or screens in their vehicle to find the nearest charging station. Roadway signs directing drivers to EV chargers are not common. Similarly, upon arriving at a charging station, accessing information about charging fees and pricing structure is not clearly labeled, so consumers must navigate a new payment platform to charge their vehicle. Improving these “offline” experiences of roadway signs and charger fee information will improve the EV charging experience for consumers and can be considered by the EVICC.

[7] U.S. Access Board, Design Recommendations for Accessible Electric Vehicle Charging Stations, last modified July 17, 2023, accessed May 22, 2025, https://www.access-board.gov/tad/ev/.

[8] Massachusetts Department of Environmental Protection, MassEVIP Public Access Charging Requirements, accessed May 22, 2025, https://www.mass.gov/doc/massevip-public-access-charging-requirements/download.

[9] California Department of General Services, California Electric Vehicle Charging Station Accessibility Regulations, 2020, https://scag.ca.gov/sites/main/files/file-attachments/tt031020_californiaevcsaccessibilityregulations.pdf.

It is critical to account for these broad consumer considerations as EV charging network standards are developed at the state and national levels. The next section describes current and proposed charger reliability, registration, data sharing, and operational standards.

Current Reliability, Registration, Data Sharing, and Operational Best Practices

Ensuring a reliable, accessible, and user friendly EV Charging experience depends on a strong foundation of operational best practices. The following best practices outline how the industry can improve charger performance, transparency, and consumer trust.

Overview of Best Practices

Real-time status reporting: Charging Network Providers should report real time operational status via Application Programming Interface (API) or on a centralized platform.

*Uptime Requirements: I*ndustry leaders have adopted minimum uptime standards to ensure consistent service availability (For instance, NEVI's 97% uptime requirement). While this is generally for Level 3 or DC Fast chargers, Level 2 stations would also benefit from adopting uptime requirements in the future.

Standardized Protocols: The Open Charge Point Protocol (OCPP) exists to standardize communication between charging station hardware and the network or back-end system. If networks don't properly adhere to the protocol, Electric Vehicle Supply Equipment (EVSE) may have communication issues with the back end or payment systems, remote diagnostics may be hindered, and the stations may be vulnerable to security breaches. Further, EVSE that adhere to the protocol can more easily change their Charging Network Provider (e.g. Enel-X recently ceased operation and rendered all of their EVSE units US inoperable as they did not follow OCPP protocols and a new network was unable to be installed).

Automated Fault Detection and Repair: Charging Network Providers are increasingly implementing automated diagnostics to detect faults, attempt remote repair and reset of the station, and escalate maintenance which reduces downtime and the need for some manual intervention.

Summary of Current Legislative and Regulatory Requirements

A patchwork of legislative and regulatory requirements for EV charging operational requirements exist at the federal and state levels. This section summarizes information at the national level and within Massachusetts, and presents a summary of key actions in other states.

Massachusetts State-Level: A number of legislative actions have been taken and subsequent regulatory processes are underway to improve EV charging network availability and reliability, and these efforts are summarized below.

EV Charger Utilization, Reliability, and Data Sharing Regulations (Sections 5 and 110 of Chapter 239 of the Acts of 2024): Section 5 of Chapter 239 of the Acts of 2024, as it relates to EV charging, aims to improve the performance, transparency, and equity of EV Charging Infrastructure across the state. Mandatory regulations of the section include a mandate that the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) promulgates regulations to monitor charger utilization, set minimum standards for charger reliability, identify equity disparities in charger reliability by geography or income, and require real-time data sharing via APIs for publicly funded and available charging stations. Section 110 establishes the regulatory implementation timeline.

EV Charger Inventory and Accuracy Standards (Sections 42 and 110 of Chapter 239 of the Acts of 2024): Section 42 tasks the Division of Standards with ensuring the pricing accuracy and the volume of electricity sold to consumers at EV charging stations stations, setting minimum standards for how pricing must be communicated, and report on these items annually to the Joint Committee on Ways and Means and the Joint Committee on Telecommunications, Utilities, and Energy, Secretary of Energy and Environmental Affairs, and Secretary of Administration and Finance.

Public charger disclosure requirement (M.G.L. Chapter 25A § 16): MGL Chapter 25A Subsection 16 establishes consumer access, payment transparency, and data disclosure requirements for public EVSE in Massachusetts. Key provisions include a prohibition on mandatory subscriptions to use a public EVSE, payment options accessible to the general public, public access, allows non-EV business to restrict charger use to customers or visitors, required public data reporting, and allows for utility ownership of EVSE, subject to Massachusetts Department of Public Utilities (DPU) approval.

DPU Dockets D.P.U. 21-90; D.P.U. 21-91; D.P.U. 21-92: In December 2022, the Massachusetts Department of Public Utilities (DPU) approved electric vehicle infrastructure programs for Eversource, National Grid, and Unitil.[10] As part of these programs, the DPU requires each utility to submit annual reports detailing EV charger utilization data. These reports must include metrics such as total annual charging events per port, average duration of charging events, and kWh dispensed. Additionally, the utilities are mandated to follow a joint statewide program evaluation plan, ensuring standardized data collection and reporting across all service territories.[11]

Overview of draft regulations and status of regulatory process: As part of its broader EV infrastructure strategy, Massachusetts is in the process of drafting a statewide EV charger reliability framework. These proposed regulations aim to standardize charger uptime, utilization reporting, and real-time data sharing for publicly accessible chargers across the Commonwealth.

EEA and its agencies are working with EVICC members, OEMs, and stakeholders through the EVICC Technical Committee to determine the appropriate scope and timing of the regulations

[10] Massachusetts Department of Public Utilities, "Electric Vehicles Filings and Reports," Mass.gov, accessed May 22, 2025, https://www.mass.gov/info-details/electric-vehicles-filings-and-reports.

[11] Massachusetts Electric Company and Nantucket Electric Company, Phase 1 EV Charging Station Program Evaluation: Program Year 4 Evaluation Report, May 9, 2023, https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/17450128.

prior to the formal regulatory process. EEA is currently contemplating applying the reliability standards, utilization reporting, and real-time data reporting requirements to all networked and publicly accessible DCFCs installed after June 1, 2026 if publicly funded or 365 days after the Division of Standards begins registering EV chargers. The requirements would also apply to all networked Level 2 chargers that are publicly accessible or located at a workplace or multifamily building 365 days after the Division of Standards begins registering EV chargers. The regulations would exclude chargers located at 1-4 unit residential buildings and chargers that secured funding prior to the regulation's promulgation. Principal reliability standards include a minimum uptime requirement of 97% for all chargers and a Successful Charge Attempt Rate (SCAR) of 90% minimum for DCFCs. Real-time Data Sharing and Utilization reporting are also required for all covered chargers.

Reliability requirements are sparse and vague for the myriad funding sources available for EV charging and infrastructure. Programs such as the Massachusetts Electric Vehicle Infrastructure Program (EVIP)[12] administered by the Massachusetts Department of Environmental Protection requires the use of networked charging stations with remote monitoring capabilities and that the stations must be operated and maintained for three full consecutive years. The Leading by Example Fleet EV Charging Deployment[13] program does not require networked charging stations, and the Utility-Sponsored Make Ready Programs by Eversource[14] and National Grid[15] do not specify reliability or performance requirements beyond remote monitoring, real-time status reporting, and a commitment to maintaining the chargers in working condition for four years.

Other States: California regulations on reporting, utilization, and reliability requirements:

California has proposed one of the nation's most comprehensive regulatory frameworks for EV charger performance through a combination of regulatory proposals and legislative mandates.

The California Energy Commission (CEC) has been tasked with developing regulations to track the number, location, and usage of all networked chargers installed using public or ratepayer funds, excluding those located at single family homes or multiunit dwellings with four or fewer units. These proposed regulations establish a 97% uptime requirement aligning with NEVI standards, and include mandates for data transparency, reliability reporting, and consumer access provisions.[16]

New York Level 3 incentive program[17] reliability requirements tie incentive payouts to verified

[12]Massachusetts Department of Environmental Protection, "Apply for MassEVIP Fleets Incentives," Mass.gov, accessed May 22, 2025, https://www.mass.gov/how-to/apply-for-massevip-fleets-incentives.

[13]Massachusetts Department of Energy Resources, "Fleet EV Charging Deployment Grant Program 2.0," Mass.gov, accessed May 22, 2025, https://www.mass.gov/info-details/fleet-ev-charging-deployment-grant-program-20.

[14]Eversource, "Massachusetts EV Charging Rebate Application Process," Eversource, accessed May 22, 2025, https://www.eversource.com/content/residential/save-money-energy/clean-energy-options/electric-vehicles/charging-stations/massachusetts-ev-rebate-process.

[15]National Grid, "Massachusetts Programs & Rebates," National Grid, accessed May 22, 2025, https://www.nationalgridus.com/electric-vehicle-hub/Programs/Massachusetts/.

[16]California Energy Commission, Tracking and Improving Reliability of California's Electric Vehicle Chargers: Regulations for Improved Electric Vehicle Charger Recordkeeping and Reporting, Reliability, and Data Sharing, CEC-600-2023-055, 2023, https://www.energy.ca.gov/publications/2023/tracking-and-improving-reliability-californias-electric-vehicle-chargers.

[17]California Energy Commission, "Docket Log: 22-EVI-04 – Electric Vehicle Charging Infrastructure Reliability," accessed May 22, 2025, https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=22-EVI-04.

uptime and require charging station operators to provide both utilization data and maintenance logs.

Federal-level: The NEVI Formula Program,[18] administered by the Federal Highway Administration (FHWA) provides funding to states to strategically deploy EV Charging infrastructure and establish an interconnected network to facilitate collection, access, and reliability. Key program requirements related to operation include long-term EVSE data sharing, proper operation and maintenance, support open-access payment methods, publicly available, located along designated Alternative Fuel Corridors.

Relevant reliability requirements for NEVI include maintaining at least 97% uptime per charging port over a 12-month period, remote monitoring with real-time status tracking, automated alerts triggered by faults or failures and requiring prompt corrective action. NEVI-funded stations must also share real-time charger status, pricing, availability and location data shared to third-party applications and platforms via APIs. Penalties for non-compliance include withholding or clawback of NEVI funds, disqualification from future funding rounds, and public reporting of non-compliant operators or stations.

[18] New York State Energy Research and Development Authority, "Charging Station Programs," NYSERDA, accessed May 22, 2025, https://www.nyserda.ny.gov/All-Programs/Charging-Station-Programs.

[19] Federal Highway Administration, "National Electric Vehicle Infrastructure Formula Program," U.S. Department of Transportation, accessed May 22, 2025, https://www.fhwa.dot.gov/infrastructure-investment-and-jobs-act/nevi_formula_program.cfm.

EV Charging Technology and Business Model Innovation

As EV adoption accelerates, there is a growing need for innovative charging technologies and sustainable business models. There are significant opportunities for growth, but also challenges in financing, deployment, and long-term viability of EV charging business models.

This section explores the range of current and emerging EV charging business models, including their benefits and barriers; highlights novel technologies reshaping the user experience and grid interaction; examines common challenges facing the sector; and offers actionable recommendations to support continued innovation and scalability.

Private Funding versus Private Chargers

The use of the term "private" can be confusing in the context of EV charging, as it is used to describe both who has access to an EV charger and how the deployment of an EV charger is funded.

"Private chargers" refers to EV chargers that are only available for specific individuals or EVs. It is the opposite of publicly accessible EV chargers, or "public chargers", which are open to all members of the public. There are degrees between "public" and "private" chargers, notably workplace and multi-unit dwelling chargers which may be used by large numbers of individuals, despite not being open to the public, or, conversely, may be open to the public, but only nominally "publicly accessible" due to its location or other barriers.

"Private funding" refers to private investment used to install, operate, and/or maintain EV chargers. This is the opposite of "public funding", which generally refers to funds derived from state or federal sources or charges to utility customers. All chargers utilize private funding to some degree and, as discussed in Chapter 4, most public EV chargers receive public funding. This Chapter explores, in part, ways to further leverage private funding to deploy EV chargers.

EV Charging Business Models Overview

As the EV charging industry grows, diverse business models have emerged to meet varying needs across the public and private sectors. These models balance financial risk, site host control, user experience, and network scalability in different ways, each presenting its own advantages and limitations. Table X below summarizes key EV charging business models in Massachusetts and beyond, highlighting how they operate, their defining features, and real-world examples that illustrate their application.

Table 7.1. Overview of EV Charging Business Models

Model	Description	Key Attributes	Real-World Example
Host-Owned	Property owners manage stations for customers or employees.	On-site control of access/pricing; Promotes loyalty/sustainability; Owner handles operations and maintenance (O&M) or outsources software management	99 Restaurants (MA locations)
Public Ownership	Government-funded installation and operations; public access.	Equity-focused placement; Supports municipal EV goals; Located in public/community spaces	Recharge Boston (City of Boston EV charging program)
Utility-Owned	Utilities install, own, and operate stations (MLPs only in MA).	Utility manages O&M; Demand response/TOU pricing; Requires regulatory compliance	Concord Municipal Light Plant; Hingham Municipal Light Plant; Middleborough Gas & Electric
Charge Point Operator (CPO)	Private companies install and manage charging networks.	Flexible pricing models; Revenue from charging and subscriptions; Varying levels of control between site and operator	ChargePoint, Electrify America, Tesla
Franchise	Businesses operate under a larger brand's charging network.	Franchisee owns/operates stations; Branding and support from parent network; Revenue sharing may apply	EVgo at Simon Mall, Burlington, MA
Advertising & Sponsorship	Ad revenue funds free or discounted charging.	Free or low-cost for drivers; Depends on high-traffic sites; Strong marketing opportunity	Volta (Shell Recharge)
Charging as a Service (CaaS)	Subscription-based full-service charging model.	Turnkey solution for site hosts; Low upfront cost; Includes installation, maintenance, and operation	EV Connect

Benefits and Barriers of Current EV Charging Business Models

Current EV charging business models offer a range of approaches to infrastructure deployment and management. Host-owned and public ownership models provide localized control and promote community engagement. However, these models often require significant upfront investment and ongoing maintenance responsibilities. Utility-owned models can leverage existing grid infrastructure and expertise but may face regulatory hurdles. Charge Point Operators (CPOs) and franchise models enable rapid network expansion and brand consistency but may face challenges in coordinating responsibilities between site hosts and operators. Advertising and sponsorship models can subsidize user costs but depend heavily on high-traffic locations to attract advertisers. Charging as a Service (CaaS) offers turnkey solutions with minimal upfront costs for site hosts but may lead to concerns about long-term service quality and reliability.

Novel Business Models

As the electric vehicle market evolves, innovative business models are emerging to address the limitations of traditional charging infrastructure. These novel approaches aim to enhance flexibility, optimize energy usage, and improve accessibility for a broader range of users. By leveraging advancements in technology and adapting to consumer needs, these models offer promising solutions to accelerate the adoption of electric vehicles. Table 7.2 below summarizes novel EV charging business models.

Table 7.2. Overview of Novel EV Charging Business Models

Model	Description	Key Attributes	Real-World Example
Turnkey Solutions	Comprehensive services covering design, installation, operation, and maintenance of charging stations.	Single point of contact for all services; Minimal upfront investment for site hosts; Scalable solutions tailored to specific needs	Matcha provides end-to-end EV charging solutions, including site evaluation, permitting, installation, and ongoing maintenance.
Dynamic Pricing Strategies	Flexible pricing models that adjust rates based on demand, time of day, or energy costs.	Encourages off-peak charging; Optimizes grid usage; Potentially lowers costs for consumers	EVgo employs dynamic pricing to manage demand charges and optimize energy usage across its network. The Town of Concord does this for their utility-owned and operated network managed by Concord Municipal Light Plant (CMLP).
Mobile Charging Services	On-demand charging services delivered to vehicles at their location.	Provides charging solutions for users without fixed infrastructure; Enhances convenience for urban dwellers- Reduces range anxiety	SparkCharge offers mobile EV charging services in urban areas, delivering energy directly to parked vehicles.
Energy-as-a-Service (EaaS)	Subscription-based model providing energy solutions, including charging infrastructure and management.	Predictable monthly costs; Includes hardware, software, and maintenance- Aligns energy supply with demand through integrated services	SWTCH offers an energy-as-a-service (EaaS) model, also known as Charging-as-a-Service (CaaS), where they handle the hardware, installation, and maintenance of EV charging infrastructure in exchange for a monthly subscription fee.

Benefits and Barriers of Current EV Charging Business Models

Innovative EV charging business models present opportunities to enhance user convenience, optimize energy consumption, and expand infrastructure reach. Turnkey solutions simplify the deployment process for site hosts, while dynamic pricing strategies can balance grid load and reduce operational costs. Mobile charging services meet the needs of users without access to fixed charging stations, and Energy-as-a-Service models offer comprehensive solutions with predictable expenses. However, these models also face challenges, including regulatory complexities, technological integration hurdles, and the need for consumer education to ensure widespread adoption and trust in new systems.

Emerging EV Charging Technologies

As summarized in Table 7.3, rapid advancements in EV charging technologies are enhancing performance, efficiency, and accessibility. From cutting-edge batteries to AI-powered smart charging and renewable integration, these innovations are shaping the future of how, when, and where EVs can be charged.

Table 7.3. Emerging EV Charging Technologies

Model	Description	Key Attributes	Real-World Example
Battery Innovations	High-density, fast-charging batteries	CATL's Shenxing LFP battery (charges to 80% in 10 minutes)	99 Restaurants (MA locations)
Charging Technology Advances	Ultra-fast chargers, bidirectional charging, wireless charging	Tesla Supercharger V4, Wallbox Quasar (bidirectional), WiTricity	Recharge Boston (City of Boston EV charging program)
Customer Experience Enhancements	Mobile apps with station location, availability, and reservations	ChargePoint and Electrify America mobile apps	Concord Municipal Light Plant; Hingham Municipal Light Plant; Middleborough Gas & Electric
Smart Charging Solutions	Load balancing, demand response, AI optimization	Wevo Energy's AI-powered platform optimizes energy usage, reduces costs, and integrates with solar energy to provide smart charging solutions.	ChargePoint, Electrify America, Tesla
Storage Integration	Battery storage paired with charging stations	Tesla Megapack used in EV charging hubs	EVgo at Simon Mall, Burlington, MA
Renewable Energy Integration	Solar-powered EV charging stations	Electrify America's solar-powered stations in California and elsewhere, including using Beam solar-powered stations	Volta (Shell Recharge)
Charging as a Service (CaaS)	Subscription-based full-service charging model.	Turnkey solution for site hosts; Low upfront cost; Includes installation, maintenance, and operation	EV Connect

Key Concerns and Solutions for EV Charging Business Models

As EV adoption accelerates, a range of challenges must be addressed to ensure the scalability, efficiency, and resilience of charging infrastructure. This section outlines common concerns facing current business models and presents actionable solutions to support a more robust and sustainable EV charging ecosystem.

Table 7.4. Concerns and Potential Solutions for EV Charging Business Models

Concerns	Challenges	Proposed Solutions
Infrastructure Costs	Expensive equipment and installation for high-capacity stations	Government grants, public-private partnerships, modular station designs
Energy Pricing	Variable electricity rates affecting profitability	Dynamic pricing, time-of-use tariffs, integration of renewable energy
Utilization Rates	Low usage can deter investment	Focus on high-demand locations, incentivize off-peak usage
Revenue Streams	Overreliance on charging fees, limited income diversification	Offer subscriptions, ads, retail collaborations, and ancillary services
Consumer Convenience	Long charging times and limited station availability	Deploy faster chargers, expand station coverage, improve payment and user experience
Interoperability	Compatibility issues across networks and vehicle types	Implement open standards, promote cross-network functionality
Grid Dependency	High energy demand strains local grids	Utilize energy storage, integrate solar, develop microgrids, utilize dynamic power sharing at the site level
Government Incentives	Uncertain long-term policy and funding availability	Align with government goals, target programs with stable funding
Technology Evolution	Rapid changes risk making infrastructure obsolete	Design modular systems that can evolve with tech advancements
Battery Advancements	Longer ranges reduce charging frequency	Invest in ultra-fast chargers and mobile/portable charging units
Sustainability	Growing pressure for carbon-neutral operations	Incorporate renewables and carbon offset initiatives
Cybersecurity	Networked systems are vulnerable to cyber threats	Strengthen cybersecurity protocols and maintain regular updates
Supply Chains	Shortages in key components like semiconductors	Diversify sourcing and boost domestic or regional manufacturing

Recommendations for EV Business Model Success

As Massachusetts scales up its EV infrastructure, a strategic approach is necessary to ensure the system is not only resilient and equitable, but also efficient and future-proof. The following recommendations provide a framework for state government leadership to strengthen the state's EV charging ecosystem by addressing financial, operational, and regulatory challenges while working with stakeholders. Each recommendation offers targeted steps that Massachusetts can take to lead in the transition to a clean transportation economy.

Partnerships

- Prioritize establishing public-private partnerships and grant programs
- Streamline permitting processes for joint ventures
- Offer matching funds or tax incentives for qualifying infrastructure projects

Pricing

- Encourage utilities and charging providers to adopt flexible pricing models by setting clear regulatory guidance, piloting pricing experiments, and educating consumers on rate benefits.
- While EVICC has developed resources and policies in this area, additional guidance on sustainable pricing models should be developed.

Data Management

A statewide effort to support interoperable data systems with accurate, real-time data would help track station usage, identify gaps, and respond to technical issues faster.

- Fund data infrastructure
- Set open data standards for charging operators
- Establish a centralized data portal for EV infrastructure analytics.

Enhanced Siting Efforts

- Develop mapping tools that identify high-potential locations
- Integrate EV charging into broader land-use planning
- Prioritize funding for projects located near high-traffic, mixed-use areas
- EVICC is releasing an EJ site guide for EV charging and will be developing more specific guidance resources on site best practices.

Standards and Policy Alignment

- Align policies and technical standards with neighboring states and federal guidelines to promote interoperability and attract investment
- Lead or join regional coordination efforts
- Support the adoption of national charging standards
- Streamline permitting and incentive programs to reduce administrative burden

Financing

Tools like green bonds, revolving loan funds, and community low interest financing models can unlock capital from both institutional and grassroots sources.

- Support legislation to authorize green bonds for EV projects
- Create public loan guarantee programs
- Launch public education campaigns on investment opportunities in clean transportation infrastructure

Recommendations

The consumer charging experience is critical to expanding EV use in the Commonwealth and meeting goals. The following recommendations should be considered by state leadership to improve the customer charging experience as EV adoption grows.

Reliability Standards

- Consumers need to access reliable chargers
- Adopt and enforce a minimum 97% uptime for all publicly funded and rate payer funded networked Level 2 and DCFC stations, in line with NEVI standards, with a 90% successful charge attempt rate for DCFCs.
  - EEA is actively working to realize this recommendation, while also working to minimize the compliance burden of such requirements.

Data Sharing

- Implement requirements around real-time data sharing from charging stations using open protocols OCPP and Open Charge Point Interface (OCPI).
- Additionally, the state can require, empower, or otherwise incentivize charging sites to collaborate with platforms such as Google, Waze, Apple Maps, and PlugShare to ensure that charger status, availability, and pricing are both visible and accurate.
  - EEA is actively working to realize this recommendation, in line with the 2024 Climate Act, including exploring ways to make data sharing easy for OEMs while protecting commercially sensitive information.

Charger Registration and Inventory

- Accessing chargers is impacted by an inconsistent inventory of available chargers.
- Enact policies to ensure all eligible chargers are registered and maintain an up to date statewide inventory of registered chargers to support enforcement and planning.
  - DOS is well positioned to support this recommendation with modifications to the existing legislative framework.

Consumer Disclosure and Payment

- In response to consumer concern about pricing structures, Massachusetts can require clear on-site pricing and signage, and set up policies to minimize or eliminate mandatory subscriptions.
  - DOS is well positioned to support portions of this recommendation with the right legislative framework.

Operational Standards

- The state can also provide Site Host guidance on charger types, interoperability, and maintenance best practices.
- Providing such resources and, where necessary and appropriate, setting operational standards through program requirements and regulations will help make the customer experience more uniform.

Summary of Recommendations

The Second EVICC Assessment represents an important next step towards building an equitable EV infrastructure for all Massachusetts residents. These biennial assessments offer the Commonwealth and transportation sector stakeholders a regular opportunity to evaluate Massachusetts' progress towards its transportation electrification goals and to refine its forecast of EV chargers and EV charging priorities.

Since the last EVICC Assessment, Massachusetts has made significant progress on the development of an equitable, interconnected, accessible, and reliable EV charging network. However, in the short-term, it is imperative that EV charger deployment continues to grow despite federal and market headwinds, improvements are made to the customer experience, and that private funding is further leveraged.
In the long-term, EV charger deployment will need to significantly increase in order to meet the Commonwealth's climate requirements.

This Assessment adopts a set of strategic actions, consisting of eight focus areas, to ensure that Massachusetts is well-positioned to continue Massachusetts' progress in deploying EV charging and to flexibility and effectively adapt to changing circumstances to ensure optimal transportation electrification outcomes:

1. Prioritizing Value

New and existing incentive programs designed to deploy EV charging will target the highest value charging opportunities, while also ensuring equitable deployment across the Commonwealth.

2. Enhancing Current Programs

Administrators of existing programs will work to improve the efficiency of and coordination between programs to enhance the customer experience and stretch current funding further.

3. Reducing Barriers

EVICC will develop additional resources, among other efforts, for municipalities and potential EV charging site hosts to address barriers to deployment.

4. Unlocking Private Funding

Massachusetts will leverage private industry and funding to a greater degree by, among other efforts, enabling new EV charging business models.

5. Improving Customer Experience

Massachusetts will develop and implement tangible solutions to improve the customer experience with EV charging, including through regulations to establish minimum reliability standards, consumer price and fee structure transparency, and charging station signage.

6. Minimizing Grid Impact

EVICC will work with the utilities to ensure that programs and technologies are deployed to minimize the need for electric grid upgrades to accommodate EV charging. These efforts should target the highest value opportunities and be incorporated into all proactive planning efforts.

7. Proactive Planning

EVICC will work with state agencies and stakeholders to execute on strategic, long-term planning efforts to ensure efficient EV charging infrastructure deployment, including through implementation of Section 103 of An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers (2024 Climate Act).

8. Sustainable Funding

EVICC will work with relevant stakeholders to explore funding models that leverage existing funding pathways and reduce the reliance on funding from electric utility customers in the long term.

The work of EVICC is ongoing with several near-term steps planned for late 2025, including starting implementation of the Section 103 process discussed in Chapter 5 and Appendix 8. EVICC also anticipates developing public resources, assisting in drafting charger reliability regulations, and beginning analysis for the next EVICC Assessment in short order.

EVICC looks forward to continuing to support the proliferation of EVs throughout the Commonwealth.

Recommended Actions

Specific recommended strategic actions for state agencies, the investor-owned electric utilities (or EDCs), and the General Court that align are included below. Recommednations for municipalities and private actors are not included. However, these groups are equally, if not more, important in realizing Massachusetts' EV charging goals as they will be responsible for deploying the charging infrastructure needed by the public.

Municipalities will have the particularly important role of ensuring that residents without off-street parking have access to EV charging in public spaces. Private businesses will be needed not only to take on the work of deploying chargers, but also in taking the financial risk that their investments in EV charging will be repaid through the revenue received from EV customers. The importance of private actors will only increase moving forward if federal funding sources are removed and as EV charging scales. The EV transition cannot happen without these groups. It is vital that EVICC and all state and regional governments prioritize ways to empower and partner with municipalities and private actors to realize the Commonwealth's transportation electrification benchmarks.

Prioritizing Impact

- **Agency Action:** Explore creation of an initiative focused on deploying fast charging stations along secondary corridors and areas along primary Alternative Fuel Corridors. These could also serve as fast-charging hubs for residential customers without off-street parking (EEA, MassDOT, DOER, MassDEP, and the EDCs)

- **Agency Action:** Develop an initiative to support MHD EV charging, by potentially establishing hubs near fleet depots and industrial zones and piloting MHD charger-sharing reservations paired. These approaches can be combined with other solutions and offerings to reduce common EV charging barriers. (EEA, DOER, MassDEP, and MassCEC)

- **Agency Action:** Establish partnerships with state, municipal, and stakeholder organizations to conduct tailored outreach and explore ways to package existing incentive programs to high value locations for EV charging infrastructure. These may include working with (i) grocery stores, (ii) big box stores, (iii) small businesses in city centers, (iv) popular destinations (e.g., hotels and resorts in the Berkshires and on Cape Cod), and (v) MHD fleets that could financially benefit from electrifying (e.g., last mile delivery and service industry vehicles).(EEA, MassDEP, DOER, and municipal governments)

Enhancing Current Programs

- **Agency Action:** Better align MassEVIP and the utility EV charger incentive programs by coordinating customer eligibility and program requirements to improve the customer experience and efficient disbursement of available funding. (MassDEP, EEA, DOER, and the EDCs)

- **Agency Action:** Improve public information on the status and future of existing incentive programs and customer communication on application status and other relevant information, as necessary and appropriate, with the objective of improving transparency and helping stakeholders plan future EV charging infrastructure deployment more effectively. (EEA, MassDEP, EEA, DOER, DPU, as appropriate, and the EDCs)

Reducing Barriers

- **Agency Action:** Collaborate with the legislature and relevant stakeholders to explore legislation standardizing local EV charger permitting, including model ordinances and enabling authority to reduce deployment delays across municipalities. (EEA and DOER)
- **Agency Action:** Create a Municipality Resource Committee that will meet on an ad hoc basis to support the development of resources targeted at reducing barriers for municipalities, potential EV charging site hosts, and other EV charging stakeholders similar to the Public Level 2 EV Charging Station Fees and Policies Guide. EEA will work with DOER's Green Communities Division and the Metropolitan Area Planning Council to identify potential members of the committee and others who can help review developed materials. (EEA, DOER, and MAPC)
- **Agency Action:** Create and maintain a public inventory of EV chargers in Massachusetts, to the greatest extent practically possible, to inform the bi-annual EVICC Assessment. This inventory will leverage existing data sources and future DOS registration processes. (EEA)
- **Agency Action:** Develop public awareness campaign to educate potential EV owners on the basics of EV charging to help overcome common barriers to EV adoption regarding a lack of awareness and understanding. (EEA and MassCEC)

Unlocking Private Funding

- **Agency Action:** Build on the success of the existing innovative EV charging infrastructure programs and ACT4All, Round 2 innovative charging projects by providing resources and lessons learned to help further unlock the potential of these business and technology models and looking for new opportunities to test and help scale other innovative business models. (MassCEC)
- **Agency Action:** Explore ways to further unlock the Charging-as-a-Service business model for publicly accessible charging. (EEA and MassCEC)

Improving Customer Experience

- **Legislative Action** (Continued from First Assessment): Renew efforts to pass comprehensive "right-to-charge" legislation by expanding on the 2024 Climate Act to include renters (EEA and DOER)
- **Legislative Action** (Continued from First Assessment): Expand consumer protection regulations for EV chargers by building on the 2024 Climate Act to allow the Division of Standards to enforce such regulations and to inspect the accuracy of pricing information through a charger registration process. (EEA and DOS)
- **Agency Action:** Implement a phased approach to regulating the reliability of fast and Level 2 charging, setting minimum uptime standards for fast chargers installed on or after June 1, 2026. Implementation of such regulations should seek to balance the dual objectives of improving the customer EV charging experience and making any new requirements as easy to understand and implement as possible. (EEA, DOER, MassDEP)
- **Agency Action:** Develop guidance on EV charging station and wayfinding signage. (EEA)
- **Agency Action:** Explore development of model local ordinances nd other approaches that allow municipalities , property owners, and other government entities to fine internal combustion engine vehicles for parking in EV charging parking spots, consistent with state law. (EEA and DOER)

Minimizing Grid Impacts

- **Agency Action:** Explore novel incentive structures and customer engagement strategies, such as active managed charging or campaigns to increase participation rates in existing managed charging programs, in residential areas projected to face grid constraints by 2030 or 2035 with the objective of fully leveraging EV charging load management in these areas to avoid grid upgrades. (EDCs, DOER, and the EEA)
- **Agency Action:** Develop a long-term managed charging strategy, defining program benefits, cost-effectiveness metrics, and incentive structures, and integrating lessons from pilot projects into broader implementation. Such strategy should include relevant metrics that provide meaningful insight into their progress in developing and implementing the comprehensive strategy. (EDCs, DPU, as appropriate, DOER, and EEA)
- **Agency Action:** Incorporate anticipated load reductions resulting from managed charging programs into distribution system planning efforts and plans. (DPU, as appropriate, DOER, EEA, and the EDCs)
- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV load management planning and vehicle-to-everything (V2X) load dispatch capabilities. (DPU, as appropriate, DOER, MassCEC, EEA, and the EDCs)

Proactive Planning

- **Agency Action:** Create a planning framework for integrating EV infrastructure projections into electric distribution system planning through the requirements outlined in Section 103 of the 2024 Climate Act, including identifying potential grid constraints that may be caused by transportation electrification in 2030 and 2035 for further investigation by the EDCs. (EEA, DOER, DPU, as appropriate, and the EDCs)
- **Agency Action:** Assess grid resilience and infrastructure needs EVs before, during, and after major weather events and other emergencies, identifying key reliability gaps and backup power solutions to inform future planning. (EVICC and emergency management agencies)
- **Agency Action:** Continue ongoing coordination to identify and execute next steps related to EV charger interconnection processes and transportation electrification inputs and strategies for the next Clean Energy and Climate Plan (CECP). (EEA, DPU, as appropriate, DOER, MassDEP, MassCEC, and the EDCs)

Sustainable Funding

- **Legislative Action:** Work with stakeholders and the legislature to explore sustainable, long-term models to fund EV charging initiatives that leverage existing funding pathways and reduce the reliance on funding from electric utility customers. (EEA)

Appendix 1. Summary of Progress Since the Initial Assessment

This Appendix provides an overview of the progress made to date on the recommendations included in the Initial EVICC Assessment. Chapter 8 of this Assessment proposes additional actions to further address these initial recommendations and/or to build on the progress made to date as necessary.

Recommendation	Progress
Recommended legislative actions	
Legislation should require publicly accessible EV chargers to register with the Division of Standards (DOS) so that they can be regularly inspected; DOS will develop new regulations to ensure that publicly accessible EV chargers are registered, inspected, and tested.	The 2024 Climate Act requires DOS to develop regulations to (1) inventory EV charging stations and (2) ensure the accuracy of pricing and volumes of electricity purchased at public EV chargers.[1] Separately, the Executive Office of Energy and Environmental Affairs (EEA) is required to develop regulations to (1) monitor EV charger utilization, (2) monitor EV charger reliability, and (3) require data sharing by public EV chargers.[2] DOS and EEA are currently developing regulations to address these requirements. More information on these efforts can be found in Chapter 6.
The Healey-Driscoll Administration will work with the legislature to pass "right to charge" legislation that will help tenants and people living in condominiums install charging infrastructure.	The 2024 Climate Act passed into law a "right to charge" rule that prohibits historic district commissions, neighborhood conservation commissions, and condominium or homeowners' associations from unreasonably restricting EV charger installations by property owners. In addition, the bill authorizes condo boards to install EV chargers on community parcels.[3]
The Department of Energy Resources (DOER) will work with the legislature to update appliance standards for EV chargers to the latest ENERGY STAR standards.	The 2024 Climate Act updated the appliance standards for EV chargers to the latest ENERGY STAR standard, Version 1.2. [4]
EEA, DOER, and DOS will coordinate with the legislature to ensure that there are no overlapping or contradictory provisions between existing language in G.L. c. 25A and any new legislation that is enacted to provide DOS with the requisite authority to carry out inspections of publicly available EV chargers.	The 2024 Climate Act requires DOS to promulgate regulations to inventory the number and location of charging stations.[5] This does not conflict with G.L. c. 25A, which requires owners and operators of public charging stations to register with the Department of Energy's Alternative Fuels Data Center.

[1]An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 42, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[2]An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 5, Acts of 2024 (Mass.), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[3]An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, §§ 85–86 (Mass. 2024), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[4]An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 30 (Mass. 2024), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

[5]An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 42 (Mass. 2024), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

Agency-specific recommendations	
DOER will work with municipalities to develop guidance and support for programs to expand curbside charging and overnight charging infrastructure for tenants and garage orphans. Executive branch agencies will focus the deployment of publicly available funds for environmental justice populations and into rural areas, with a particular focus on reaching low-income residents, to ensure that the transition to electric vehicles is equitable.	EVICC provided the Massachusetts Clean Energy Center (MassCEC) with $11.2 million in American Rescue Plan Act (ARPA) funding to launch a new On-Street Charging Solutions Program to support municipalities in installing on-street charging and to develop a guidebook to equip all municipalities to successfully develop on-street charging programs. EVICC provided MassCEC with additional ARPA funding to launch several new programs that prioritize charger deployment in environmental justice and low-income communities. The On-Street Charging Solutions Program focuses on municipalities with high populations of renters, multi-unit dwelling residents, and environmental justice communities. Additionally, the Ride Clean Mass: Charging Hubs program is prioritizing charging station deployment in environment justice communities with high amounts of rideshare drivers. The Massachusetts Office of Environmental Justice and Equity (OEJE), in coordination with EVICC, recently developed a guide to provide a comprehensive framework for advancing Environmental Justice and equity in the planning, implementation, and operation of publicly accessible EV charging stations.
Massachusetts Department of Transportation (MassDOT) will pursue options to communicate EV charging station locations on highway signage and/or elsewhere.	MassDOT enacted a new policy allowing EV chargers to be advertised on state highway signs.[6]
EEA and other state agencies will develop programs to reduce the transmission and distribution infrastructure burden of electric vehicle chargers by using policies such as time-of-use rates and technologies such as on-site storage and bidirectional charging to turn electric vehicles and electric vehicle charging stations into grid assets.	Funded by $6.1 million from EVICC, MassCEC launched its Vehicle-to-Everything (V2X) Demonstration program to deploy bi-directional charging infrastructure to improve grid resilience, reduce energy costs, and increase renewable energy integration. Further, the state Interagency Rates Working Group (IRWG) issued a Long-Term Rates Strategy in March 2025 that outlines recommendations for time-of-use rates, and is currently meeting with stakeholders to develop a more granular set of recommendations. Relatedly, in December 2024, Eversource, National Grid, and Unitil filed petitions to expand managed charging opportunities across all three companies in D.P.U. 24-195, 24-196, and 24-197, respectively.[7]
EEA, DOER, and DPU will encourage electrification of alternative vehicle ownership modes, such as electric vehicle car sharing and electrification of ride-hailing services.	Funded by $7.2 million from EVICC, MassCEC launched its Ride Clean Mass: Charging Hubs program to pilot EV charging station hubs for TNC and taxi drivers.

[6] See, MassDOT, MassDOT EV Charging Sign Policy, EVICC Public Meeting, September 4, 2024, available at: https://www.mass.gov/doc/evicc-meeting-9-4-24-massdot-presentation/download.

[7] Visit the DPU file room and insert 24-195, 24-196, or 24-197 as the "Docket No." to access information related to these filings and corresponding DPU proceedings.

DOS will also develop new regulations that apply consumer protections to EV chargers, including, but not limited to signage and price disclosure requirements; protections against price gouging; standardized EV charging connection equipment; and limiting the sale of consumer data collected.	As noted above, the 2024 Climate Act requires DOS to develop regulations to ensure the accuracy of pricing and volumes of electricity purchased at public EV chargers, among other requirements. DOS is currently developing regulations to address these requirements. More information on these efforts can be found in Chapter 6.
EEA and DOER will work with other agencies (e.g., Operational Services Division (OSD), MassDEP, the Department of Capital Asset Management and Maintenance (DCAMM), the Massachusetts Clean Energy Center (MassCEC), MassDOT, and the MBTA) and cities and towns responsible for procuring EV chargers to coordinate procurement processes, and, if necessary, develop recommendations for the legislature to align processes.	The 2024 Climate Act clarified the treatment of EV and EV charging procurements for government entities (e.g., state and municipal government)[8] Section 32 of the Energy Affordability, Independence, and Innovation Act filed on May 13, 2025, would clarify the range of options that PowerOptions can provide its nonprofit and public sector clients.
EVICC next steps	
EEA will lead the EVICC in developing a plan to use the $50 million in the Charging Infrastructure Deployment Fund. This plan will be developed consistent with the recommendations in this initial assessment and will draw from future EVICC findings.	The Administration awarded $50 million to initiatives to build out EV charging infrastructure across Massachusetts, increase access to charging infrastructure for more residents, electrify the state fleet, improve operation of public charging stations, manage the impact of charging infrastructure on the electric grid, and provide charging solutions for difficult to electrify vehicle types.
The EVICC will refine its assessment of charging station needs by providing focused attention on the need for public fast charging to support long distance trips, including on peak travel days.	With its consultants, EVICC completed analysis of public fast charging infrastructure needed to support long-distance travel. A summary of this analysis can be found in Chapter 4. The methodology for this analysis can be found in Appendix 7.
The EVICC will incorporate data on the need for charging station and infrastructure upgrades associated with electrification of medium- and heavy-duty fleets. The EVICC will continue work with the Grid Modernization Advisory Council, utilities, and other stakeholders to proactively manage the grid impacts of expanded EV charging infrastructure.	EVICC's estimates of the number of charging stations in 2030 and 2035 that would support the Clean Energy and Climate Plan EV adoption rates include a focus on charging infrastructure to support medium-and heavy-duty fleets. A summary of this analysis can be found in Chapter 4. The 2024 Climate Act required a new grid planning process to accommodate forecasted EV charging demand.[9] Additionally, EVICC's consultant team analyzed the impact of forecasted EV demand on the electric distribution grid in 2030 and 2035. A summary of this analysis can be found in Chapter 5. As noted above, MassCEC recently launched its Vehicle-to-Everything (V2X) Demonstration program, the state Interagency Rates Working Group (IRWG) issued a Long-Term Rates Strategy in March 2025 that outlines recommendations for time-of-use rates, and Eversource, National Grid, and Unitil filed petitions in December 2024 to expand managed charging opportunities in service territories.

[9] An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers, ch. 239, § 103 (Mass. 2024), https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239.

EVICC will further research EV chargers and related infrastructure costs and how those costs will be allocated between the public and private domains.	EVICC is continuing to explore different models for sharing costs between private investors, public funds, and EV drivers. Chapter 7 provides an overview of EVICC's analysis on this topic and areas of focus to further unlock private investments, including promoting the Charging-as-a-Service business model.
EVICC will collaborate with state fleet operators to collect data to determine the highest priority locations for EV charging at state facilities and direct resources to facilitate charging installations at those locations.	EVICC allocated $9.5 million to DCAMM and $1.5 million to DOER's Leading By Example Program to deploy fleet charging at state-owned sites that the Office of Vehicle Management identified as high priority.
EVICC will work with MassCEC and the Executive Office of Labor and Workforce Development (EOLWD) to ensure there is a trained workforce of licensed electricians with an Electric Vehicle Infrastructure Training Program (EVITP) certification ready to deploy new EV chargers, ensuring populations historically left out of the clean energy workforce are offered opportunities.	The International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA) offer the EVITP certifications. MassCEC and EOLWD have supported access to this training pathway by providing grants to IBEW's new Clean Energy Pre-Apprenticeship program. Here is the link to LWD's Division of Apprenticeship Standards award https://www.mass.gov/news/healey-driscoll-administration-announces-32-million-in-apprenticeship-grants and our award is summarized below. **Greater Boston Joint Apprentice Training Center (JATC)- $352,000** GB JATC will keep expanding its Clean Energy Pre-Apprenticeship Program to provide participants with career readiness training, career navigation and coaching, direct clean energy career exposure through field trips and tours, and hands-on training resulting in industry-recognized credentials, including OSHA 10 and CPR, with the goal of navigating participants into electrical apprenticeships and into other trade apprenticeships and programs. Beyond the unionized space, we are also supporting expanded training in other electrical programs, including Upper Cape Cod Technical School and support/ training for MWBE small business support programs like the one run by BECMA. See descriptions below. **Upper Cape Cod Technical School, $471,975** UCT will purchase equipment including EV chargers, a prefabricated building, and electrical panels and wiring to enhance the hands-on learning environment and experience of electrical students and other students entering climate-critical occupations. **285+ Participants in Wareham, Bourne, Cape & Islands** **Black Economic Council of Massachusetts** BECMA will expand its state-wide Electric Vehicle Supply Equipment (EVSE) initiatives to guide more Black-owned businesses into the EV space. In addition to continuing to raise awareness of expansion opportunities through EV Kickstarter workshops, BECMA will offer responsive support to MWBEs through its Back Office Support Services (BOSS) and Vendor Advisory Council (VAC) programs. These programs will better position MWBEs to acquire contracts, capital, and the skilled workforce needed to scale in the EV sector. One of the businesses the BECMA supported, Better Together Brain Trust (BT2) secured a contract to help the City of Boston install their EV Chargers: https://www.boston.gov/news/mayor-wu-announces-expanded-curbside-charging-electric-vehicles

Appendix 2. MassEVIP Charging Infrastructure Program Details

This Appendix provides additional detail about the MassEVIP Charging Infrastructure Programs. Further information about the MassEVIP programs can be found at the following links:

- MassEVIP Public Access Charging
- MassEVIP Workplace & Fleet Charging
- MassEVIP Multi-Unit Dwelling & Educational Campus Charging
- MassEVIP Fleets
- MassEVIP Programs Summary Matrix

A summary of the various MassEVIP Charging Infrastructure Programs (see Table 2.1), the funding sources for MassEVIP programs (see Table 2.2), and the impact of MassEVIP programs as demonstrated by the number of electric vehicle charging ports deployed (Tables 2.3 and 2.4) are provided below. Additional information on funding for the MassEVIP Charging Infrastructure Programs can be found on the Massachusetts Department of Environmental Protection website.

Table 2.1. MassEVIP charging infrastructure programs

	Workplace and Fleet Charging	Multi-Unit Dwelling and Educational Campus	Public Access Charging	DCFC Charging (program closed as of 2021)
Eligibility	• workplaces with >15 employees on-site • EV fleet vehicles garaged in Massachusetts • in non-residential areas • Charging stations must be practically accessible to all employees • light-, medium-, and heavy-duty fleets all eligible	• multi-unit dwellings with 5 or more units • Campuses with 15 or more students on-site • charging stations must be practically accessible to all students, staff or residents	• Charging stations must be practically accessible to the public for a minimum of 12 hours a day, 7 days a week. • The location must be non-residential	• Property owners or managers of non-residential locations accessible to the public 24/7 or educational campuses with at least 15 students on-site • Charging stations must be publicly accessible
Charger Type(s)	L1 or L2	L1 or L2	L1 or L2	DCFC stations
Covered Expenses	EVSE + make-ready costs (only for non-Eversource/ National grid customers)	EVSE + make-ready costs (only for non-Eversource/National grid customers)	EVSE + make-ready costs (only for non-Eversource/National grid customers)	EVSE + make-ready costs (only for non-Eversource/National grid customers)
Percentage of Expenses Covered	60%	60%	80-100%	Up to 100%, max $50,000 per charging station

Table 2.2. Partial List of MassEVIP Funding Sources

Funding Source	Amount
American Electric Power Settlement	$1,364,689.36
Motor Vehicle Inspection Trust Fund	$826,347.83
Consent Judgment in Commonwealth of Massachusetts v. EthosEnergy Power Plant Services, LLC, et al.[1]	$110,000
Volkswagen Group of America (VW) settlement (settlement + interest)	$12,487,796.54
Climate Protection and Mitigation Expendable Trust (CMT)	$20,306,495.27
GHG Expendable Trust pursuant to nowsunsetted provisions of 310 CMR 7.29 (Emissions Standards for Power Plants)	$96,394

Table 2.3. Ports Funded by MassEVIP Programs (complete and in-progress projects as of April 22, 2025)

MassEVIP Program	Funding Dispersed	Ports
Direct Current Fast Charging (DCFC)	$7,276,912	179
PAC (Public Access Charging Program)	$14,743,538	2,502
MUDC (Multi-Unit Dwelling and Educational Campus Charging Program)	$3,589,502	1012
WPF (Workplace and Fleet Charging Program)	$9,581,771	3,275
Total	**$35,191,723**	**6,968**

[1]Mass. Super. Ct., Suffolk Cty., No. 16-1020A.

Table 2.4 MassEVIP Program Impact Table (Data in Table 2.4 is current as of April 22, 2025)

MassEVIP Program	Status	Program	Amount	# of Ports
DCFC	Contract Sent	Public DC Fast	$4,828,735.50	116
	Grant Paid	Public DC Fast	$2,448,176.48	63
PAC	Contract Sent	Public L2	$6,257,771.25	1,211
	Grant Paid	Public L2	$8,485,766.64	1,291
MUDC	Contract Sent	Educational campus	$560,477.43	82
		MUD	$1,228,194.17	347
	Grant Paid	Educational campus	$578,396.89	124
		MUD	$1,222,433.76	459
WPF	Contract Sent	Govt. Fleet	$485,899.59	143
		Private Fleet	$212,082.89	30
		Workplace	$1,018,843.18	352
	Grant Paid	Govt. Fleet	$1,234,423.32	218
		Private Fleet	$294,400.95	59
		Workplace	$6,336,121.44	2,473
Subtotal	Contract Sent[2]		$14,592,004.01	2,281
Subtotal	Grant Paid[3]		**$20,599,719.48**	**4,687**
Grand Total			**$35,191,723.49**	**6,968**

[2] "Contract Sent" is projects underway for which payment has not been issued.

[3] "Grant Paid" is completed projects for which payment has been issued.

MassEVIP Incentive Programs Matrix

	Workplace & Fleet (WPF)			Multi-Unit Dwelling & Educational Campus (MUDC)		Public Access Charging (PAC)
Application deadline	Rolling			Rolling		Rolling
Who may apply	Private, public and non-profit workplace	Private or non-profit fleet owner with 15+ employees on-site	Municipal, public university and college or state agency fleet owner	Public DC Fast	$2,448,176.48	Private, public or non-profit
Eligible Location Types	Non-residential workplace with at least 15 employees on-site	Non-residential location where applicant garages fleet vehicle	Non-residential location where applicant garages fleet vehicle	Dwelling with 5 or more residential units	Educational campus with at least 15 students on-site	Non-residential location available for public use
Who must be allowed to use charging station?	All employees who drive an EV	Applicant's EV fleet users	Applicant's EV fleet users	All residents who drive an EV	All students/ staff who drive an EV	Anyone who drives an EV
Maximum level of funding	60%			60%		100% at government owned property; 80% at all other locations
Minimum required hours of availability	N/A			N/A		24 hours/day unless location has restriction, then 12 hours/day
Charging station type	L1 or L2			L1 or L2		L1 or L2
Time to complete project – existing locations/new construction	18 months/ 24 months (plus 3 months to complete contracting)			18 months/ 24 months (plus 3 months to complete contracting)		18 months/ 24 months (plus 3 months to complete contracting)

For all programs:

- For National Grid, Eversource, and Unitil program participants, funding covers equipment only; for all others, funding covers both equipment and Installation
- Charging station must be able to charge EVs produced by multiple manufacturers
- A parking spot must be clearly marked as EV-only with permanent signage for each port installed
- The applicant must own the location or provide written permission from the location owner to install charging station

Appendix 3. Massachusetts Utility EV Charging Incentive Programs Information

This Appendix provides additional details about the EV charging infrastructure programs administered by the state's investor-owned utilities (Eversource, National Grid, and Unitil) and approved by the Massachusetts Department of Public Utilities (DPU).

Incentive Programs Overview

Below is a summary of the incentives provided by the state's investor-owned utilities for residential, public, workplace, and fleet segments of the electric vehicle (EV) market (Table 3.1). These incentive programs are approved through 2026. Proposed mid-term modifications to each program are currently under review by DPU in D.P.U. 24-195, 24-196, and 24-197[1] for Eversource, National Grid, and Unitil, respectively (Table 3.2).

[1]Visit the DPU file room and insert 24-195, 24-196, or 24-197 as the "Docket No." to access information related to these filings and corresponding DPU proceedings.

Table 3.1 Massachusetts Utility Incentive Programs Overview

	Residential	Public & Workplace	Fleet
Program term	Eversource: $53M National Grid: $58M Unitil: $300k	Eversource: $109M National Grid: $93M Unitil: $538k	Eversource: $4M National Grid: $33M Unitil: N/A
Who may apply		Eversource: 2023-2026 National Grid: 2023-2026 Unitil: 2023-2027	
Funding available	All Companies: 1 4-unit homes Eversource and National Grid: 5+ unit homes	All Companies: public sector Eversource and National Grid: workplace sector	Eversource and National Grid: light-duty fleets Eversource's EJ pilot and National Grid: medium- and heavy-duty fleets
Minimum required	All Companies: Make-ready rebates;1 EVSE rebates3,5 (low-income only) Eversource and National Grid: EVSE rebates (5+ unit homes); energy management system ("EMS") rebates (case-by-case, 5+ unit homes only); 20+ unit dwelling site plans	All Companies: Make-ready rebates2 Eversource and National Grid: EVSE rebates3,5 (publicly accessible sites only); EMS rebates (case-by-case) National Grid: Make-ready rebates for Level 1 charging at long-dwell time parking	Eversource: Make-ready rebates (light-duty fleets only); public light duty fleet EVSE rebates;4,6 public fleet assessments National Grid: Make-ready rebates; public fleet EVSE rebates;4,6 public fleet assessments
Minimum required hours of availability	N/A	Public sector ports must be available to the public 12 hours per day, 7 days per week	N/A
Charging station type	Level 2	Level 1 (National Grid only at long-dwell time parking); Level 2; DCFC	Level 2; DCFC

Notes:

1. For multi-unit dwellings, Eversource and National Grid may provide up to 150 percent of the average cost of customer-side infrastructure, not to exceed actual installation cost, on a case-by-case basis.
2. For the public and workplace segment, Eversource and National Grid may provide up to 150 percent of the average cost of customer-side infrastructure, not to exceed actual installation cost, on a case-by-case basis.
3. For the publicly accessible public and workplace segment and multi-unit dwelling L2 ports: (1) a 100 percent EVSE rebate in EJ populations that meet the EJ criteria based on income; (2) a 75 percent EVSE rebate in EJ populations that meet any of the other EJ criteria; and (3) a 50 percent EVSE rebate for non-EJ neighborhoods. For public segment DCFC ports, rebates of $40,000/port in all communities and $80,000/port for ≥150kW ports in EJ populations, up to a maximum of $400,000/site. More information on public, workplace, and residential multi-unit dwelling segment EVSE rebate structures can be found here:
    a. Eversource: pages 45, 59-61
    b. National Grid: pages 45, 65-66
4. For public fleets: (1) a 100 percent EVSE rebate for public fleets that are registered in an EJ population that meets the EJ criteria based on income or operate more than 50 percent of the time within census block groups that meet the EJ criteria based on income; (2) a 75 percent EVSE rebate for public fleets that are registered in an EJ population that meets the EJ criteria based on any of the other EJ criteria or operate more than 50 percent of the time within census block groups that meet the EJ criteria based on any of the other EJ criteria; and (3) a 50 percent EVSE rebate for public fleets in non-EJ neighborhoods.
5. For the public and workplace segment and multi-unit dwellings, the port deployment targets in EJ populations are 35 percent and 28.5 percent for Eversource and National Grid, respectively.
6. For the fleet segment, the port deployment targets in EJ populations are 40 percent for both Eversource and National Grid.

Utility Company Mid-term Modification Requests

In late 2024, each of the three utility companies submitted mid-term modification proposals for their EV charging infrastructure incentive programs. At the time of the Second Assessment's publishing, the mid-term modification proposals are still under review by DPU. The briefing schedule in D.P.U. 24-195, 24-196, and 24-197 ends on August 15 and DPU will issue an order expeditiously thereafter.

The proposed changes to incentive programs are summarized in Table 3.2. Each of the full mid-term modification proposals are linked below:

- Eversource
- National Grid
- Unitil

Table 3.2 Summary of Utility Midterm Modification Proposals

Description	Eversource	National Grid	Unitil
Allow Third-Party Incentive Stacking	Third-party funding deducted from EV program incentives only if designated for the same purpose and the combined third-party funding and EV program incentives would exceed 100% of the customer's actual and eligible costs	Third-party funding deducted from EV program incentives only if designated for the same purpose and the combined third-party funding and EV program incentives would exceed 100% of the customer's actual and eligible costs	Third-party funding deducted from EV program incentives only if designated for the same purpose and the combined third-party funding and EV program incentives would exceed 100% of the customer's actual and eligible costs
Managed Charging	New residential managed charging program (active and passive components)	Eliminate cap on the number of participants in its Off-Peak Charging Rebate Program	DCFC stations
Extend Off-Peak Charging Rebate Program through 2026	New residential managed charging program (passive)	EVSE + make-ready costs (only for non-Eversource/ National grid customers)	EVSE + make-ready costs (only for non-Eversource/ National grid customers)
Downward Adjustment to Direct Current Fast Charger Rebate Levels	Reduce DCFC rebate levels	Reduce DCFC rebate levels	N/A
Medium and Heavy Duty-Fleet Program Expansion	Request for a $5 million increase to the fleet segment budget to provide support for approximately six medium- and heavy-duty fleets	N/A	N/A
Bidirectional Charger Incentive Pilot Program	Implement pilot program to support the purchase of approximately 25 bidirectional chargers	N/A	N/A

Description	Eversource	National Grid	Unitil
Eliminate the 15% Cap on Budget Shifting	N/A	Allow budget shifting of more than 15% between program segments	N/A
Increased Workplace and Public Segment Funding	N/A	Request for a $34 million increase to the public and workplace segment budget	N/A
Suspend Requirement for Residential Customers to Enroll in EV TOU Rates	N/A	N/A	Suspend the requirement for residential customers to enroll in EV TOU rates
Customer Choice Pathway	N/A	N/A	Allow customers to hire their own contractors to install the infrastructure on the customer side of the meter

Utility Company Demand Charge Alternative Rates

In addition to infrastructure incentive programs, the utility companies offer Demand Charge Alternative Rates to reduce potentially high demand charges for commercial EV charging site owners. Rates vary by utility company and are summarized in Tables 3.3, 3.4, and 3.5 below.

Table 3.3: Demand Charge Alternative Rates for Eversource

Rate	Rate Components	Eligibility
EV-1	• Customer charge • Base distribution charge	Customers with a billing demand of 200 kW or below for twelve consecutive billing months
EV-2	• Customer charge • Base distribution charge • Demand charge	Customers with a billing demand above 200 kW for twelve consecutive billing months

Table 3.4: Demand Charge Alternative Rates for National Grid

Rate	Rate Components	Eligibility
G-2	• Customer charge • Base distribution charge • Demand charge	Customers with a billing demand of 200 kW or below for twelve consecutive billing months and a monthly usage greater than 10,000 kWh
G-3	• Customer charge • Base distribution charge • Demand charge	Customers with a billing demand above 200 kW for twelve consecutive billing months

Table 3.5: Demand Charge Alternative Rates for Unitil

Rate	Rate Components	Eligibility
GD-2	• Customer charge • Base distribution charge • Demand charge	Customers with a billing demand of 4 kW or above and a monthly usage between 850 kWh and 120,000 kWh
GD-3	• Customer charge • Base distribution charge with different per kWh charges for peak and off-peak • Demand charge	Customers with a monthly usage above 120,000 kWh

Appendix 4. State Fleets Eligible for LBE Fleet EVSE Grant Program

This Appendix provides a complete list of State fleets that are eligible for the Department of Energy Resources (DOER) Leading By Example (LBE) Fleet Electric Vehicle Supply Equipment (EVSE) grant program. There are a total of 92 eligible fleets (Table 4.1).

Table 4.1 State fleets eligible for the LBE fleet EVSE grant program

State Fleets	
Barnstable Sheriff's Department	Holyoke Soldiers' Home
Berkshire Community College	Mass College of Art and Design
Berkshire Sheriff's Department	Mass. College of Liberal Arts
Bridgewater State University	Mass. Emergency Management Agency
Bristol Community College	Mass. Gaming Commission
Bristol Sheriff's Department	Mass. Lottery Commission
Bunker Hill Community College	Mass. Maritime Academy
Bureau of the State House	Mass. Port Authority
Cannabis Control Commission	Mass. Rehabilitation Commission
Cape Cod Community College	Mass. Water Resources Authority
Chelsea Soldiers' Home	Massasoit Community College
Chief Medical Examiner	MassBay Community College
Department of Agriculture	MassDOT - Highway
Department of Conservation & Recreation	MBTA Non-Revenue
Department of Correction	Middlesex Community College
Department of Criminal Justice Information Services	Middlesex Sheriff'S Department
Department of Developmental Services	Military Division
Department of Environmental Protection	Mosquito Control Board
Department of Fire Services	Mt. Wachusett Community College
Department of Fish & Game	Municipal Police Training Committee
Department of Mental Health	Nantucket Sheriff's Department
Department of Professional Licensure	Norfolk Sheriff's Department

Department of Public Health	North Shore Community College
Department of Public Utilities	Northern Essex Community College
Department of Revenue	Office of the Attorney General
Department of State Police	Office of the Inspector General
Department of Transitional Assistance	Office of the State Treasurer
Department of Youth Services	Operational Services Division
Division of Capital Asset Management & Maintenance	Parole Board
Division of Standards	Plymouth Sheriff's Department
Division of Unemployment Assistance	Quinsigamond Community College
Dukes Sheriff's Department	Roxbury Community College
Environmental Police	Salem State University
Essex Sheriff's Department	Secretary of State
Executive Office of Energy & Environmental Affairs	Springfield Tech. Community College
Executive Office of Health & Human Services	State 911 Department
Executive Office of Housing & Livable Communities	Suffolk Sheriff's Department
Executive Office of Technology Services & Security	Trial Court
Executive Office of Veterans' Services	UMass Amherst
Fitchburg State University	UMass Boston
Framingham State University	UMass Dartmouth
Franklin Sheriff's Department	UMass Lowell
Greenfield Community College	UMass Medical School
Hampden Sheriff's Department	Westfield State University
Hampshire Sheriff's Department	Worcester Sheriff'S Department
Holyoke Community College	Worcester State University

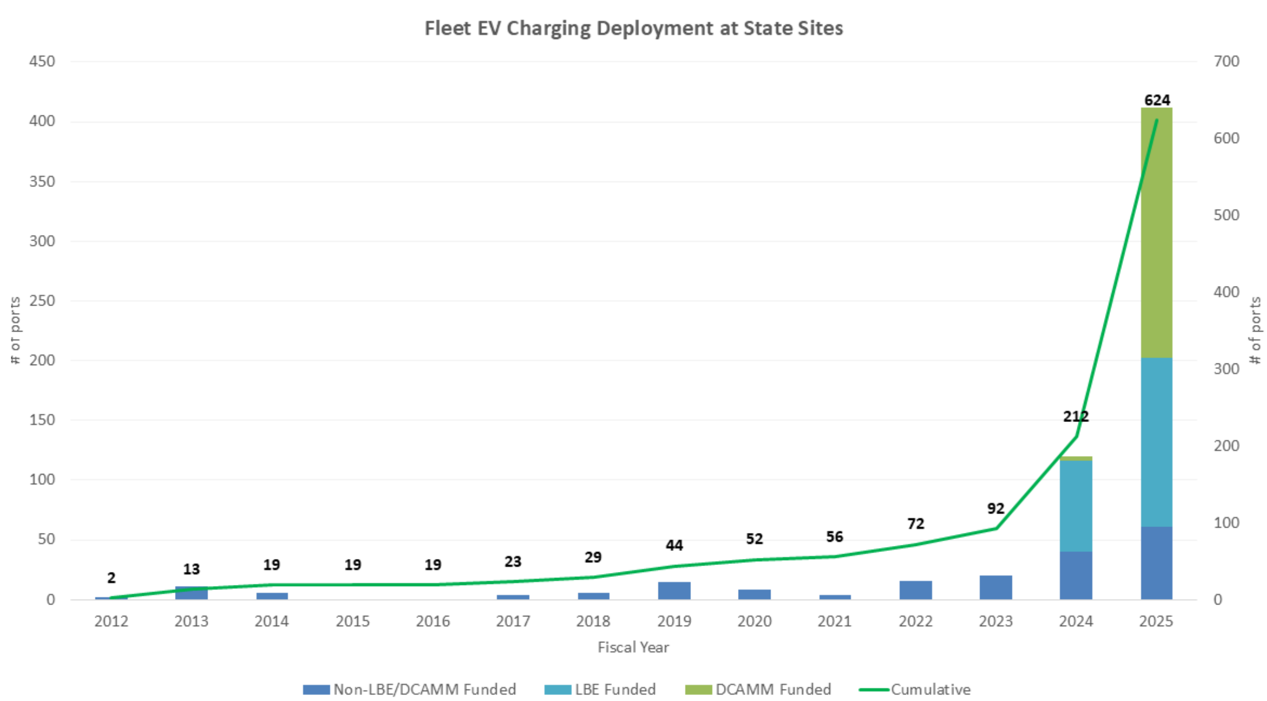
Appendix 5. Summary of Ports Funded by LBE and DCAMM Programs and Annual Fleet Charging Port Deployment by Funding Type

This Appendix provides additional detail about the Department of Energy Resources (DOER) Leading By Example (LBE) and Division of Capital Asset Management and Maintenance (DCAMM) incentive programs that support deployment of EV charging infrastructure for state fleets. Details on funding allocated and charging ports funded by each program are summarized in Table 5.1 and Figure 5.1.

Table 5.1. Ports funded by LBE and DCAMM programs

Program	Funding Source(s)	Amount Awarded	Ports Funded[1]
DCAMM LBE	American Rescue Plan Act (ARPA)	$9,500,000	212
L1 or L2	ARPA, Regional Greenhouse Gas Initiative (RGGI), Fiscal Year (FY) 24 Capital Investment Plan (CIP), FY25 CIP	$3,336,987	240
Total		**$12,836,987**	**452**

Figure 5.1. Annual fleet charging port deployment by funding type (state program or individual entity)



[1]Number of ports noted in Table 5.1 are installed or projects to be installed by the end of FY25, subject to minor changes pending final project completion.

Appendix 6. Early Learning from MassCEC Innovative Programs

The Massachusetts Clean Energy Center is a state energy and economic development agency which administers several programs designed to pilot and support rollout for innovative EV charging strategies. A summary of MassCEC's early learnings from the following programs is provided below: On-Street Charging Solutions; Ride Clean Mass: Charging Hubs; Vehicles-to-Everything Demonstration Projects; and Medium- and Heavy-Duty Charging.

Curbside Charging

The On-Street Charging Solutions Program provides no cost EVSE planning support and feasibility studies to a representative subset of 25 municipalities, as well as funding and technical support to install on-street charging projects in 15 municipalities.

Early Lessons Learned

1. As of Spring 2025, MassCEC is not likely to pursue pole-mounted charging models in National Grid and Eversource territories as pole-mounted charging face unique challenges in these service territories due to complex ownership structures and competition for pole space amongst the municipalities, electric utility companies, and network service providers. MassCEC is more likely to pursue pole-mounted charging in Municipal Light Plant (MLP) territories and at sites with municipality-owned poles.

2. Municipal zoning regulations must be considered when siting and right-sizing on-street charging. Municipalities with restrictions on overnight parking have expressed interest in higher powered level 2 chargers for quicker charger turnover, while municipalities without restrictions on overnight parking may opt for lower-powered (7.2 kW) chargers given that users are allowed to charge for longer durations.

3. The program received 51 applications, of which 36 requested EVSE installation funding. The program has funding available to support 15 municipalities with installation and 25 municipalities with feasibility studies. This high demand indicates a strong interest from municipalities and need for widely available on-street charging.

Transportation Network Company (TNC) Charging Hubs

MassCEC's Ride Clean Mass: Charging Hubs program is piloting EVSE charging station hubs for TNC and taxi drivers. Implementation will include the purchase and installation of publicly accessible Level 2 and DCFC charging stations at approximately six sites across the Commonwealth.

Early Lessons Learned

1. Based on survey responses, many drivers would be interested in using public chargers located at grocery stores, gas stations, or other areas with large parking spaces and access to bathrooms. Low cost of charging and fast charging speeds ranked as the top two priorities for both current EV drivers and non-EV drivers.

2. Based on survey responses, drivers would prefer charging stations sited closer to where they live rather than where they pick up or drop off riders. Gateway cities would be strong candidates for EV charging stations since respondents largely reported living in zip codes located within Gateway Cities such as Brockton, Lynn, and Worcester.

3. The program has received interest from companies that manage supermarkets and shopping locations across the Commonwealth. Should these pilots prove successful, there is significant interest from this sector in hosting EV chargers.

Vehicle-to-Grid

MassCEC's Vehicle-to-Everything (V2X) Demonstration program launched in early 2025 and will ultimately deploy bi-directional charging infrastructure across the Commonwealth to improve grid resilience, reduce energy costs, and increase renewable energy integration. The program will explore a variety of use cases by deploying approximately 100 bi-directional chargers at residential, commercial, and school sites, and will prioritize locations in Environmental Justice Communities.

Early Lessons Learned

1. The definition of V2X and its associated use cases varies. Common terminology should be developed to improve coordination between groups working with V2X and to better communicate potential benefits to stakeholders.

2. The V2X landscape is constantly shifting as new technology is being developed and commercialized. For example, CHAdeMO charging ports, which have allowed for bidirectional charging for several years, are being phased out even though they support inexpensive electric vehicles. NACS and CCS ports are being quickly adopted but there are limited compatible bidirectional vehicles. Flexibility is needed in this pilot program to allow for a wide range of electric vehicles to be eligible.

3. Many bidirectional chargers, vehicles, and software systems are just reaching commercialization. The V2G market is still developing and many bidirectional EVs are exclusively compatible with the bidirectional systems developed by their manufacturer, leading to limitations in EVSE procurement within the program.

Mobile Charging for Medium- and Heavy-Duty Vehicles

MassCEC's MHD Mobile Charging Solutions Program will pilot semi-permanent, off-grid, and grid-flexible charging solutions with four (4) MHD fleets domiciled and operating throughout the Commonwealth to test the capabilities and benefits of mobile charging solutions. Mobile charging solutions can minimize the complexity of EVSE installation, making it an increasingly appealing option for fleet owners and operators looking to test out and right size medium- and heavy-duty (MHD) zero emission vehicles (ZEVs).

Early Lessons Learned

1. The definition of "mobile charging" can vary and ranges from EVSE that is 100% mobile and does not interact with the grid to EVSE that requires minimal installation and is semi-grid tied. To assist in clearly describing the potential benefits, and as mobile charging technology and demand expands, a common terminology should be developed.

2. Common challenges to MHD electrification and mobile charging justifications cited by fleets in the applications include leased facilities and lack of authority to make permanent infrastructure decisions, delays and/or long lead times for permanent EVSE installation, and desire to test out and right size EVSE before permanent installation. While fleets express strong interest in electrification, EVSE installation poses the most significant challenge.

3. The program received 18 applications, however, program funding only allows for four fleets to be supported through the program. Applicants represented a variety of fleet types, duty cycles, and stage of fleet electrification from large business chains with existing EVs to small businesses interested in deploying an EV for the first time. This demand indicates the challenges fleets face with EVSE installation, the uniqueness of each fleet electrification scenario, and the need for alternative solutions.

Additional Resources

More information on these programs can be found in Chapter 3 and on MassCEC's EV Charging Infrastructure webpage.

Appendix 7. Analytical Approach to Charger Needs and Methodology for Estimates of 2030 and 2025 EV Charger Deployment and Associated Grid Impacts

Note: Appendix 7 is pending graphic design formatting. The Appendix text is included here for reference.

Appendix 7. Analytical Approach to Charger Needs and Methodology for Estimates of 2030 and 2025 EV Charger Deployment and Associated Grid Impacts

This Appendix includes information on the analytical approach and methodology used to develop the detailed estimates of future electric vehicle (EV) charger deployment to meet the EV adoption rates included in the Massachusetts Clean Energy and Climate Plans[1] (CECP) and associated grid impacts in 2030 and 2035. The estimated EV charger deployment amounts and associated grid impacts are summarized in Chapter 4 and Chapter 5 of this Assessment, respectively.

The Electric Vehicle Infrastructure Coordinating Council (EVICC) technical consultants, Synapse Energy Economics (Synapse), Resource Systems Group (RSG), and Center for Sustainable Energy (CSE), combined several data sets and modeling approaches to determine future charging demand and to develop a geospatial forecast of the type and number of EV chargers necessary to meet the state's climate requirements.

Light-duty vehicle charging

To estimate the EV charging infrastructure in 2030 and 2035, the consultant team first estimated the number of EVs that would be registered across Massachusetts for these years, relying on state-level projections from the Massachusetts Clean Energy and Climate Plan for 2050.[2]

The consultant team then allocated the estimated number of EVs across the state at a granular spatial scale. This allowed the consultants in subsequent steps to estimate where single-family and multi-family charging will be concentrated for 2030 and 2035. To make granular estimates of EVs, the annual estimates of EVs were distributed across towns based on their respective proportion of new EV sales for 12 months spanning 2022 and 2023. For instance, if a municipality accounted for 1% of total new EV sales across 2022-2023, it was inferred to have 1% of EVs registered across Massachusetts by 2030. This assumes that locations leading EV adoption now will likely continue to lead in the future. To mitigate potential overestimations, an upper threshold was applied to prevent unrealistic EV concentrations in towns with existing large market shares.

The allocation was then further refined to the grid cell level (hexagon cells that are approximately 1-km across) by adjusting the number of EVs proportionally to the share of all vehicle sales within each grid cell for 2022-2023. Notably, total new vehicle sales were utilized for this refinement, rather than exclusive EV sales, due to the limited number of EV transactions in some towns for 2022-2023, which would generate unrealistic outcomes.

Once the forecasts for the number of EV registrations were completed at the grid level, the consultant team proceeded to estimate how these EVs would be distributed between

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[1] See 2050 CECP and 2025/2030 CECP.

[2] Massachusetts Executive Office of Energy and Environmental Affairs. *Massachusetts Clean Energy and Climate Plan for 2050*. Commonwealth of Massachusetts, 2022. https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050.

single-family and multi-family homes. These estimates utilized grid cell-level forecasts for populations of single-family and multi-family homes derived from the VE-State model of Massachusetts (developed by RSG for the Massachusetts Department of Transportation). The allocation to each home type was informed by ownership ratios indicating differing tendencies of EV ownership with respect to single-family versus multi-family homes. The observed data originated from survey responses collected by the California Vehicle Rebate Project,[3] which includes information on household characteristics and EV adoption patterns. To ensure relevance to Massachusetts, the data were adjusted using a housing-type normalization approach that accounts for differences in the proportion of single-family and multi-family dwelling units between California and Massachusetts, thereby better aligning the housing-related EV adoption trends with Massachusetts' built environment.

Single and multi-family charging

To determine the number of home chargers in each grid cell, the consultant team utilized the EV registration allocations at the grid cell level (discussed above) in combination with the estimated number of single and multi-family chargers that would be required to support the 2030 and 2035 fleet (see Table 7.1).

Table 7.1. Estimated EV chargers by category and charger type for 2030 and 2035 CECP vehicle projections

Category	Charger Type	Port Count		2035 EV/Port Ratio	Source
		2030	2035		
Single-Family	L1	216,000	373,000	5.4	EV Pro Lite
	L2	482,000	945,000	2.1	EV Pro Lite
Multi-Family	L1	8,000	18,000	22.5	EV Pro Lite
	L2	18,000	45,000	8.9	EV Pro Lite
Workplace	L2	18,000	47,000	51.7	EV Pro Lite
Public	L2	40,000	92,000	26.4	Observed ratios
	DC fast charger[4]	5,500	10,500	230.4	Observed and modeled ratios
MHD	L2	6,500	17,000	1.9	Modeled ratios
	DC fast charger	800	2,500	13.9	Modeled ratios
Total		**795,000**	**1,550,000**		

The consultant team then allocated these chargers proportionally to each grid cell based on the number of projected single-family and multi-family EV registrations in that cell. For multi-family chargers, charger assignment was based on the count of multi-family homes with off-street parking. For instance, if a grid cell was projected to contain 1% of all multi-family EV

[3] Center for Sustainable Energy. *Rebate Survey Dashboard*. Clean Vehicle Rebate Project, 2024. https://cleanvehiclerebate.org/en/rebate-survey-dashboard.

[4] In 2030, 45 percent of DC fast chargers will serve multi-family housing and 55 percent will serve long-distance travel. In 2035, 57 percent of DC fast chargers will serve multi-family housing and 43 percent will serve long-distance travel.

registrations with off-street parking, it would be allocated 1% of the total multi-family home chargers needed across Massachusetts.

The availability of off-street and on-street parking at multi-family homes is based on a parking availability model developed by the consultant team as part of this analysis. It was developed using land use data and municipal parking inventory data and applied to all housing units in the state.

Workplace L2 charging

To estimate the number of Level 2 (L2) workplace chargers in each grid cell, the consultant team incorporated data on the number of workers projected for 2030 and 2035 from the VE-State model[5] of Massachusetts (developed by RSG for Massachusetts Department of Transportation), and data from the US Bureau's American Community Survey (ACS)[6] that indicates the proportion of workers that drive to work. The consultant team combined these two fields to estimate the number of workers that drove vehicles to work in each grid cell. The consultant team then allocated the estimated number of workplace chargers required to support the fleet (see Table 7.1 above) proportionally across grid cells based on the number of workers that drive to work in each grid cell.

Public L2 Charging

Deployment of L2 public charging stations followed a two-stage allocation process, beginning at the town level and followed by grid cell-level distribution. This approach ensured chargers were allocated based on broader indicators of need while retaining the ability to fine-tune siting at a granular level.

At the town level, allocations were informed by the expected number of registered EVs. Within towns, grid cell-level allocation was conducted using the proprietary Caret EVI Planner software. The algorithm prioritized grid cells based on:

- Proximity (within 2 miles) to off-street parking associated with multi-unit dwellings[7]
- Density of nearby amenities that could serve as potential site hosts[8]
- Projected 2030 traffic volume[9]

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[5] Resource Systems Group (RSG), *VisionEval*, 2025, accessed June 11, 2025, https://rsginc.com/visioneval-webinar/.

[6] U.S. Census Bureau. *American Community Survey 5-Year Estimates*. Retrieved from https://www.census.gov/programs-surveys/acs/

[7] Areas were scored based on their proximity to locations lacking off-street parking. A two-mile Euclidean buffer was applied, and the estimates of off-street parking for any grid cell intersecting this buffer were summed.

[8] This metric captures the count of relevant amenities located within each grid cell. Amenity types included a wide range of potential destination and site-hosting locations, such as restaurants, supermarkets, gyms, and community facilities. The data were gathered from OpenStreetMap.

[9] Estimated using a combination of VisionEval forecast for 2030 and baseline traffic data from 2021. The VisionEval forecast generated forecasts of projected changes in population, employment, demographics, and housing. This was combined with annual average daily traffic (AADT) data from MassDOT and roadway data from the Highway Performance Monitoring System (HPMS) to project vehicle miles traveled (VMT) for 2030 and 2035.

- Existing public L2 charger infrastructure, to avoid oversaturation.[10]

This methodology distributed chargers to areas with the greatest potential demand. However, it should be noted that the consultant team did not take into account potential charging from rideshare drivers.

Public DC charging

Public DC fast charging deployment also followed a two-stage process, with chargers first allocated at the town level and then distributed to grid cells. This methodology addressed two distinct use cases to ensure that both neighborhood-based and corridor-based charging needs were met: residential demand from multi-family households and charging needs associated with long-distance travel.

For the multi-family household use case, town-level allocations were based on the number of multi-family housing units without access to off-street parking. Within each town, DC fast chargers were further distributed to grid cells using the EVI Planner software. The allocation algorithm favored grid cells that had higher numbers of off-street parking spaces associated with multi-unit dwellings within a 2-mile radius, and greater density of potential site hosts such as businesses and other amenities. The algorithm also accounts for existing DC fast charging infrastructure to avoid oversaturation. However, we did not take into account the potential impacts of rideshare, including idling locations and driver homes.

For the long-distance travel use case, chargers were allocated across towns according to the projected share of long-distance charging demand occurring within one mile of highway or interstate exits. These town-level allocations were then refined at the grid cell level, emphasizing areas with high levels of long-distance travel activity, proximity within one mile of highway exit ramps, greater density of potential site hosts such as businesses and other amenities, and low existing coverage of DC fast charging infrastructure.

Charging demand for long distance travel is not simply proportional to traffic volumes or even to long-distance travel traffic volumes. Instead, it is driven by where vehicles will be when they need to charge during a long-distance trip. To identify those locations, RSG analyzed travel behavior using vehicle telemetry data, calibrated to overall traffic volumes. The analysis included all light duty travel in or through Massachusetts, using data that identified the start and end point of all trips. It includes travel between other states that passes through Massachusetts, as well as trips within, originating in, or ending in Massachusetts. RSG developed a charging model in which each vehicle departed with an initial state of charge drawn from a distribution reflecting expected pre-trip charging behavior (generally starting with a relatively full battery), and the battery depletes along the trip based on typical vehicle range. Charging demand is based on the aggregated locations where these sampled vehicles would be when batteries fell below 20 percent charge. The resulting distributions of charging demand are spread more

[10] Derived from AFDC data, this metric used a weighted system where areas with more existing chargers were assigned fewer chargers than they would have otherwise. Charger counts were assessed within each grid cell and also within 1-mile and 4-mile radii to discourage clustering and encourage geographic dispersion.

evenly along major highway corridors than traffic volumes because vehicles tend to be further from population centers when they need to charge.

While Massachusetts has made meaningful progress in building out its DC fast charging network along travel corridors, the current pace of deployment will need to increase to keep up with the projected increase in demand. The deployment rate of DC fast chargers has been increasing for the past decade but is inadequate to meet the estimated needs for 2030 and 2035. As of the end of 2024, just over 1,000 ports serve primary and secondary travel corridors, with most located on primary routes. Meeting the estimated need of nearly 5,000 ports by 2030 and over 9,000 by 2035 will require a continued increase in the rate of deployment. In dense urban areas such as Springfield, Worcester, Lowell, and Greater Boston, 10 to 24 DC fast charger ports will need to be installed per year, with Boston reaching up to 46 ports per year.

Travel modeling and forecast of multi-unit housing with off-street parking

To develop a spatial distribution of EV charging infrastructure expected across the state in 2030 and 2035, the consultant group modeled future travel patterns and developed forecasts of multi-unit housing with on-street parking.

Specifically, the consultant team used current year (2019) and future year (2050) scenario outputs from the Massachusetts statewide travel demand model, a tool maintained by the Boston Region Metropolitan Planning Organization that is used for transportation planning. The model estimates trips generated by residents in Massachusetts as well as through travel passing through the state. This model calculates future vehicle miles traveled (VMT) and total daily traffic on the road network from personal vehicles.

Population, household, and employment forecasts by town out to 2050 were obtained from the Metropolitan Area Planning Council (MAPC). Their forecasts extend to cover all of Massachusetts as well as their core planning area. These forecasts were used to develop 2030 and 2035 VMT estimates from the 2019 and 2050 statewide travel data, which informs the future location of public chargers.

The team also forecasted the quantity and location of future multi-family housing without off-street parking, an important driver of public L2 and DC fast chargers. The team used current parcel-level data on multi-family housing, data from the Census Bureau's 5-year ACS, and MAPC's population and household forecasts by town to estimate the locations of new multi-family housing in 2030 and 2035. Town parking inventory studies and survey data collected by NREL were used to establish rates of off-street parking availability at different types of multi-family housing, which were then applied to the forecasts of multi-family housing in 2030 and 2035. The analysis assumed the continuation of current rates of parking availability for new housing.

Multi-family housing charging needs will be met through a combination of both L2 chargers and DC fast chargers. Existing infrastructure and economics will play a large role in determining whether multi-family housing is met with DC fast chargers or L2 chargers. Streets that can be easily upgraded to include L2 on light posts or other street fixtures are better suited for higher penetration of L2 chargers. However, locations that have a high density of multi-family housing will likely benefit from the space-efficient and rapid DC fast chargers. Available parking space, proximity to housing, and capacity on the distribution system are other drivers in the selection of L2 chargers vs. DC fast chargers to meet multi-family charging needs.

Medium-duty and heavy-duty vehicle charging

Chargers for medium- and heavy-duty vehicles, including buses, are categorized into two groups: DC fast chargers for long-haul trucking and L2 vehicles for depot charging (although the analysis recognized and accounted for the fact that some DC fast chargers are likely to be installed at depots.)

For long-haul charging, the consultant team forecasted medium and heavy-duty vehicle travel in 2030 and 2035 using the Massachusetts statewide travel demand model (which was also used for passenger vehicle travel modeling). This provides estimates of VMT by trucks on the road network across the state, which is used to identify routes with high demand for charging. The VMT estimates take into account long-haul trucking to, from, and traveling through Massachusetts on the highway network as well as local trucking within the state. From this model, priority charging locations were identified, such as truck rest stops, gas stations and other locations with truck parking close to the sections of the highway network with high amounts of truck travel. Data from MassGIS and the EPA's Underground Storage Tank database were used to develop a complete set of gas stations, rest areas, and other potential charging fueling and parking locations.

For depot-based charging, depot and gas station locations for Massachusetts-based vehicles were found using the EPA Underground Storage Tank database, MassGIS data for rest stops and depots, and specific locations of existing charging infrastructure or depots from various data sources (MBTA, National Grid, Eversource, CALSTART/FleetAdvisor, and DOER). The geographic density of these depot and fueling locations was used as a weight to allocate medium and heavy-duty vehicles from Census Tract-level Massachusetts RMV data to smaller hex geographies. The forecasts of electric buses and trucks in the medium- and heavy-duty fleet were then used to estimate the proportion of registered vehicles that are EVs in 2030 and 2035 for each hex cell.

Estimated charger requirements for medium- and heavy-duty vehicles were used to allocate chargers to potential charging locations for both long-haul charging and depot-based charging, based on medium- and heavy-duty vehicle to charger ratios developed by the Lawrence Berkeley National Laboratory (LBNL). Charger and EV counts for already existing and planned charging infrastructure were also added to each hex cell (the data sources for existing and planned chargers included Eversource, CALSTART/Mass Fleet Advisor, and DOER).

Areas of uncertainty

Finally, it is important to acknowledge the significant uncertainty that underlies this analysis. EV adoption rates over the next five to ten years remain uncertain and will be shaped by policy developments, market conditions, and consumer behavior. CECP projections of EV adoption may not materialize by 2030 and 2035, leading to fewer chargers needed and a slightly different spatial distribution for the chargers required. In addition, interconnection delays may result in the deployment of chargers following different spatial trends than what was modeled. EV adoption rates can also be driven by factors such as the availability of state and federal incentives, technological advancements, and supply chain issues impacting cost of ownership. Higher costs may stymie EV growth as Massachusetts residents wait for more affordable models of EVs.

There is also uncertainty in EV adoption rates for single-family vs. multi-family units. Adoption rates in multi-family units will partially depend on the availability of on-street parking with charger access, which is shaped by local infrastructure and zoning practices that differ by municipality.

The analysis is sensitive to the plug-in hybrid EV (PHEV) share of EVs. A higher fraction of PHEVs will reduce the need for public L2 and DC fast chargers, while lower penetration of PHEVs than was modeled will necessitate more publicly accessible chargers.

This analysis uses certain assumptions for the number of ports per EV (see Table 7.1, above). As charger sizes increase, this ratio may decrease over time, reducing the total number of chargers required but increasing the energy demand at a given location. Technological advancements in range, charging times, and battery efficiency will also place downward pressure on the number of chargers required.

To estimate future DC fast charger needs, the modeling relies on several assumptions, each of which introduces potential variability. Technological advancements further complicate projections. For example, this Second EVICC Assessment forecasts fewer DC fast chargers than the Initial EVICC Assessment. This is primarily due to a higher share of PHEVs in the short term (informed by recent trends in vehicle sales), and increased BEV battery sizes and charging speeds (more vehicles are capable of charging at higher speeds/higher kW chargers).

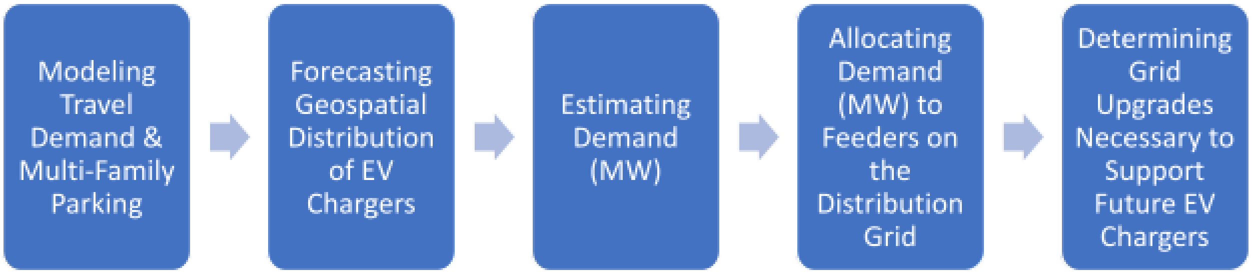
For the estimates of the requirements of medium and heavy-duty trucks, the analysis assumes that the future truck fleet will be operated in a similar way to the current almost entirely non-EV truck fleet. As EV penetration into the truck fleet increases, truck operators may change their travel patterns to accommodate charging requirements, but there is a high degree of uncertainty around this issue.

While the analysis attempts to account for these factors, they remain important sources of uncertainty that may shift infrastructure needs over time.

Detailed 2030 and 2035 EV charger needs projections and grid impacts methodology

High-Level methodology and approach

The analysis of charger needs and projections for 2030 and 2035, and the associated electricity grid impacts was developed through five key steps, as shown below. These are each discussed in turn throughout Chapter 4, Chapter 5, and this Appendix.



Modeling travel demand

The spatial distribution of EV charging infrastructure expected across the state in 2030 and 2035 relies on several data inputs. This section discusses modeling of future travel patterns based on statewide travel model outputs and forecasts of population and employment changes in the state.

Overview of the Massachusetts statewide travel demand model

The estimates of travel demand for both light vehicles and medium and heavy-duty trucks are based on outputs from the Massachusetts statewide travel demand model, a tool maintained by Central Transportation Planning Staff (CTPS) in the Boston Region Metropolitan Planning Organization (MPO) that is used for transportation planning. The consultant team obtained the version of the model called TDM23 Version 1.0,[11] which was released by the Boston MPO in June 2024.

The TDM23 was developed for the MPO's 2023 Long-Range Transportation Plan (LRTP), Destination 2050. TDM23 is also intended for use for project and policy analyses by MPO members, stakeholders, and researchers. TDM23 includes an update of the model base-and forecast-year scenarios to 2019 and 2050 respectively. These two scenarios were used by the consultant team to develop travel demand inputs.

TDM23 is a trip-based travel demand model, i.e., it estimates individual trips between traffic analysis zones by mode, purpose, and time of day, and then assigns the transit trips onto a transit network and vehicle trips (in light vehicles and medium and heavy trucks) onto a highway network. Once trips are assigned, the results from the model can be used to calculate vehicle miles traveled (VMT) and total daily traffic on the road network from personal vehicles and medium and heavy-duty trucks.

The geography of TDM23 covers the entire state of Massachusetts, and areas of the surrounding states including Rhode Island and southeast New Hampshire. The model estimates trips generated by residents of and truck based in Massachusetts as well as external travel to

[11] TDM23: Structures and Performance (TDM Version 1.0), CTPS, Boston Region MPO, June 2024, https://ctps.org/pub/tdm23_sc/tdm23.1.0/TDM23_Structures%20and%20Performance.pdf

and from the state and through travel passing through the state. Table 7.2 summarizes the structure of the travel demand steps in TDM23.

Table 7.2: TDM23 demand component functionality, inputs and outputs

Component	**Estimates**	**Sensitive To**
Vehicle Availability	Household vehicle availability relative to household drivers (zero, fewer than drivers, greater than or equal to drivers)	• Household size, income, workers, children • Transit access density
Work from Home	Share of commute vs. work at home days	• Regionally specific inputs of work-from-home levels
Trip Generation	Resident average daily trips within region by purpose produced and attracted by zone	• Person type • Household size, income, vehicles • Household children, seniors, non-workers • Employment by category
Peak/Off-peak	Segmentation of trips into peak period (AM or PM) and off-peak (MD or NT)	• Trips by zone, purpose and market segment
Trip Distribution	Flow of trips between zones	• Trip productions and attractions by peak/off-peak • Path impedances • Mode choice utilities
Mode Choice	Mode shares and flow of trips by mode	• Trip tables by purpose, market segment, and peak/off-peak • Path roadway and transit level of service
University Travel	Generation and distribution of off-campus university student travel	• Commuter enrollment • Household population
Truck Trips	Generation, distribution, and time of day of medium, and heavy truck trips	• Employment • Path distances
Airport Ground Access	Distribution, time of day, and mode of airport traveler trips	• Airport non-transferring enplanements and deplanements
Special Generator, Externals	Non-average daily trips (airport) and nonresident/outside of region trips (through trips)	• Trips produced/attracted by zone
Time of Day	Outbound and inbound trip time of day period	• Trip tables by purpose, market segment, peak/off-peak, and mode

Source: Table E-1, "TDM23: Structures and Performance" (Boston MPO, 2024)

Of note is that TDM23 estimates personal travel in the state for a complete enumeration of travel purposes including segments such as airport ground access, university-related travel, and external/through travel. The table shows that the estimates are sensitive to many factors including household structure and income, availability of working from home, and aspects of transportation supply such as transit level of service.

The TDM23 also separately estimates medium and heavy truck trips which are sensitive to employment forecasts and “path distances”, i.e., the distance over the highway network between trip origins and destinations. Table 7.3 summarizes the structure of the transportation supply steps in TDM23.

Table 7.3: TDM23 supply component functionality, inputs and outputs

Component	**Estimates**	**Sensitive To**
Access Density	Access density category of Traffic Analysis Zone	• Population and employment density • Transit location by mode
Highway Assignment	Congested speed and volumes by roadway segment	• Trip tables by vehicle type and occupancy, market segment, and time of day • Roadway network
Transit Assignment	Transit activity (Park-and-Ride [PnR]), boardings, alightings, transfer) by line	• Trip tables by transit access mode, market segment, and time of day segment • Transit network

Source: Table E-2, “TDM23: Structures and Performance” (Boston MPO, 2024)

For this project, the key travel metrics are taken from the highway assignment outputs. This step loads trips on to the highway network and routes them according to the travel time between origin and destination. The process takes into account congestion to produce volumes of travel on different roads that have been validated by CTPS and shown to compare reasonably well with observed traffic counts.

Model outputs for 2019 and 2050

The highway assignments results from TDM23 were processed by the consultant team to estimate travel demand by vehicle type by highway link across all of Massachusetts. The model outputs for 2019 and 2050 are summarized to show VMT by vehicle class by functional class (type of roadway, from interstates to local roads). The output from this step of the analysis is an Environmental Systems Research Institute (ESRI) GIS shapefile of the state’s highway network showing light-duty, and medium- and heavy-duty truck volumes.

Table 7.4 shows the base year VMT results. In total, the TDM23 estimates that there are 166 million vehicle miles traveled each day on roads in Massachusetts.

The majority of travel (158 million miles) is by light vehicles, with 7 million miles driven by trucks. Just under half of all travel (46% or 76 million miles) is on the freeway and expressway networks (including the ramps to these roads), while 37% of travel (62 million miles) is on arterials and the remaining 17% (28 million miles) is on smaller local roads.

The distribution is a little different for trucks, with a higher proportion on the freeway and expressway networks (63%, 5 million miles), and lower proportions on arterials (27%, 2 million miles) and local roads (10%, 1 million miles).

Table 7.4: Base year (2019) daily vehicle miles traveled by vehicle type and road functional class, Massachusetts

Facility Type	Light Vehicles	Medium Trucks	Heavy Trucks	All Trucks	All Vehicles
Freeway	55,926,375	1,766,562	2,097,872	3,864,434	59,790,809
Expressway	9,538,185	298,056	198,713	496,768	10,034,954
Major Arterial	27,578,750	740,358	287,082	1,027,439	28,606,189
Minor Arterial	32,621,125	756,358	258,292	1,014,650	33,635,775
Collector	13,097,378	282,367	96,511	378,878	13,476,255
Local Road	3,543,404	87,559	34,584	122,143	3,665,547
Freeway Ramp	1,255,333	43,421	37,911	81,332	1,336,666
Expressway Ramp	4,410,975	143,252	72,191	215,443	4,626,418
Centroid	10,712,972	191,737	57,734	249,471	10,962,443
Total	**158,684,497**	**4,309,670**	**3,140,890**	**7,450,559**	**166,135,057**

Table 7.5 shows the forecast year VMT results. In total, the TDM23 estimates that there will be a very small increase to 167 million vehicle miles traveled each day in 2050. The small increase in VMT is made up of a small increase in daily light vehicle VMT, from 159 million miles to 160 million miles, and a small decrease in the daily truck VMT, from 7.5 million miles to 7.1 million miles.

Table 7.5: Forecast year (2050) daily vehicle miles traveled by vehicle type and road functional class, Massachusetts

Facility Type	Light Vehicles	Medium Trucks	Heavy Trucks	All Trucks	All Vehicles
Freeway	56,961,003	1,698,198	2,056,028	3,754,226	60,715,228
Expressway	9,681,903	276,510	182,286	458,796	10,140,699
Major Arterial	27,449,563	689,113	255,535	944,648	28,394,212
Minor Arterial	32,407,955	715,529	240,271	955,800	33,363,755
Collector	13,085,076	268,915	90,448	359,364	13,444,440
Local Road	3,753,637	86,822	32,527	119,348	3,872,986
Freeway Ramp	1,240,636	40,296	35,777	76,073	1,316,709
Expressway Ramp	4,451,383	133,667	66,220	199,887	4,651,270
Centroid	0,774,129	180,018	52,419	232,437	11,006,566
Total	**159,805,286**	**4,089,068**	**3,011,511**	**7,100,579**	**166,905,864**

Table 7.6 shows the shares of VMT by vehicle type and scenario year. The tables confirm that truck VMT makes up between 4% and 5% of all vehicle VMT, and that the proportions are only forecast to change very marginally over the forecast horizon between 2019 and 2050.

Table 7.6: Base and forecast year percentage of vehicle miles traveled by vehicle type, Massachusetts

Scenario Year	Light Vehicles	Medium Trucks	Heavy Trucks	All Trucks	All Vehicles
Base (2019)	95.5%	2.6%	1.9%	4.5%	100.0%
Future (2050)	95.7%	2.4%	1.8%	4.3%	100.0%

Estimating 2030 and 2035 travel demand

While the TDM23 produces VMT for 2019 and 2050, the consultant team required estimates of VMT in 2030 and 2035 to be used as inputs to later steps in the analysis of EV charging infrastructure requirements.

The previous section showed that travel demand is forecast to change by only small amounts between 2019 and 2050, however, the consultant team did use population, household, and employment forecasts by town obtained from the Metropolitan Area Planning Council (MAPC) to interpolate VMT to 2030 and 2035, and in order to benchmark the reasonableness of the future estimates from the TDM23.

The MAPC forecasts extend to cover all of Massachusetts as well as their core planning area and were available in 10 year increments between 2010 and 2050. The version of the forecasts used by the consultant team are from MAPC Model Run 139, prepared on August 11, 2023, and from Statewide Model Run 97, also prepared on August 11, 2023.

Table 7.7 shows the forecasts of household population[12] in the state between 2010 and 2050. The two spatial areas covered by the two sets of MAPC forecasts overlap slightly. The statewide forecasts, which generally cover the area outside of the MAPC region, include four towns from the MAPC region (Duxbury, Hanover, Pembroke, and Stoughton). The table shows the "Non-MAPC Communities" forecasts with those four towns removed, as well as the MAPC region forecasts and the statewide totals. The growth rates in 2030, 2040, and 2050 are calculated relative to the 2020 values.

The forecasts show a household population peaking in 2040 at just over 7 million followed by a small decrease by 2050. The overall statewide growth between 2020 and 2030 is about 3%,

[12] Household population excludes some residents of the state including military personnel and residents living in group quarters (dorms, correctional facilities, nursing homes, etc.)

and this remains static in 2040 and 2050. The growth is higher in the MAPC region (which covers the Boston metropolitan area), with 4% growth by 2030 and 7% forecast by 2040. In the rest of the state, there is little to no growth forecasted in that time frame.

Table 7.7: MAPC forecasts of household population from 2010 to 2050

Year	2010	2020	2030	2040	2050
Total Statewide Forecasts	3,344,502	3,551,218	3,591,541	3,552,416	3,464,029
MAPC Communities	73,062	77,581	76,593	74,953	71,293
Non-MAPC Communities	3,271,440	3,473,637	3,514,948	3,477,463	3,392,736
Relative to 2010 (Non-MAPC Communities)		100%	101%	100%	98%
MAPC Region	3,037,304	3,304,593	3,435,077	3,526,211	3,606,761
Relative to 2010 (MAPC Region)		100%	104%	107%	109%
Massachusetts	6,308,744	6,778,230	6,950,025	7,003,674	6,999,497
Relative to 2010 (Massachusetts)		100%	103%	103%	103%

Table 7.8 shows similar forecasts of total employment. The employment forecasts produced by MAPC have the same structure as the household population forecasts. In this case, employment is forecasted to grow by 2% by 2030 and 3% by 2040. As with the household population forecasts, employment is forecasted to grow more in the MAPC region (3% by 2030 and 6% by 2040) than in the rest of the state where a 1% growth is forecasted in 2030 followed by a 1% decline relative to 2020 by 2040.

Table 7.8: MAPC forecasts of total employment from 2010 to 2050

Year	2010	2020	2030	2040	2050
Total Statewide Forecasts	1,344,233	1,496,830	1,501,552	1,484,617	1,467,985
MAPC Communities	27,457	26,933	24,026	23,213	22,334
Non-MAPC Communities	1,316,776	1,469,897	1,477,526	1,461,404	1,445,651
Relative to 2010 (Non-MAPC Communities)		100%	101%	99%	98%
MAPC Region	1,877,169	2,167,923	2,235,548	2,291,736	2,352,856

Relative to 2010 (MAPC Region)		100%	103%	106%	109%
Massachusetts	3,193,945	3,637,820	3,713,074	3,753,140	3,798,507
Relative to 2010 (Massachusetts)		100%	102%	103%	104%

The small changes in both household population and employment suggest that the small changes in VMT forecasted by the TDM23 are reasonable.

The final outputs from this portion of the analysis included statewide estimates of VMT by vehicle type, highway network link estimates of 2030 and 2035 VMT by vehicle type, and also household population forecasts by 2030 and 2035 that were used to grow the base year data on the location and type of households and household units. Table 7.9 shows the interpolated VMT results for the state by vehicle type for 2030 and 2035.

Table 7.9: Interpolated 2030 and 2035 daily vehicle miles traveled forecasts by vehicle type

Year	**Light Vehicles**	**Medium Trucks**	**Heavy Trucks**	**All Trucks**	**All Vehicles**
2019	158,684,497	4,309,670	3,140,890	7,450,559	166,135,057
2050	159,805,286	4,089,068	3,011,511	7,100,579	166,905,864
Change (2019-2050)	1,120,788	(220,602)	(129,379)	(349,981)	770,808
2030	159,350,192	4,178,643	3,064,045	7,242,687	166,592,880
2035	159,488,350	4,151,449	3,048,096	7,199,546	166,687,896

Modeling multi-family parking availability

The spatial distribution of EV charging infrastructure expected across the state in 2030 and 2035 relies on several data inputs. This section discusses forecasts of multi-unit housing locations and modeling the availability of on-street and off-street parking.

Approach

The consultant team forecasted the quantity and location of future multi-family housing with only on-street parking available as well as the quantity and location of multi-family housing with off-street parking for residents. The distinction between the two types of parking is an important driver of public L2 and DC fast chargers. Residents of multi-family housing without off-street parking will be more likely to rely on public chargers.

The consultant team used current parcel-level data on multi-family housing, data from the Census Bureau’s 5-year ACS, and MAPC’s population and household forecasts by town to estimate the locations of new multi-family housing in 2030 and 2035. Town parking inventory studies and survey data collected by the National Renewable Energy Laboratory (NREL) were used to establish rates of off-street parking availability at different types of multi-family housing, which were then applied to the forecasts of multi-family housing in 2030 and 2035.

Land use data

The US Census Bureau’s 5-year ACS data for Massachusetts for the period ending in 2023 was the primary source of data on household locations and household dwelling types by Census Block Group. The data were extracted using the statistical programming platform, R, and the census data R package, tidycensus. The data covers 5,116 Census Block Groups, and includes data on population, households, dwelling types, number of vehicles available, household type (owned vs. rented housing), average household income, and employment.

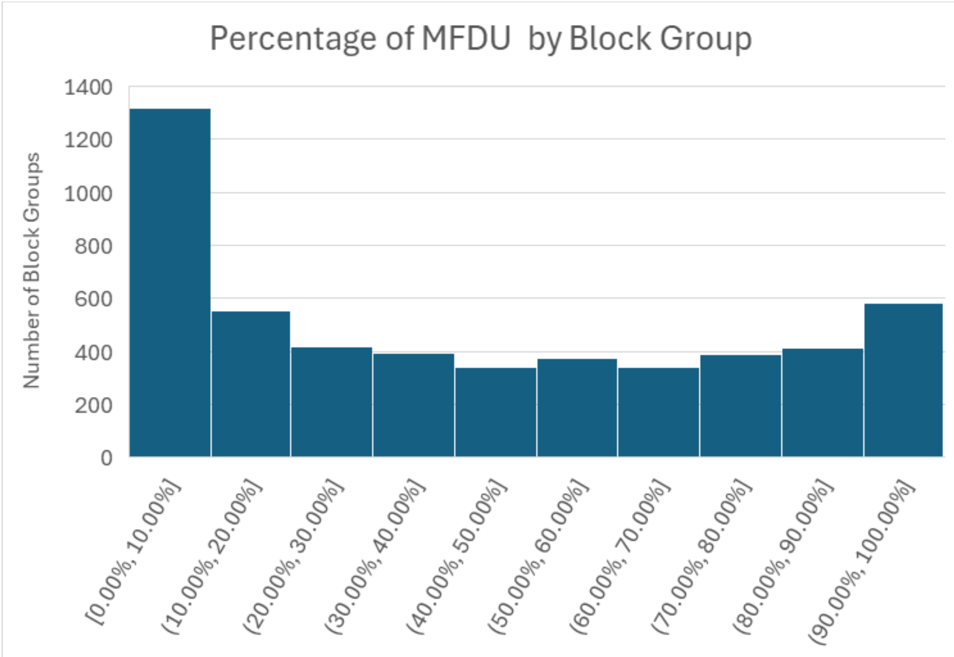
Table 7.10 summarizes the number of households by dwelling unit type according to the ACS estimates. A slight majority of households (57%) live in single family houses, compared to 42% in multi-family homes. A very small number of households live in mobile homes, boats, RVs or vans. Amongst the multi-family homes, almost half are 2, 3, or 4 unit buildings and just over half are large buildings, with 8% of all households in the state (accounting for about 20% of the multi-family dwellings) living in large developments of over 50 units.

Table 7.10: 5-year ACS (2019-2023) estimates of household by dwelling unit type in Massachusetts

Dwelling Unit Type	Number of Households	Percentage of Households
SFDU_detached	1,550,002	51%
SFDU_attached	175,084	6%
MFDU_2_units	283,336	9%
MFDU_3or4_units	320,710	11%
MFDU_5to9_units	172,273	6%
MFDU_10to19_units	128,312	4%
MFDU_20to49_units	134,009	4%
MFDU_50+_units	226,169	8%
Mobile_home	23,618	1%
Boat_rv_van	1,144	0%
SFDU_total	1,725,086	57%
MFDU_total	1,264,809	42%
Total	**3,014,657**	**100%**

Figure 7.1 is a histogram of the proportion of multi-family units by Census Block Group.

Figure 7.1: 5-year ACS (2019-2023) percentage of multi-family dwelling units by Block Group in Massachusetts



The most common range is the Block Group that has between 0% and 10% of its units as multi-family units. A significant number of Block Groups are over 90% multi-family units. Between those extremes, there is an even distribution in terms of the number of Block Groups in each 10% increment.

In addition to the ACS data, two other data sources were used to describe the land use in the state and other characteristics of the built environment:

- Parcel databases for each of the towns in Massachusetts, available from the Mass GIS portal.[13] These data were used to support the development of the model application including the disaggregation of the model application from Census Block Groups to the Hex geography used in later phases of the analytical process.
- The EPA's smart location database[14], which contains Census Block Group level data for a series of variables including processed Census data, accessibility measures, and transportation supply measures such as transit service frequency. These data were collected to supplement the model estimation dataset.

Literature

The consultant team conducted a literature review to identify examples of surveys and other research that developed observed rates of parking availability by dwelling unit type. A report published by NREL, "There's No Place Like Home: Residential Parking, Electrical Access, and

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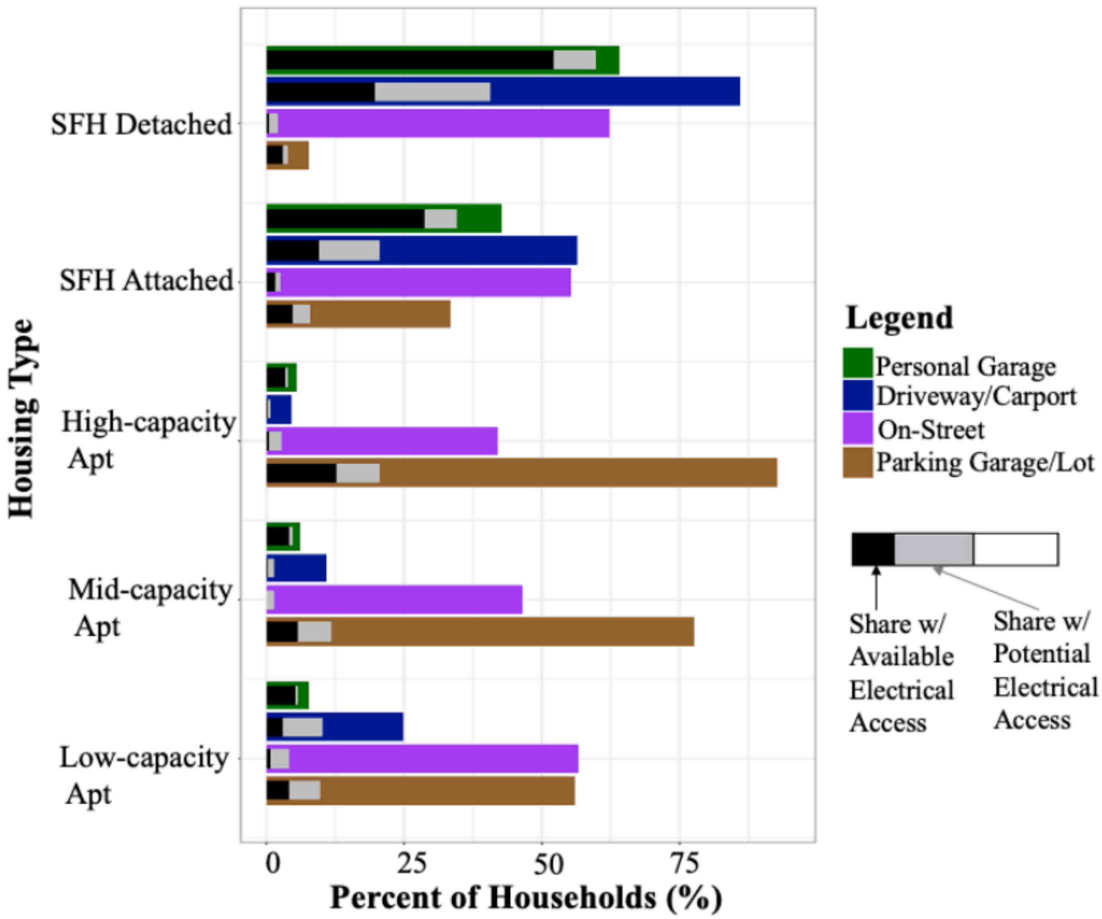
[13] Commonwealth of Massachusetts, *MassGIS—Bureau of Geographic Information*, accessed June 11, 2025, https://www.mass.gov/orgs/massgis-bureau-of-geographic-information.
[14] U.S. Environmental Protection Agency (EPA), *Smart Location Mapping*, accessed June 11, 2025, https://www.epa.gov/smartgrowth/smart-location-mapping#SLD.

Implications for the Future of Electric Vehicle Charging Infrastructure”[15] contains some useful rates derived from survey work nationally.

Figure 7.2 shows a figure from the report which summarizes the survey findings. Of note for the work on this project is the percentage of multi-family households with access to parking of different types. Smaller developments, i.e., low capacity apartments (2 to 4 unit buildings), are the least likely to have on-site (off-street) parking either in a garage or lot but do have higher rates of driveway availability. Larger developments (high-capacity apartments, 20+ unit buildings) tend to have available off-street parking garages or lots and the proportion of households that make use of on-street parking is smaller (about 40% compared to around 60% in low-capacity apartments.)

[15] Yanbo Ge, Christina Simeone, Andrew Duvall, and Eric Wood, *There's No Place Like Home: Residential Parking, Electrical Access, and Implications for the Future of Electric Vehicle Charging Infrastructure* (Golden, CO: National Renewable Energy Laboratory, 2021), NREL/TP-5400-81065, https://www.nrel.gov/docs/fy22osti/81065.pdf.

Figure 7.2: Percent of households with charging or potential charging access by household and parking type[16]



Parking inventory data

Several towns and planning agencies in Massachusetts have inventories of on-street parking as well as other types of parking available to residents and visitors. These data were processed and analyzed to augment the land use data and provide training data for the models of parking availability. The sources obtained and reviewed by the consultant team included:

- Somerville: On-street parking inventory by Somerville neighborhood[17]
- Andover: Andover public parking map and study (2016), includes on-street parking inventories and locations[18]

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[16] Yanbo Ge, Christina Simeone, Andrew Duvall, and Eric Wood, *There's No Place Like Home: Residential Parking, Electrical Access, and Implications for the Future of Electric Vehicle Charging Infrastructure* (Golden, CO: National Renewable Energy Laboratory, 2021), Figure 7, NREL/TP-5400-81065, https://www.nrel.gov/docs/fy22osti/81065.pdf.

[17] City of Somerville, *Parking Study Engagement Platform*, accessed June 11, 2025, https://voice.somervillema.gov/parking-study.

[18] City of Andover, *Downtown Andover Parking Study*, accessed June 11, 2025, https://andoverma.gov/DocumentCenter/View/181/Downtown-Andover-Parking-Study-PDF?bidId=.

- Brookline: Brookline metered parking inventory, from a quick Google maps comparison it appears their metered parking is all on-street parking[19]
- Barnstable: all on-street spaces[20]
- MAPC Perfect Fit Parking: Overnight parking inventory[21]

Model development

The consultant team created an estimation dataset for 140 Census Block Groups from the ACS data, smart location database, and parking inventory data, and tested a series of regression models to develop models that predicted with reasonable accuracy the number of on-street and off-street parking spaces available to residents of multi-family dwellings in the Census Block Group. The final models are shown below in Table 7.11 and Table 7.12.

Table 7.11: Regression model of on-street parking

Coefficients:	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**	**Significance code**
(Intercept)	1.464	0.431	3.396	0.001	***
OwnedVehicles	-0.002	0.001	-2.877	0.005	**
D3BPO4_mea	0.023	0.009	2.454	0.015	*
HH_Density	-0.114	0.024	-4.761	0.000	***
D4C_mean	-0.028	0.008	-3.454	0.001	***
PopDensity	0.056	0.014	3.922	0.000	***
EmpDensity	-0.206	0.127	-1.629	0.106	

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 1.362 on 133 degrees of freedom
Multiple R-squared: 0.2479, Adjusted R-squared: 0.214
F-statistic: 7.308 on 6 and 133 DF, p-value: 9.176e-07

Where:

- OwnedVehicles is the number of vehicles in units that are owner occupied
- D3BP04 is the density of pedestrian oriented four legged intersections
- HH_Density is the density of households
- D4C_mean is the average frequency of transit services accessible to households
- PopDensity is the population density
- EmpDensity is the employment density

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[19] Metropolitan Area Planning Council (MAPC), *Metro Boston Perfect Fit Parking Dashboard*, accessed June 11, 2025, https://experience.arcgis.com/experience/0a4e9fb71c0a4cdca76edcb2eff21a09/.
[20] Town of Barnstable Planning & Development Department, *Appendix B: Existing Conditions Report*, accessed June 11, 2025, https://www.town.barnstable.ma.us/Departments/planninganddevelopment/Projects/Appendix-B--Existing-Conditions.pdf.
[21] Metropolitan Area Planning Council, *Perfect Fit Parking*, accessed June 11, 2025, https://perfectfitparking.mapc.org/.

Table 7.12: Regression model of off-street parking

Coefficients:	Estimate	Std. Error	t value	Pr(>|t|)	Significance Code
(Intercept)	2.946	0.583	5.052	0.000	***
D3A_mean	-0.082	0.017	-4.956	0.000	***
RentalVehicles	0.002	0.001	4.319	0.000	***
HH_Density	-0.022	0.010	-2.256	0.026	*
IncomePerCapita	-0.00001	0.000	-2.592	0.011	*
OwnedVehicles	-0.001	0.001	-1.874	0.063	.
D3BPO4_mea	0.012	0.007	1.688	0.094	.

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 1.03 on 133 degrees of freedom
Multiple R-squared: 0.2866, Adjusted R-squared: 0.2544
F-statistic: 8.906 on 6 and 133 DF, p-value: 3.599e-08

Where:

- D3A_mean is the total road network density
- RentalVehicles is the number of vehicles in units that are renter occupied
- HH_Density is the density of households
- IncomePerCapita is the average income per person
- OwnedVehicles is the number of vehicles in units that are owner occupied
- D3BP04 is the density of pedestrian oriented four legged intersections

The model estimation results indicate that use of on-street parking by multi-family dwelling units is more likely (positive coefficient) in areas with higher density pedestrian friendly street patterns (for example in urban grid type street networks), is slightly lower (negative coefficient) in areas with good transit service and where fewer owner occupiers have vehicles, and is lower in areas with higher employment density (for example mixed use neighborhoods where competition for on-street parking may be higher).

The model estimation results indicate that use of off-street parking by multi-family dwelling units is more likely (positive coefficient) as the number of vehicles owned by renting households increases. Conversely, it is slightly lower (negative coefficient) in areas with higher total road network density (and therefore is more likely in units in more suburban locations), in areas with higher household density, and in higher income areas.

Model application

The model application developed by the consultant team applied the two models described above to all Census Block Groups in the state in 2030 and 2035.

The first step in this process was to estimate the number of multi-family dwelling units by Census Block Group. This was achieved by factoring the ACS estimates of households by dwelling unit type by Census Block Group to the future year estimates of total households derived from the MAPC household forecasts (described earlier in this Appendix).

Since forecasts by dwelling unit type are not available, the consultant team assumed that the housing mix in each Block Group would remain the same in the future. Given the relatively small changes in the number of housing units, this simplifying assumption is likely to be reasonable. Table 7.13 shows the resulting breakdown of single family and multi-family units in the current year, 2030, and 2035. The total number of units increases modestly, and the share of multi-family units increases slightly (as expected given the slightly higher growth rates in more urban areas of the state).

Table 9.13: Number and percentage of units by type, current year, 2030, and 2035

Year	SFDU	MFDU	Total
Units in 2023	1,675,232	1,253,371	2,928,603
Units in 2030	1,733,408	1,314,737	3,048,145
Units in 2035	1,742,624	1,336,960	3,079,584
Percent in 2023	57.2%	42.8%	100.0%
Percent in 2030	56.9%	43.1%	100.0%
Percent in 2035	56.6%	43.4%	100.0%

The consultant team did not attempt to model changes in some of the explanatory variables that were found to be significant in the models, such as transit level of service, vehicle ownership, and road network characteristics. These were assumed to be unchanged from the current year to 2030 and 2035. Given the relatively small changes in the number of households and amount of employment, any changes in these other variables are likely to be small.

Once the models have been applied for each Block Group, the results are then disaggregated to the hex zone system that later analytical steps use, creating an output database of numbers of dwelling units by year and type and number of parking spaces available to multi-family dwelling units by year and type (on and off-street) by hex zone.

Model results

Table 7.14 shows a summary of the parking availability results from the application of the model in 2030 and 2035. The share of parking spaces used by residents of multi-family dwellings, both on and off-street, remains fairly static over time as expected given the application assumptions and the relatively small changes in the number and distribution of housing units over time.

The mapped results shown in the main body of the report show that off-street parking at multi-family dwellings is more common in non-Boston urban areas and lower density parts of the Boston Region. However, many multi-family buildings even in the densest parts of Boston do have some off-street parking.

The estimates of on-street parking spaces used by residents of multi-family households in 2030 and 2035 are much more focused in the densest (and often older) parts of urban areas, particularly the Boston Region.

Table 7.14: Number and Percentage of Units by Type, Current Year, 2030, and 2035

Year	Off Street	On Street	Total
Units in 2023	1,422,085	926,932	2,349,017
Units in 2030	1,474,655	968,358	2,443,013
Units in 2035	1,487,755	981,969	2,469,724
Percent in 2023	60.5%	39.5%	100.0%
Percent in 2030	60.4%	39.6%	100.0%
Percent in 2035	60.2%	39.8%	100.0%

Forecasting geospatial distribution of EV chargers

The methodology, data sources, and approach for the geospatial forecast of EV chargers are outlined in Chapter 4 and earlier in this Appendix.

Estimating demand (MW)

Chapter 4 and this Appendix describe the process of estimating the spatial distribution of EV charging ports in 2030 and 2035 that are necessary to meet the state's climate goals. The next step in the analysis was estimating demand (MW) from the number of charging ports in 2030 and 2035, a precursor to estimating the associated distribution grid impact. Specifically, the Synapse consultant team converted the geospatial distribution of charger ports to a geospatial distribution of demand during peak periods.

To develop a full picture, the Synapse consultant team estimated EV charger demand for four scenarios, each with different degrees of managed charging. The four scenarios are:

1. Unmanaged charging
2. Evenly spread charging (flat charging)
3. Currently offered managed charging programs (status quo)
4. High-enrollment advanced managed charging (technical potential)

For more details about each scenario, refer to Chapter 5.

To determine electricity demand during peak periods from EV chargers, analysts need to understand charging behavior and use over a 24-hour period on a summer weekday (i.e., on days when the electricity system currently peaks and is expected to peak in 2030 and 2035). This generally involves developing and using 24-hour load curves, specific to different charger types and managed charging scenarios.

The Synapse consultant team estimated the load curves for each of the five types of chargers included in the EV Charger Deployment analysis for light-duty vehicles: residential level 1 (L1) and L2 chargers, work L2 chargers, and publicly available L2 and DC fast chargers. The team also estimated load curves for L2 and DC fast chargers that support medium and heavy-duty vehicles. Additional information on how each load curve was developed is provided in the following section.

Once 24-hour load curves were developed, the consultant team could determine the maximum demand coincident with peak periods (e.g., 3pm to 7pm). As discussed in Chapter 4 and earlier in this Appendix, the Synapse consultant team first estimated counts for each EV charger type at the hex level (approximately 1 km in diameter) in 2030 and 2035. For each hex, the consultant team then multiplied the count of each EV charger type by the demand for that charger type at times that are coincident with the grid load peaks. This process was repeated for each of the four managed charging scenarios and for both 2030 and 2035.

Load curves for light-duty vehicle chargers

Scenarios 1 & 2

The consultants used load curves for light-duty vehicle chargers for the "unmanaged charging scenario" (scenario 1) and the "flat charging" scenario (scenario 2) from NREL's EVI-Pro Lite.[22] The model uses detailed data from personal vehicle travel patterns, electric vehicle attributes, and charging station characteristics to develop state-wide aggregate weekend and weekday 24-hour load curves by charger type. The Synapse consulting team then converted the state-wide aggregate load curves to be a per-charger 24-hour load curve.

The team used the assumptions provided in Table 7.15 to generate EVI-Pro Lite load curves. In EVI-Pro Lite, the home charging strategy assumption was set to *Immediate – as fast as possible* or the unmanaged scenario (scenario 1) and *Immediate – as slow as possible* (even spread) for the "flat charging" scenario (scenario 2).

Table 7.15. EVI Pro-Lite assumptions

Assumption	2035 Value	Assumption Support
Number of light-duty EVs	2.4 million	Projections from CECP[23]
Average daily miles traveled per vehicle	35 miles	EVI Pro Lite default assumption
Average ambient temperature	86F	Assuming charging during summer peak hours

[22] National Renewable Energy Laboratory. 2018. *EVI-Pro Lite: Electric Vehicle Infrastructure Projection Tool.* Available at: https://afdc.energy.gov/evi-x-toolbox#/evi-pro-ports.
[23] Mass.gov, 2024. *Massachusetts Workbook of Energy Modeling Results.* Available at https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050.

Plug-in vehicles that are all-electric	75%	Estimated based on recent vehicle sales trends[24]
Plug-in vehicles that are sedans	38%	EVI Pro Lite default assumption
Mix of workplace charging	20% Level 1, 80% Level 2	Workplace chargers assumed to be primarily level 2.
Access to home charging	75%	Reflects estimates of current access to home chargers.[25]
Preference for home charging	80%	Most similar percentage to access to home charging (of available EVI Pro-Lite options)

Scenario 3

Residential charger load curves for the status quo scenario (scenario 3) come from National Grid's off-peak charging rebate program.[26] Currently, roughly 15 percent of EV owners participate in this program in National Grid's service territory.[27] The consultant team applied these program-specific load curves and participation rates to all residential L1 and L2 chargers across the state in 2030 and 2035. No other charger types are managed in this scenario.

Scenario 4

The consultant team developed load curves from the technical potential scenario (scenario 4). The consultants assumed that 95 percent of all home, workplace, and public L2 charging would participate in rigorous managed charging programs on any given day, where all participating charging occurs during off-peak periods. This is meant to demonstrate the highest possible load reductions that could exist from managed charging and would likely involve a mix of active and passive management programs and technologies. It is not necessarily meant to reflect a feasible scenario. We also assume there would be no secondary peaks associated with managed EV charging (as a result of active and full management of EV loads). In this scenario, 95 percent of public DC fast chargers are assumed to participate in a management program on any given day that reduces peak demand by 10 percent (maintaining "fast" charging and a positive customer experience for these charger types).[28]

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[24] Massachusetts Department of Transportation, *Massachusetts Vehicle Census – Municipal Aggregation*, 2025, accessed June 11, 2025, https://geodot-homepage-massdot.hub.arcgis.com/pages/massvehiclecensus.

[25] International Council on Clean Transportation, *Home Charging Access and the Implications for Charging Infrastructure Costs in the United States*, 2023, accessed June 11, 2025, https://theicct.org/wp-content/uploads/2023/03/home-charging-infrastructure-costs-mar23.pdf.

[26] DNV, *Final Report: Massachusetts Phase III EV Program Year 1 Evaluation Report*, for National Grid, May 7, 2024, Docket 24-64, Phase II and III Exhibit NG-MMJG-1, 104.

[27] National Grid, *MA EV Phase II and III Program Year 1 Annual Report*, May 15, 2024, Docket 24-64, Phase II and III Exhibit NG-MMJG-1, 29.

[28] 10 percent is a rough estimate. Peak demand reductions for DC fast chargers is expected to be small.

Load curves for medium and heavy-duty vehicle chargers

The distribution of medium and heavy-duty electric vehicle chargers is described in Chapter 5 and in above sections of this Appendix. The consultant team used load curves for medium and heavy-duty chargers from LBNL's HEVI-Load tool,[29] provided to EEA as part of DOE's state technical assistance program. For the scenarios 1, 2, and 3, Synapse calculated the load curves for the private and public chargers. Scenario 1 load curves are based on the LBNL average hourly unmanaged loads. Scenarios 2 and 3 are calculated from the LBNL managed average hourly loads.

Public medium and heavy-duty vehicle chargers are typically less flexible than residential and workplace light-duty vehicle charging, due to fleet operational and long-distance travel needs.[30] For scenario 4, the consultant team assumed that for public chargers, 10 percent of the load during peak hours (5 to 10 PM) could be redistributed evenly to off-peak hours. Private chargers, typically located at fleet depots, have a higher potential for managed charging. The consultant assumed that 95 percent of private medium and heavy-duty chargers participate in a program that distributes all charging to off-peak hours.

Allocating peak demand to feeders on the distribution grid

The consultant team conducted geospatial analysis to assess how the EV load will impact the electric distribution system in 2030 and 2035. To assign the EV load from each hex cell to the electric distribution feeders, the consultant team overlaid geospatial data on locations of National Grid's, Eversource's, and Unitil's distribution system feeders onto the map of load estimates for each hex cells across the entire state.

The consultant team determined the portion of each hex cell load to allocate to each feeder based on how much of each feeder overlapped with the hex cell's area. If only one feeder intersects a hex cell, the entirety of the EV load in that hex cell is assumed to be served by that feeder. If multiple feeders intersect a hex cell, the EV load in that hex cell is allocated to the feeders based on the distance each feeder covers in the hex cell. For example, if two feeders intersect a hex cell, and the length of one feeder within that hex cell is 1 kilometer, and the length of other is only 0.5 kilometers inside the hex cell, then two-thirds of the EV load is allocated to the first feeder, and the remainder to the second feeder. If there are no feeders that intersect a hex cell, the EV load of that hex cell is assigned to the nearest feeder. However, if there is not a feeder within two kilometers (the diameter of two hex cells), the EV load in that hex cell is not assigned to a feeder, because that hex cell is likely in the service area of another utility (e.g., a municipal light plant). Finally, since single feeders often span multiple hex cells, the EV load from each hex cell along the feeder was summed to estimate the total load across the feeder from all hex cells.

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[29] LBNL. *Medium and Heavy-Duty Electric Vehicle Infrastructure – Load Operations and Deployment (HEVI-LOAD).* Available at: https://transportation.lbl.gov/hevi-load.

[30] Pricing signals have the potential lead to more flexible management of medium and heavy-duty chargers in the future. For this analysis, it was assumed these loads have minimal flexibility.

This length-based methodology is an oversimplification. In reality, demand from EV chargers on individual feeders will depend on the precise point locations of the EV chargers at a street level. However, since EV charger counts are only calculated at the granularity of the kilometer-wide hex cell, a more granular analysis of EV charger locations and their associated feeder was not possible.

Determining potential grid upgrades necessary to support future EV chargers

Analysis of distribution feeders

National Grid and Eversource provided two key pieces of data for the feeders in their service areas in Massachusetts: 2022 peak load (demand) and 2022 feeder rating. The feeder rating describes the upper limit on how much electricity can be carried on that feeder. A summary of the data provided by the utilities is summarized in Table 7.16.

Peak load data provided by the utilities is the absolute maximum demand (kW) experienced by the feeder across the entire year, rather than coincident demand (i.e., load on the feeder during the system peak period). Historically, peak periods in Massachusetts occur during hot summer afternoons and early evenings, when home air conditioners and appliances are in highest use.[31] National Grid and Eversource did not specify when peaks on each feeder occur. The consultant team assumed that most feeders would be peaking during summer afternoons in this analysis, in line with typical peak periods. As forecasted by the utilities, the team also assumed that peak periods would shift later in the day by 2035, primarily due to incremental distributed solar.[32]

Table 7.16 Summary of data provided by utilities

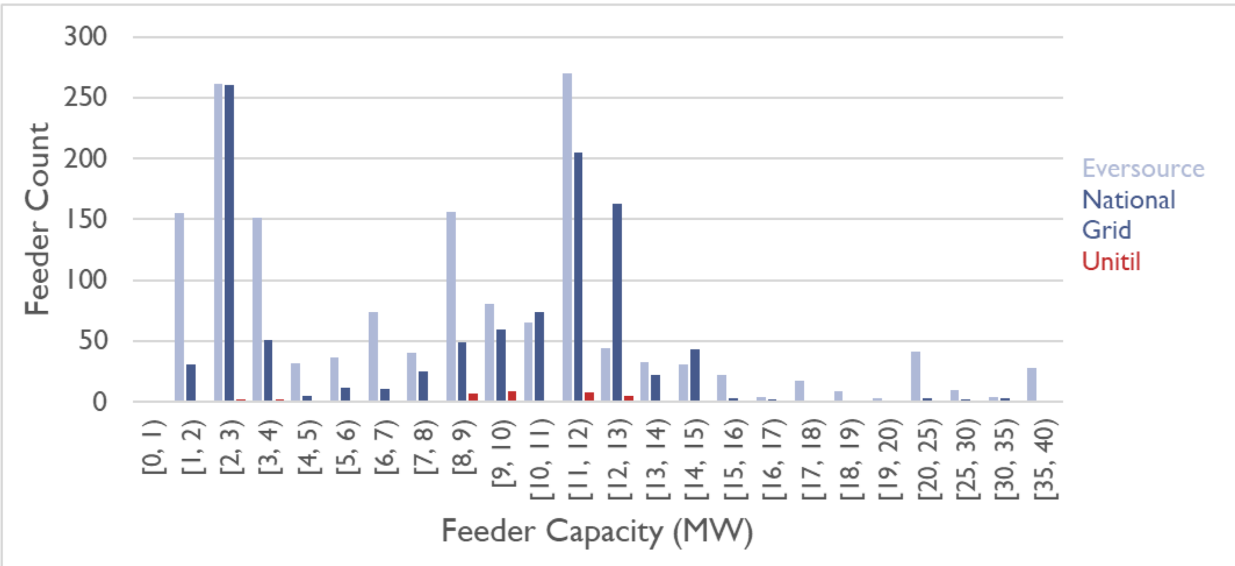
Data Category	Eversource	National Grid	Unitil	Total
Total feeders provided	2,006	1,045	38	3,089
Feeders with load and capacity data	1,555	1,024	38	2,614

[31] Beyond the mid-2030s, Massachusetts is expected to become a winter peaking system. Further analysis and data would be required to analyze coincident EV loads with these different peaks. The shift to winter peaking may occur sooner in some locations on the grid.
[32] National Grid, *Future Grid Plan, Massachusetts Electric Company and Nantucket Electric Company 2023 to 2050 Electric Peak (MW) Forecast*, p. 10, and *Appendix E: Load Shapes for Typical Day Types*, p. 75, accessed June 11, 2025, https://www.mass.gov/doc/gmacesmp-draftnational-grid/download?_gl=1%2Adfgptb%2A_ga%2ANzUwNDI5MDE3LjE2NTA5ODEyMjQ.%2A_ga_SW2TVH2WBY%2AMTY5MzkyMDE2OS4zNi4xLjE2OTM5MjM1OTcuMC4wLjA.

Already overloaded feeders in 2022 (excluded)	152	174	0	326

The size of feeders varies substantially across the state (Figure 7.3). About 20 percent of all feeders fall into the 2-3 MW size range while roughly 18 percent feeders are in the 11-12 MW size range.

Figure 7.3 Distribution of feeders in Massachusetts



For this analysis, feeders that carry peak loads equal to or greater than 80 percent of their nameplate capacity are considered overloaded (as per industry standards).[33] Utilities often reserve the top 20 percent margin as a safety buffer for unexpectedly high load events or emergencies, such as a nearby feeder going offline.[34] Given the high values observed in many scenarios, feeders operating between 80% and 100% of their rated capacity may warrant further study by the utility to assess whether intervention is necessary. In particular, special attention should be paid to new building load and other non-EV loads. Feeders with ratios greater than 100 percent are already overloaded at peak times, and likely need prompt attention from utilities. Approximately 326, or 13 percent, of National Grid and Eversource feeders in Massachusetts were found to be already overloaded (≥80 percent) in 2022. Five feeders were found to have capacity fractions equal to or greater than 110 percent (severely overloaded).[35]

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[33] Electric Power Research Institute (EPRI), *EVs2Scale2030 Grid Primer: An Initial Look at the Impacts of Electric Vehicle Deployment on the Nation's Grid*, 2023, accessed June 11, 2025, https://www.epri.com/research/products/000000003002028010.
[34] Eversource Energy, *Distribution System Planning Guide*, 2020, accessed June 11, 2025, https://www.mass.gov/doc/eversource-distribution-planning-guide/download.
[35] This may be due to data discrepancies, or these feeders may have taken on high loads during emergency events or outages of nearby feeders. These feeders are likely already on utility's radar for near-term studies.

Table 7.17 shows the load level experienced by feeders in Eversource and National Grid service territories according to 2022 data.

*Table 7.17 Count of feeders experiencing overloading in 2022**

Current Loading % (2022)		National Grid	Eversource	Total
≥	<			
80%	90%	120	88	208
90%	100%	42	52	94
100%	110%	9	10	19
110%	120%	3	0	3
120%		0	2	2
Total feeder count		174	152	326
% of Feeders in MA		7%	6%	13%

**Note: No Unitil feeders in 2022 are considered already overloaded.*

Analysis of substations

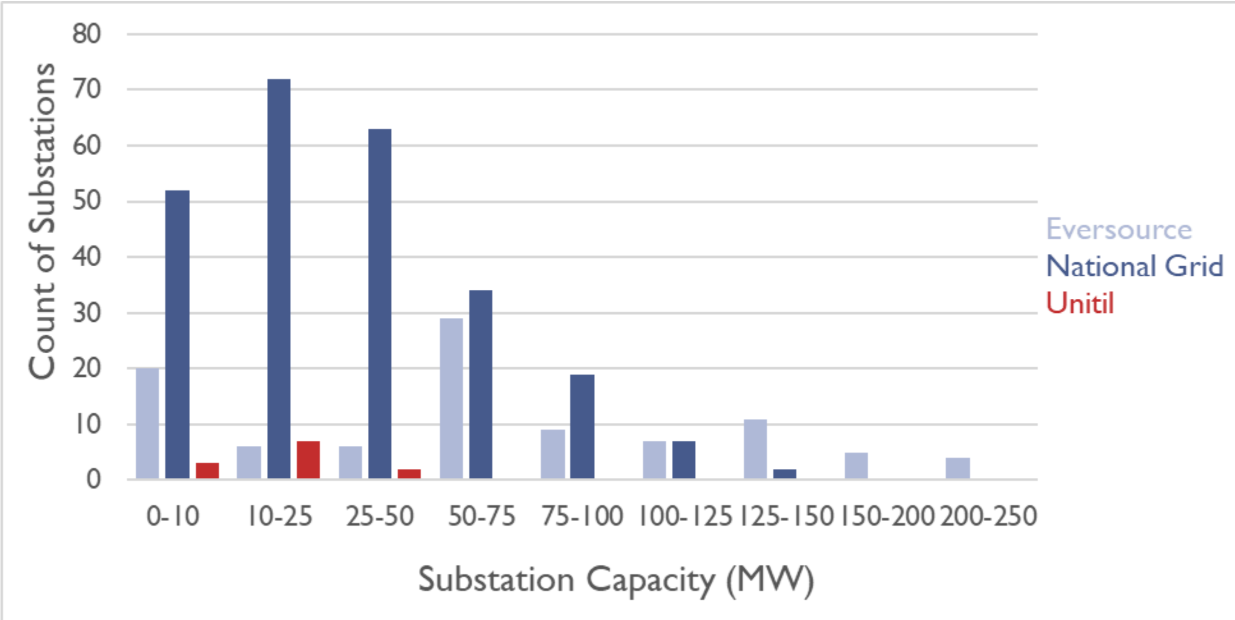
The Synapse consulting team also assessed overloading on the 346 substation areas in Eversource's, National Grid's, and Unitil's service territories. Substation capacity is determined by the size and configuration of substation equipment, including transformers and circuit breakers. Similar to feeder capacities, substation capacity is a dynamic rating that can depend on temperature and other factors. For this analysis, the consultant team assumed a threshold for overloading of 100 percent.

National Grid and Eversource did not provide the Synapse consulting team with substation peak loads; instead, the team used the sum of the peak loads of all the connecting feeders as a proxy. Larger substations serving urban areas may have eight or more connecting feeders. This approach is likely to overestimate peak load slightly, as there are likely feeders peaking at different times on peak days.

National Grid did not provide substation capacity data; again, as a proxy, the team added up the capacity ratings of all connecting feeders. Eversource provided bulk substation ratings for most of their substations; for substations that were missing substation capacity, the team estimated it using the same approach taken for National Grid substation ratings. Unitil provided substation transformer peak loads and normal ratings, which were used for this analysis.

Like feeders, the capacity of substations differs substantially across the state and between utility service territories, as shown in Figure 7.4.

Figure 7.4. Sizes of substations in Massachusetts



Roughly 20, or 4 percent, of substations have 2022 peak loads greater than or equal to 100 percent of their 2022 capacities (Table 7.18). All overloaded substations are in Eversource's service area. Substation overloading is more imprecise than feeder loading, since substation peak loads are calculated by summing up non-coincident 2022 existing peak loads and feeder capacities. Substations may also have a higher threshold for being considered overloaded than we assumed in this study.

Table 7.18. Current substation overloading

Current Loading % (2022)		**Eversource (count)**
≥	**<**	
100%	110%	4
110%	120%	6
120%	130%	2
130%		8
	Sum	20
	% of substations in MA	4%

Caveats

The assessment of overloaded feeders has several key assumptions and system simplifications. The assessment of feeder headroom is based on 2022 peak load and feeder capacity data; it does not include forecasts of future peaks, nor does it take into account upcoming improvements to the distribution grid. The purpose of this analysis was to determine the relative likelihood of EV loads causing the need to upgrade grid assets, not to determine specific loads, specific grid assets to upgrade, or what upgrade may be warranted. Specifically, the analysis does not include future building electrification and behind-the-meter solar, which will change peak loads across most distribution feeders. This data was not provided by the utilities and was out of scope for the analysis.

The analysis also assumes that Massachusetts continues to be a summer peaking system in 2035. Analysis of future winter peaking would require projected winter peak loads on feeders and substations, resulting from increased building electrification. EDCs would need to provide current winter peaks and forecasted system peaks on a feeder-level. The analysis would require new wintertime EV charger load curves, taking into account that colder temperatures diminish EV range. Different charging behavior and reduced range would impact locational charging needs. A winter peaking analysis should also consider future building electrification and coincidence with winter peaks. Managed charging programs would need to be reconsidered. EV charging during the hottest periods of the day (midday) should be incentivized, in contrast to charging during summer periods. A winter grid impact analysis could be useful in the next EVICC assessment.

Appendix 8. EV Charging Grid Planning Processes

This Appendix provides an overview of the information related to electric vehicle (EV) charging included by Massachusetts' investor-owned utilities, Eversource, National Grid, and Unitil (also known as electric distribution companies or EDCs), in their Electric Sector Modernization Plans and the grid impact analysis and EDC planning process required under Section 103 of An Act Promoting a Clean Energy Grid, Advancing Equity and Protecting Ratepayers (2024 Climate Act).

Electric Sector Modernization Plans (ESMPs)

The 2022 Act Driving Clean Energy and Offshore Wind (2022 Climate Act) directed the EDCs to develop ESMPs every five years. These comprehensive grid planning documents describe the current state of the distribution grid, the utilities' current and proposed investments in the electric grid, projections of future electric grid reliability needs, a forecast of the Commonwealth's future electricity needs, and strategies to support Distributed Energy Resources (DERs) including solar, energy storage, EVs, and electric heat pumps. To inform their EV load forecasts, the EDCs relied on the EV adoption benchmarks included in the Massachusetts Clean Energy and Climate Plans[1] (CECP) and the Commonwealth's adoption of Advanced Clean Cars II (ACC II) and Advanced Clean Trucks (ACT).[2]

The first ESMPs were approved by the Massachusetts Department of Public Utilities (DPU) as strategic plans in August 2024, following robust stakeholder engagement and review. The Massachusetts Department of Energy Resources (DOER), the Attorney General's Office (AGO), and other stakeholders advocated for the inclusion of EV load management assumptions in the ESMP forecasts, citing its importance in advancing EV adoption and reducing ratepayer costs. Future ESMP proceedings will include additional opportunities for stakeholder engagement.

In its Order on the EDCs' ESMPs, the DPU encouraged Eversource and Unitil to file managed charging programs for the DPU's review in the near term. Eversource and Unitil filed managed charging program proposals in December 2024 (See D.P.U. 24-195 and D.P.U. 24-197). If the DPU approves the electric distribution companies' managed charging program proposals, EVICC anticipates that these utilities will adjust their future ESMP forecasts and demand assessments to account for the impacts of their managed charging programs on expected load growth and provide relevant load -management updates in their biannual ESMP reports to the DPU (See Chapter 3 and Appendix 3 for more information on the EDCs' December 2024 filings).

[1]See 2050 CECP and 2025/2030 CECP.

[2]See Chapter 2 for more on ACC II and ACT.

Section 103 of the 2024 Climate Act

Under Section 103 of the 2024 Climate Act, a new grid planning process was created to accommodate the growth of EV charging. Section 103 directed EVICC to include an EV charging demand forecast for the next ten years and an analysis of the associated impacts on the distribution grid in its biannual assessments to the General Court moving forward, including identification of areas that may require distribution system upgrades to accommodate future EV charging demand. EVICC's ten-year charging forecast can be found in Chapter 4 and the associated analysis of grid impacts can be found later in Chapter 5. The analytical methodology for both the ten-year forecast and the grid impact analysis are included in Appendix 7.

Section 103 of the 2024 Climate Act also requires EVICC to work with state agencies and the EDCs following the publication of this Assessment to identify fast charging and fleet charging hubs across Massachusetts. EVICC plans to utilize pre-existing analysis from the EDCs[3] and this Assessment as a starting point to identify the following hubs: (1) fast charging hubs along major corridors and secondary transportation corridors; (2) fast charging hubs located in dense urban areas, with a focus on Environmental Justice Communities, where on-street charging is unlikely to meet future EV charging demand; (3) fast charging and Level 2 charging hubs at medium- and heavy-duty fleet depots; and (4) fast charging hubs that serve two or more of these use cases. The results of this analysis will be shared at a future EVICC public meeting.

Last, Section 103 of the 2024 Climate Act requires the EDCs to identify distribution system upgrades necessary to meet ten-year EV charging demand in coordination with EVICC and to file a plan for the necessary grid upgrades with DPU within a year of the Assessment (i.e., on or before August 11, 2026, and every two years thereafter). EVICC plans to provide the EDCs with a list of electric distribution feeders and substations to evaluate for potential infrastructure upgrades or other solutions to accommodate transportation electrification in 2030 and 2035 based on the analysis conducted for this Assessment.[4] The list will include feeders with a load-to-capacity ratio at or above 80 percent and substations with a load-to-capacity ratio at or above 100 percent[5] in those years using an estimate of future EV charging demand that balances current EV charging deployment rates with the EV charging deployment rate needed to meet the 2030 and 2035 CECP EV adoption benchmarks. The EV charging demand used to identify feeders and substations for further analysis also assumes that the current managed charging participating rates persists as EV adoption increases. This approach will ensure that the most important and most likely grid constraints are evaluated first, while mitigating the risk of building and having electric customers pay for new grid infrastructure before it is needed.

[3]See, e.g., National Grid, Overview: Electric Highways Study, EVICC Public Meeting, June 29, 2023, https://www.mass.gov/doc/june-29-2023-evicc-meeting-national-grid-presentation/download; See also, e.g.,National Grid, Northeast Freight Corridors Charging Plan: Planning the Future of Medium- and Heavy-Duty Infrastructure, EVICC Public Meeting, December 4, 2024, 32–43, https://www.mass.gov/doc/evicc-meeting-deck-december-4-2024/download.

[4]This analysis will be updated, as necessary, based on the charging hubs identified through the processes discussed in the prior paragraph.

[5]See Chapter 5 for more information regarding the 80 percent and 100 percent load-to-capacity ratios for feeders and substations, respectively.

EVICC and state agencies will work with the EDCs on this subsequent grid impact analysis, ensuring that other demands on the electric distribution system, including building electrification, economic and housing development, and distributed generation deployment, are included in the EDCs' analysis of each feeder and substation.

EVICC will request that the EDCs include the following in its analysis:

- Whether an upgrade is required on each feeder and substation identified by EVICC in 2030 or 2035:
- If so, why and if not, why not;
- If so, whether an upgrade that will address the identified constraint is already planned and information on the planned upgrade, including but not limited to the following:
    - The public planning document or public filing in a DPU proceeding where the upgrade is included (e.g., rate case, ESMP, etc.);
    - Information on the planned upgrade if it is not included in a public planning document or a filing in a DPU proceeding;
    - The completion date of the planned upgrade and whether the timing would meet the identified constraint; and,
    - If the timing would not meet the identified constraint, whether the EDCs plan to reprioritize upgrades to meet the timing of the constraint.
- If so and if an upgrade that would address the identified constraint is not already planned or being planned, details on the type of upgrade that would be needed to meet the identified constraint, including:
    - Analysis of the type of upgrade (e.g., reconductoring the feeder from X kVa to Y kVA) needed;
    - How long it will take for any identified upgrade to be deployed; and,
    - Justification for any recommended upgrades.
- For each feeder and substation, the EDCs will identify key deviations between the EDCs' analysis of future EV charging and grid capacity needs and the analysis conducted for this Assessment.

The EDCs will present the outcome of their subsequent analysis, protecting confidential and sensitive information as necessary, at an EVICC public meeting.