Driving Towards a Sustainable New Hampshire Economy

SUPPORTING NEW HAMPSHIRE'S TOURISM INDUSTRY THROUGH EV CHARGING INFRASTRUCTURE

TECHNICAL REPORT

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Executive Summary

New Hampshire's $7 billion tourism industry is at a crossroads. As electric vehicle (EV) adoption accelerates in neighboring states and Canada, travelers expect and require reliable charging options. Yet, with only 7% of the necessary charging infrastructure in place to meet 2030 demand, New Hampshire risks losing an estimated **$1.4 billion** in tourism revenue to Maine and Vermont—both of which have invested heavily in EV charging infrastructure. Without strategic action, the state could fall behind in both economic competitiveness and transportation modernization.

This challenge comes at a time when the global EV market is experiencing explosive growth. In just five years, EV sales have risen from 2% to 18% of total car sales worldwide, with nearly 14 million EVs sold in 2023 alone. While New Hampshire has seen an uptick in EV ownership, it lags behind its New England peers in charging accessibility. Vermont and Massachusetts have already built 45% and 25% of their required networks, respectively, creating a more attractive environment for EV drivers and businesses alike. Without intervention, New Hampshire risks being left behind in this transition, losing not only visitors but also long-term economic opportunities.

Beyond the economic imperative, EV adoption plays a crucial role in reducing greenhouse gas (GHG) emissions and improving air quality. Transportation is the largest source of emissions in the U.S., and in New Hampshire, light-duty vehicles contribute nearly 70% of transportation-related pollution. With 70% of the state's electricity coming from renewable sources, New Hampshire could leverage its clean energy resources to position itself as a leader in sustainable transportation and incentivize EV adoption.

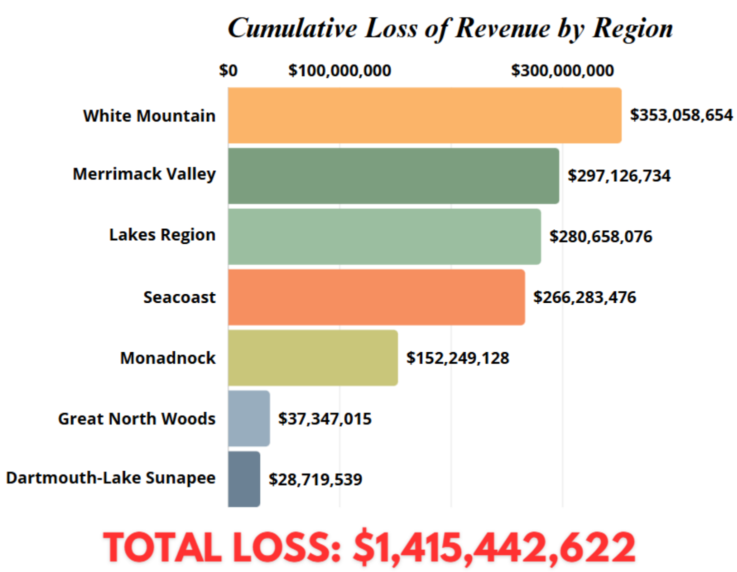
However, widespread EV adoption faces hurdles, including high upfront costs, limited charging access, and regulatory barriers. The interdependence of EV demand and need for charging infrastructure creates a market failure: private investment remains hesitant due to uncertainty, while consumers are reluctant to switch to EVs without sufficient charging options. Other states have broken this cycle through proactive policies. Massachusetts and Vermont, for example, have successfully expanded their EV infrastructure by combining financial incentives, utility programs, and public-private partnerships.

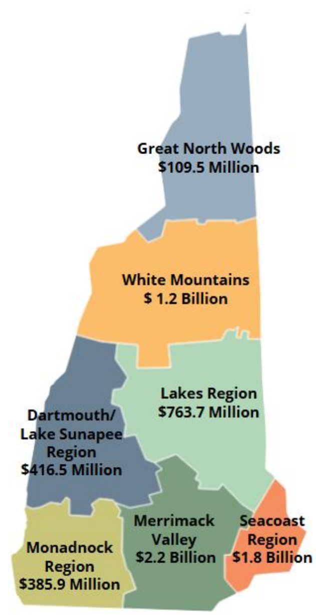
New Hampshire, on the other hand, has largely relied on federal funds and dollars from the Volkswagen "Dieselgate" settlement, leaving it less competitive in securing additional resources. To avoid being outpaced, the state must act decisively. This includes setting clear EV adoption targets, securing diversified funding, enabling utility-led infrastructure investments, and fostering collaboration between the public and private sectors. By taking these steps, New Hampshire can not only safeguard its tourism economy but also drive long-term economic growth, strengthen energy security, and position itself at the forefront of clean transportation in New England.

1. Electric Vehicles and Charging Infrastructure Trends and Perspectives

As the second largest sector in the state's economy, the travel and tourism sector serve as a crucial part of New Hampshire's business ecosystem. Visitors contributed over $7 billion to the state in 2023, and providing income for many communities and even entire counties. However, the rapid adoption of millions of electric vehicles (EVs) in southern New England and Canadian provinces presents a challenge for New Hampshire's tourism landscape. The state's lack of sufficient charging infrastructure threatens its economic strength and ability to accommodate the growing number of EV-owning visitors. Recognizing the significance of the transition to EVs, Maine and Vermont – New Hampshire's biggest tourism competitors – have proactively invested in extensive public charging networks, creating an attractive incentive for EV owners who are looking at viable destinations.

In contrast, New Hampshire's slower progress in building out this crucial infrastructure undermines its competitiveness in the regional tourism market and diminishes its appeal as a destination for both leisure and business travelers. Our analysis shows that the availability of charging infrastructure is a critical factor in maintaining visitor engagement and sustaining tourism revenue. The rapid global adoption of EVs presents a pivotal economic opportunity for New Hampshire, where investing in robust charging infrastructure is essential to accommodate growing demand, and sustain the state's competitiveness in tourism, business, and broader economic development.





Destination spending revenue generated by region, 2023. Source: New Hampshire Travel Barometer - Impacts, Dean Runyan Associates.

1.1 The Future of Mobility is Electric

1.1.1. Global EV Markets Trends

The transition to electric mobility is accelerating worldwide. Since the introduction of the hybrid electric Toyota Prius in Japan in 1997 and later the release of the first Tesla luxury electric sports car model in the United States in 2008, the market has swiftly transitioned from the luxury sector to the mass consumer sector, thanks to the participation of a greater number of automakers and increased consumer demand.

EV sales skyrocketed from 2 percent of global car sales in 2018 to 18 percent in 2023, with nearly 14 million sold, according to the International Energy Agency (IEA). In 2023, nearly 14 million EVs were sold worldwide, with 95 percent of them being sold in China, Europe, and the United States. This marks a 35 percent year-on-year growth compared to 2022[1]. Bloomberg projects that by the end of 2024, there will be nearly 60 million EVs on the road worldwide, which is 100 times more than the amount of EVs that were on the road in 2013. They also suggest that EVs could represent 50 percent of light vehicle sales by 2050. In contrast, global sales of ICVs peaked in 2017 and have since declined by 23 percent[2].

1.1.2. United States EV Markets

The U.S. market is the third biggest EV market in the world and has seen a rapid increase in EV sales that have taken over conventional ICV sales (See Figure 7). In 2023, EVs made up 16 percent of total car sales in the U.S., while ICVs accounted for 84 percent. BEVs represented over 50 percent of total EV sales in 2023. Despite a slowdown that year, EV sales are expected to increase by 20 percent in 2024, resulting in nearly half a million more sales than the previous year.[3]

Due to the significant increase in sales, the number of EVs on U.S. roads has been rapidly growing, with an average annual growth rate of 43 percent. By the end of 2023, there were approximately 3.3 million registered EVs in the U.S. (see Figure 9).

Figure 5: Annual U.S. Light-duty vehicle sales by powertrain

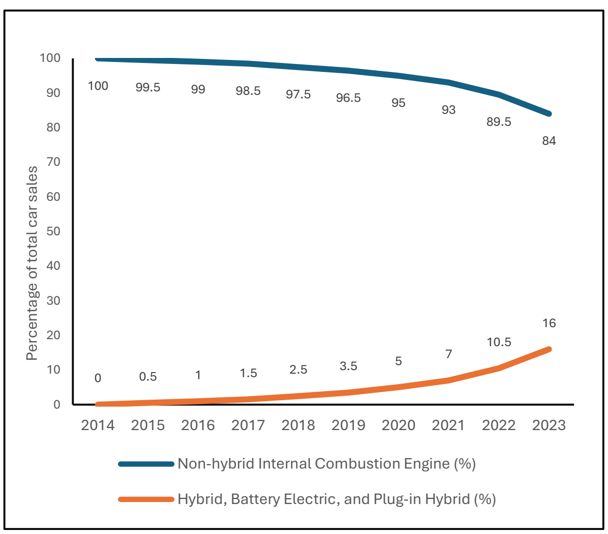
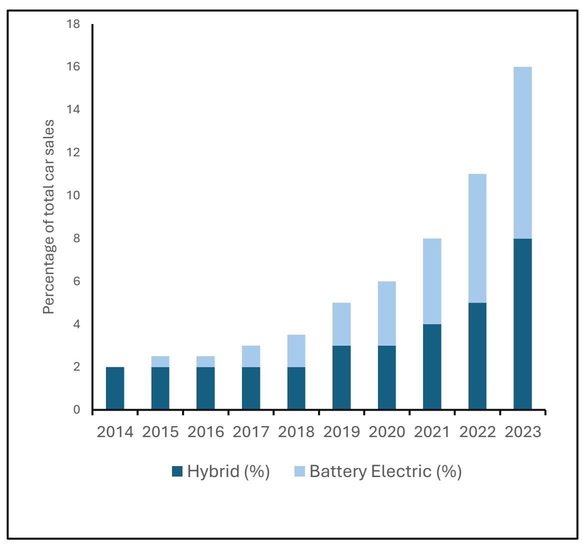


Figure 6: Breakout of EV sales – U.S. Market



Source: U.S. Energy Information Administration (eia).

[1] https://www.iea.org/reports/global-ev-outlook-2024

[2] https://about.bnef.com/electric-vehicle-outlook/

[3] https://www.iea.org/reports/global-ev-outlook-2024 ; https://www.kbb.com/car-news/america-set-ev-sales-record-in-2024/

California leads the nation, with over 1.7 million EVs, with the District of Columbia and Hawaii close behind in high adoption rates. (see Figure 10). As discussed in Section 2, the varying levels of EV adoption are influenced by different sets of priorities and policy interventions across the country. Markets with strong EV adoption, like California, have pioneered supportive measures for charging infrastructure and financial incentives. In the Northeast, New Jersey, Massachusetts, and New York are emerging as leaders in EV deployment and policy.[4]

Figure 7: U.S. EV stock and annual growth rate

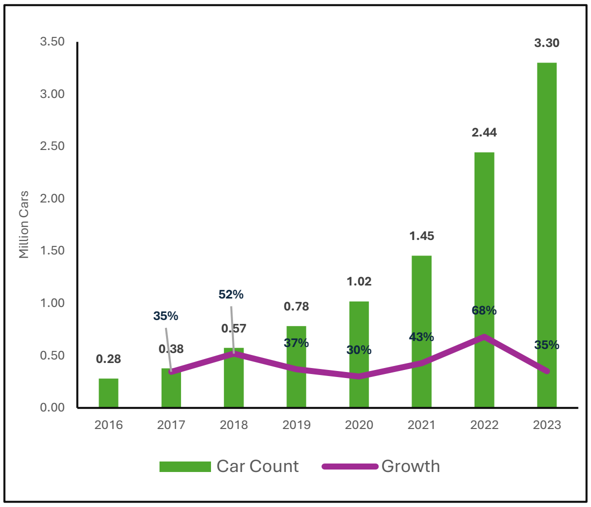
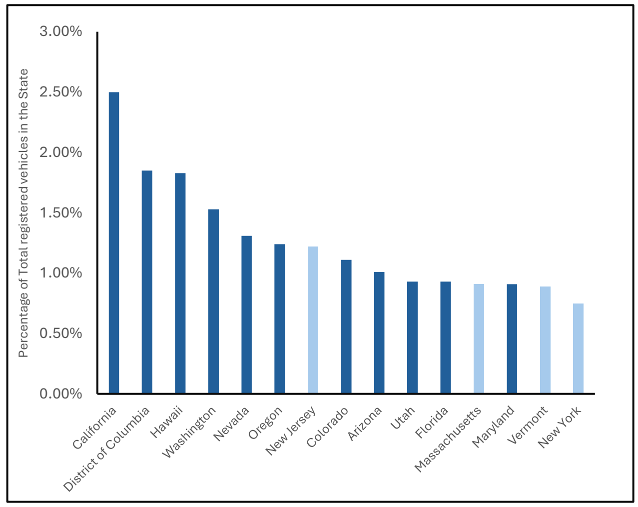


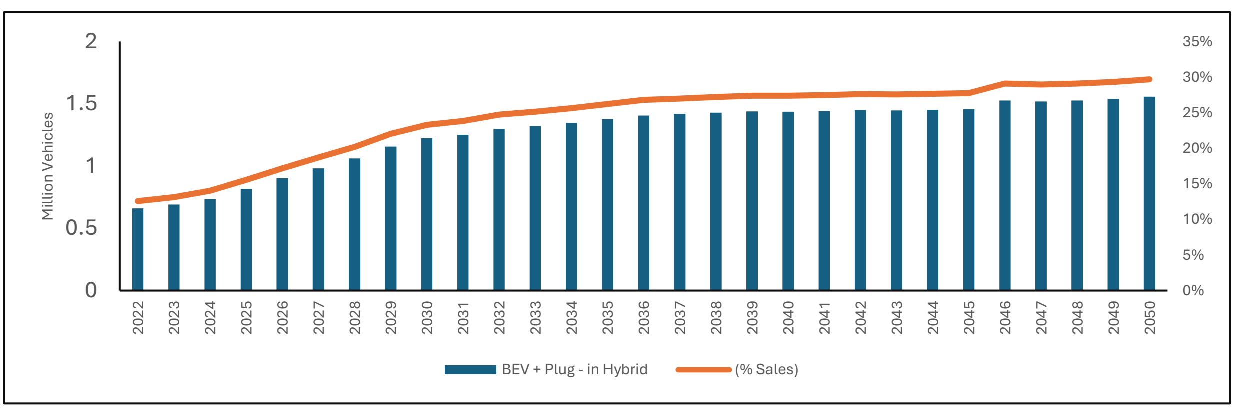
Figure 8: Top 15 States - Market Share U.S. - 2023



Source: DoT - Alternative Fuels Data Center – TransAtlas.

Based on the 2023 annual energy outlook from the U.S. Energy Information Administration (EIA), it is projected that EVs, including both BEVs and plug-in hybrid electric vehicles (PHEVs), will represent between 13 percent and 29 percent of new light-duty vehicles (LDVs) sales in the U.S. by 2050. These estimates are attributed to the decreasing costs of EV components and the implementation of federal and state policies that either provide incentives for EV purchases or mandate minimum sales.[5].

Figure 9: Projected EV U.S market share



Source: U.S. Energy Information Administration (EIA).

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[4] https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

[5] https://www.eia.gov/todayinenergy/detail.php?id=56480

1.1.3 EV Markets in New England

The EV market in New England has shown significant growth over the past five years, consistently exceeding the national average growth rate, except for a dip in 2022 (refer to Figure 12). By the end of 2023, the region had 127,000 registered BEVs, representing a 20-fold surge since 2016 (Figure 15). Massachusetts and Connecticut have been the main contributors to this impressive growth. While national BEV growth slowed in 2023, New England saw a 92 percent surge, with Rhode Island leading the way at 127 percent, followed by Massachusetts (97 percent) and Connecticut (95 percent). As a result, 77 percent of the EVs on New England roads are owned by residents in Massachusetts and Connecticut. Growth in New Hampshire, Vermont, and Maine has been more modest, with New Hampshire reporting a slowdown in 2023. (Figure 13). In New Hampshire, there were about 9,200 BEVs by the end of 2023, representing a market share of 0.55 percent.

Figure 10: Annual growth rate BEV Stock.

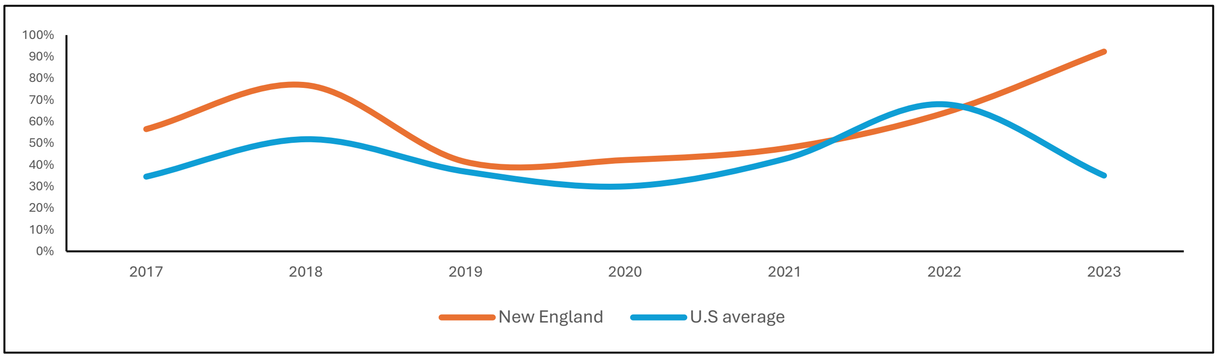


Figure 11: Annual growth rate by State

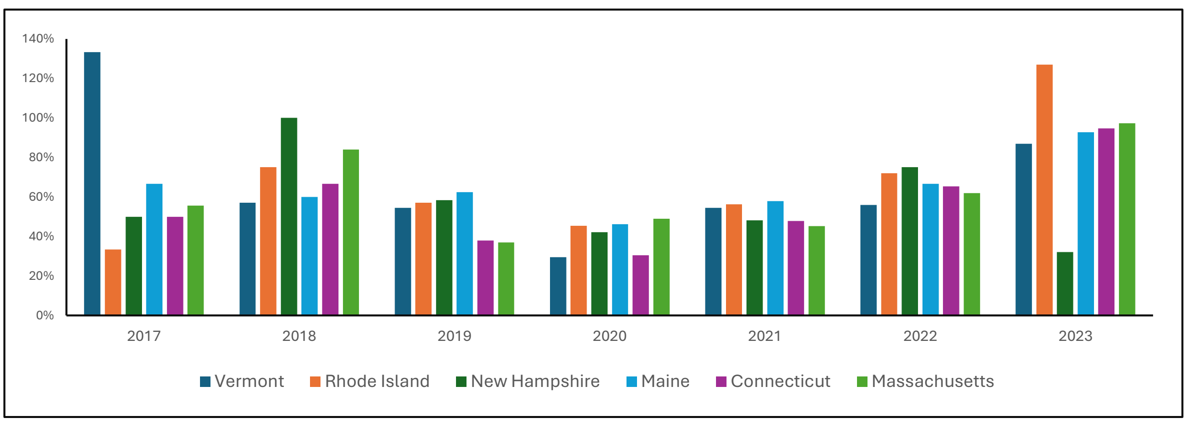


Figure 12: EV Penetration – Market Share by State (percentage of total registered vehicles)

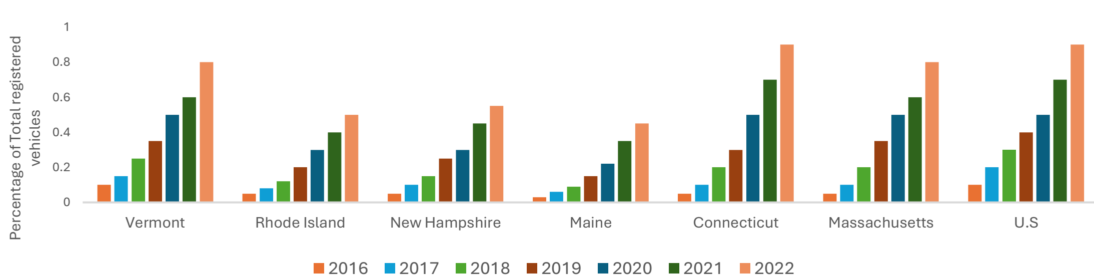
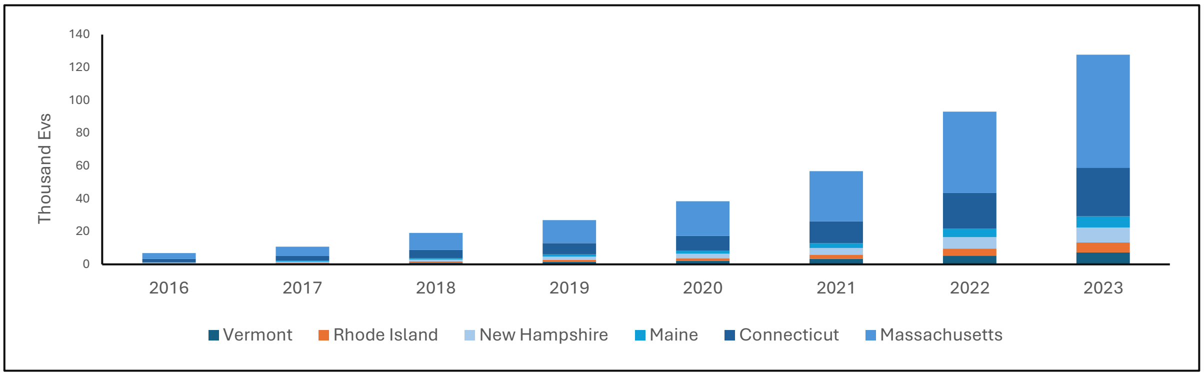


Figure 13: New England EV Stock by State



Source: Source: DoT - Alternative Fuels Data Center.

According to a forecast by ISO-NE, the Independent System Operator of New England, it is estimated that there will be around 3 million BEVs in New England by 2033, which is 24 times the current number of EVs (Figure 16). Consequently, the market penetration of BEVs in New England is projected to approach 30 percent of the total number of vehicles on the road (Figure 17).

Figure 14: New England BEV Adoption Forecast

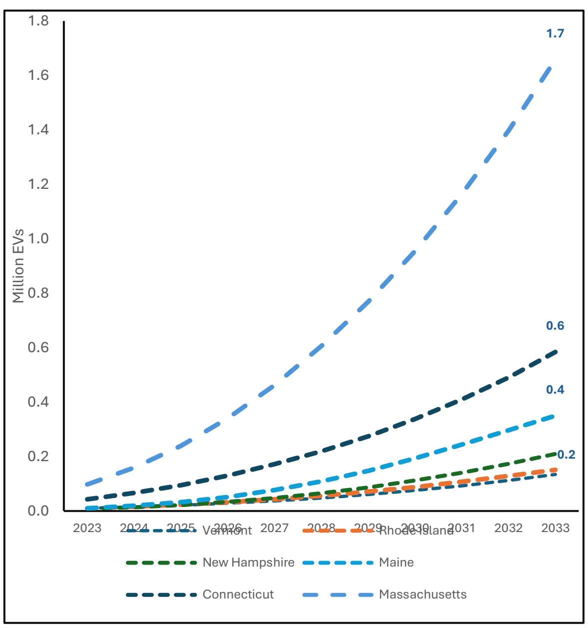
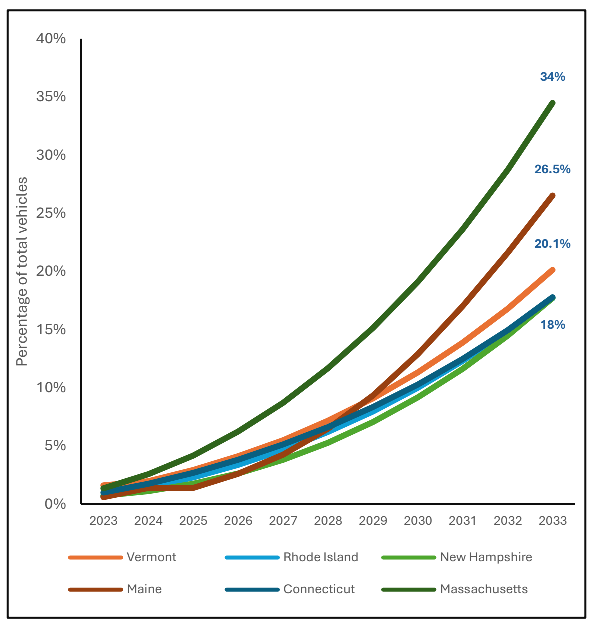


Figure 15: New England BEV Market Share Forecast



Source: ISO New England - Final 2024 Transportation Electrification Forecast

1.2. Sustainable Transportation for a Sustainable Planet

Overall, the transportation sector accounts for approximately 30 percent of total U.S. energy needs and 70 percent of U.S. petroleum consumption[6]. As a result, the transportation sector has been the largest source of greenhouse gas (GHG) emissions and pollutants in the United States, accounting for 28 percent of the total U.S. emissions, followed by the electricity sector with 25 percent. Light-duty vehicles (LDVs) are a major contributor, responsible for 57 percent of these emissions, followed by medium and Heavy-Duty trucks with 23 percent. Carbon dioxide makes up the majority (97 percent) of greenhouse gases emitted by transportation activities[7].

According to New Hampshire's Priority Action Plan, in 2021, the transportation sector was responsible for 45.9 percent of the State's total GHG emissions (see Figure 1), with passenger cars accounting for 40 percent of these emissions, followed by Heavy–Duty vehicles with 28 percent (See Figure 2)[8]. LDVs account for almost 70 percent of the sector's emissions, being the primary mode of passenger travel in New Hampshire and the major contributor to other air pollutants.

Figure.1: New Hampshire's Total GHG Emissions in 2021 by Sector.

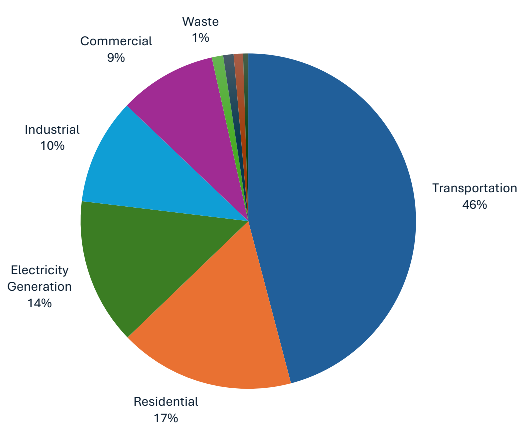
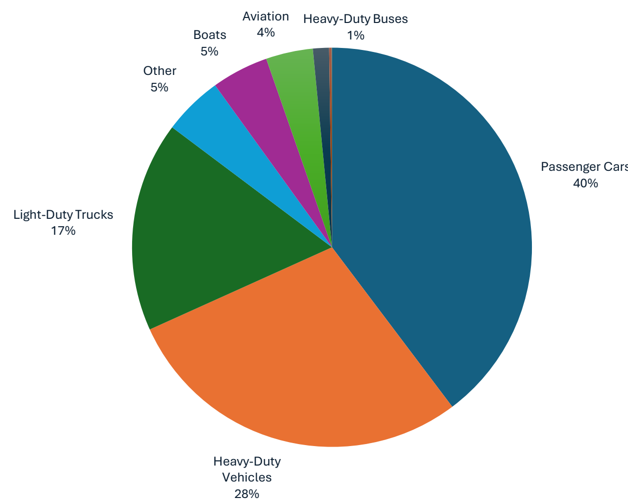


Figure 2: New Hampshire's Total GHG Emissions from the Transportation Sector by Vehicle Type.



Source: State of New Hampshire – Priority Climate Action Plan 2024

New Hampshire Department of Environmental Services

Given the well-documented adverse effects of greenhouse gas emissions on air quality, public health, the environment, and global warming, decarbonizing the transportation and electricity sectors is increasingly recognized as a vital strategy for addressing the growing climate crisis and achieving the goal of net-zero GHG emissions economy-wide by 2050. Electrifying LDVs through widespread adoption of BEVs and building a clean energy grid is the most promising way to cut emissions from transportation and reduce

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[6] https://afdc.energy.gov/fuels/electricity-benefits

[7] https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

[8] https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/state-of-new-hampshire-priority-climate-action-plan.pdf

national carbon output. This transition can lead to improvements in air quality in communities affected by vehicle transit.

BEVs have a life cycle emissions advantage over similar conventional vehicles running on gasoline or diesel, even when accounting for emissions produced during manufacturing. They produce zero tailpipe emissions, resulting in lower GHG emissions over their lifetime[9]. However, the life cycle emissions of an electric vehicle depend on the source of the electricity used to charge it. According to the U.S. Department of Transportation (DoT), transitioning all LDVs in the U.S. to hybrids or plug-in electric vehicles using the current U.S. technology mix could lower carbon pollution from the transportation sector by as much as 20 percent[10].

Cleaner grids amplify the environmental benefits of BEVs. With increasing deployment of renewable energy sources like wind and solar, GHG emissions associated with electricity generation are projected to decline by 22 to 36 percent, according to the National Renewable Energy Laboratory (NREL)[11]. In geographic areas that use relatively low-polluting energy sources for electricity generation, BEV and PHEVs typically have an especially large life cycle emissions advantage over similar conventional vehicles, so the potential for emission and pollutant reductions are higher. This is the case of states like New Hampshire, where more than 70 percent of electricity generation comes from renewable sources. According to the DoE, the average BEV in the U.S. produces approximately 2,727 pounds of CO_2 equivalent over its lifetime. However, in New Hampshire, a BEV produces only 949 pounds, just one-third of the national average (See Figures 3 and 4).

Beyond environmental gains, the electrification of transportation offers substantial economic benefits. Households and businesses can enjoy significant cost savings, while the shift creates new opportunities for industries focused on vehicle manufacturing, charging infrastructure, and clean energy deployment, as well as opportunities for induced demand in various locations (See Section 2).

As renewable energy sources increase their share of the electricity mix, grids become less reliant on fossil fuels, creating a more secure energy source for the electrified transportation sector. According to the Department of Transportation (DoT), transitioning all LDVs in the U.S. to hybrids or plug-in electric vehicles using the current U.S. technology mix could reduce dependence on foreign oil by 30-60 percent.[12] Currently, EVs of all types are already displacing 1.7 million barrels of oil daily, which is equivalent to about 3 percent of total road fuel demand.[13]

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[9] https://www.epa.gov/greenvehicles/electric-vehicle-myths

[10] https://www.energy.gov/articles/history-electric-car#:~:text=Around percent201832 percent2C percent20Robert percent20Anderson percent20develops,Photo percent20courtesy percent20of percent20Wikimedia percent20Commons.

[11] https://afdc.energy.gov/fuels/electricity-research

[12] https://www.energy.gov/eere/vehicles/batteries

[13] Bloomberg – Electric Vehicle Outlook 2024

Figure 3-4: New Hampshire - Electricity Sources and Fuel-Cycle Emissions.

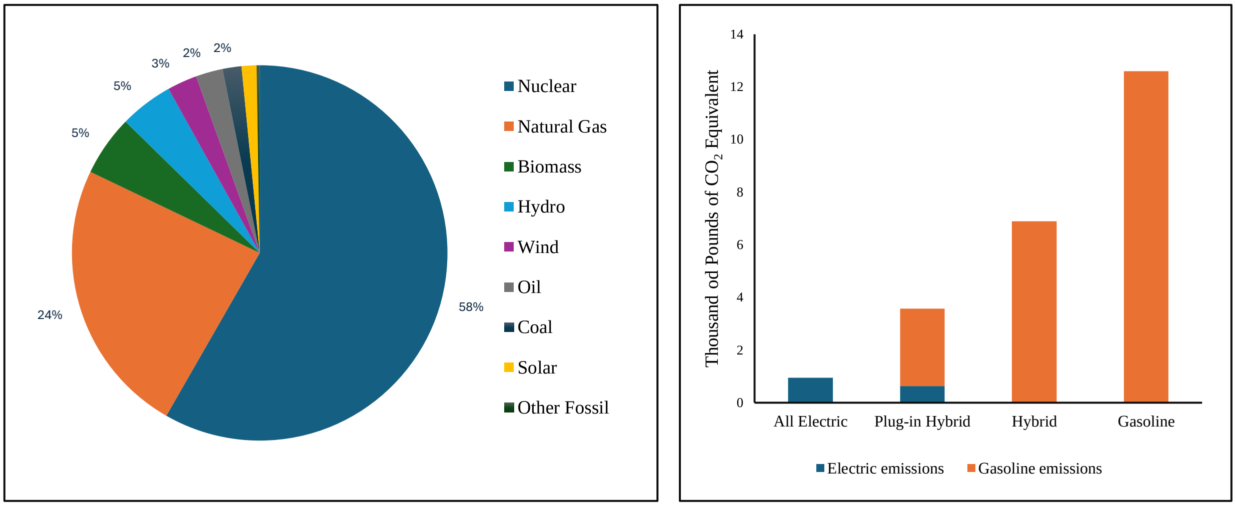
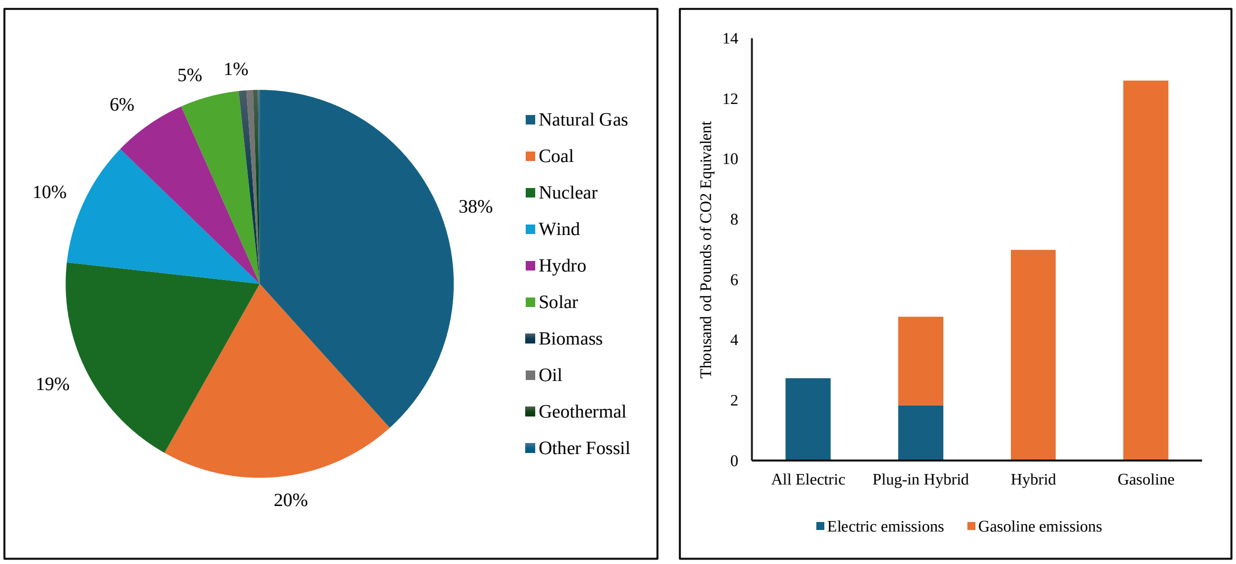


Figure 5-6: U.S average - Electricity Sources and Fuel-Cycle Emissions.



Source: Deparment of Energy - Alternative Fuels Data Center

Bold emissions policies and incentives are driving global growth in the EV market, much like those that revolutionized solar and wind power. Policy tools such as commitments, standards, subsidies, and incentives have been employed by governments worldwide to foster innovation, remove entry barriers, and address capital constraints. As a result, EVs are more accessible, with falling battery prices, improved range, and enhanced affordability. This progress is paving the way for a significantly scaled market, poised to unlock substantial economic and environmental benefits (see Section 2).

1.3. Charging Infrastructure

An adequate and dense EV charging infrastructure is essential to realizing the economic, environmental, and social benefits of transportation electrification. Without sufficient charging options, consumers may hesitate to make the shift from ICVs, limiting progress toward cleaner and more efficient transportation systems.

While home charging accounts for about 80 percent of EV charging in the U.S., according to the Energy Information Administration (EIA), public charging infrastructure plays a critical role in enabling widespread adoption. Home charging offers the greatest energy savings and efficiency gains, but public chargers at destinations and along travel corridors are necessary for long-distance travel and equitable access for those without home charging options.

To address this demand, governments worldwide have increased investments in public charging infrastructure. In 2023, global public charging stock grew by more than 40 percent, with the number of fast chargers increasing by 55 percent, surpassing the growth rate of slower chargers. This surge in fast chargers reflects the growing need for rapid recharging solutions to accommodate EV users on the go.

The U.S. has also seen a consistent rise in EV charging stations. Between 2015 and 2020, the number of charging ports more than doubled, and in 2021 alone, the growth exceeded 55 percent. As of today, about 90 percent of the total 68,475 charging stations are public, with 76 percent of the 194,000 public charging outlets being Level 2 chargers and 23 percent being DC Fast chargers. While Level 2 chargers are ideal for extended stops, the limited number of fast chargers presents a challenge for drivers seeking quicker recharging options.

Figure 16: U.S. Public and private EV charging Infrastructure.

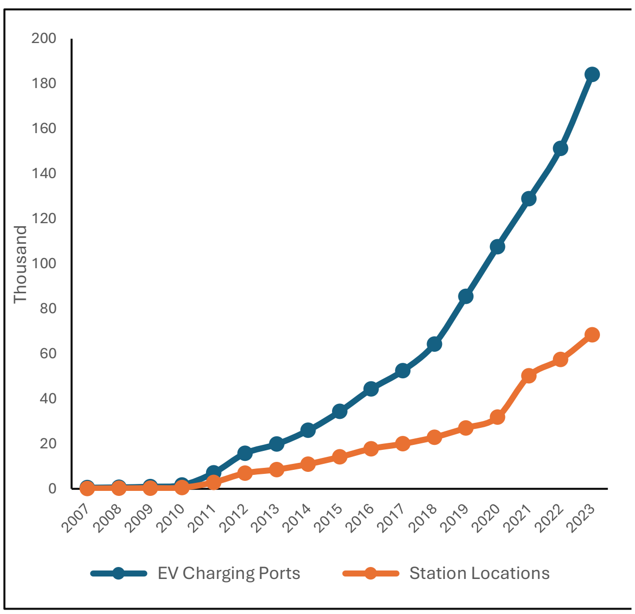
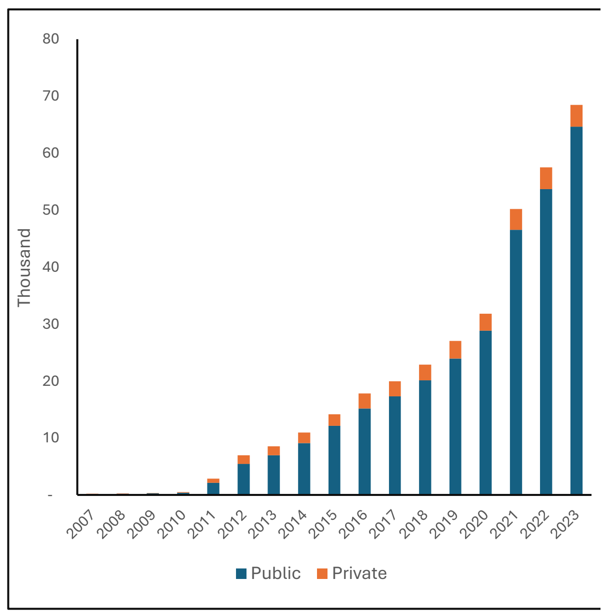


Figure 17: Public vs private charging stations in the U.S.



Source: Alternative Fuels Data Center – U.S. Department of Energy (DoE).

The current charging infrastructure is not strong enough to fully support the growing EV market. The current EV charging infrastructure in the U.S. is insufficient to meet the growing demand. According to the National Renewable Energy Laboratory (NREL), by 2030, supporting 33 million light-duty EVs will require 28 million charging ports, including 1.2 million public chargers, with 88 percent being Level 2 and 12 percent DC-fast (See Appendix A). Presently, there is a gap of over 1 million public charging ports, primarily in Level 2 stations. NREL estimates that closing this gap will cost between $31 and $55 billion, with investments split between public (48 percent) and private (52 percent) charging. Home charging is expected to remain the primary and most convenient option for approximately 90 percent of EV owners.

1.4. EV Charging Infrastructure in New England

The electric charging infrastructure in New England has developed rapidly over the past decade. Currently, there are approximately 5,300 charging stations in the region, with over half located in Massachusetts (56 percent) and only 5 percent in New Hampshire. Maine has experienced the most significant growth in charging infrastructure, with a 26 percent increase in outlets and a 16.2 percent increase in the number of stations compared to 2014 levels. Additionally, Maine has shown the highest average annual growth rate of 39 percent per year over the last decade. In contrast, Vermont, New Hampshire, Rhode Island, and Connecticut have demonstrated slower growth in their charging infrastructure.

New Hampshire, however, has the lowest number of charging ports, with only 597 statewide. This is about half as many as Maine and Vermont and about a quarter of Massachusetts (Figure 22). New Hampshire also currently has the lowest number of charging stations, with only about 270 stations. However, the ratio of chargers per station is among the highest in the state, along with Maine, with 0.43 and 0.44 charging outlets per station, respectively.

When looking at the number of chargers per number of EVs registered in each New England state, it's clear that since 2019, New Hampshire consistently has had the lowest ratio. This indicates that the number of vehicles is growing faster than the number of chargers compared to other states (see Figure 23).

Figure 18: Number of EV charging stations in NE

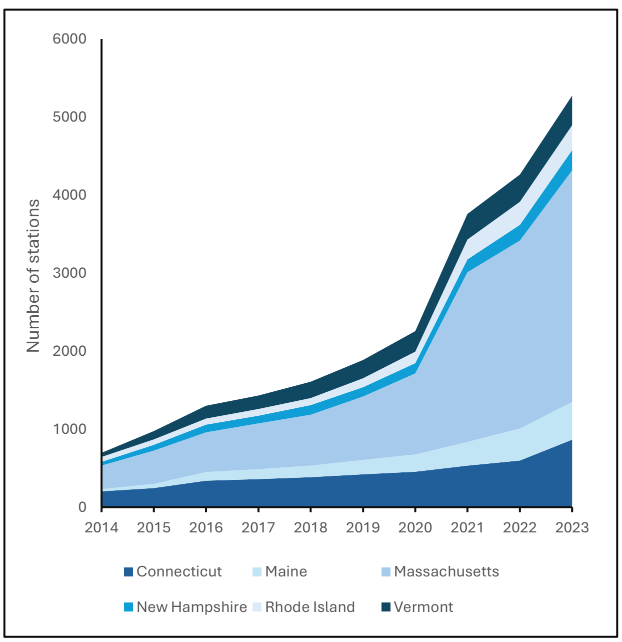
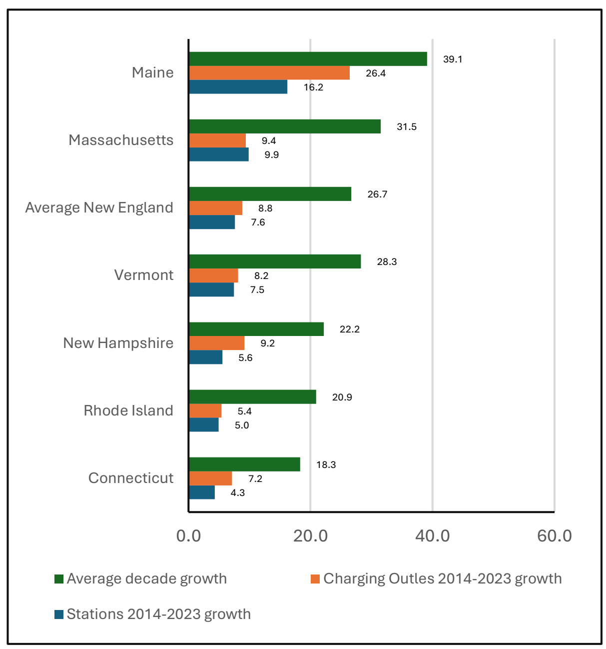


Figure 19: EV charging stations percentage growth rate for NE states



Source: Alternative Fuels Data Center – U.S. Department of Energy (DoE).

Figure 20: Number of charging points by charger type.

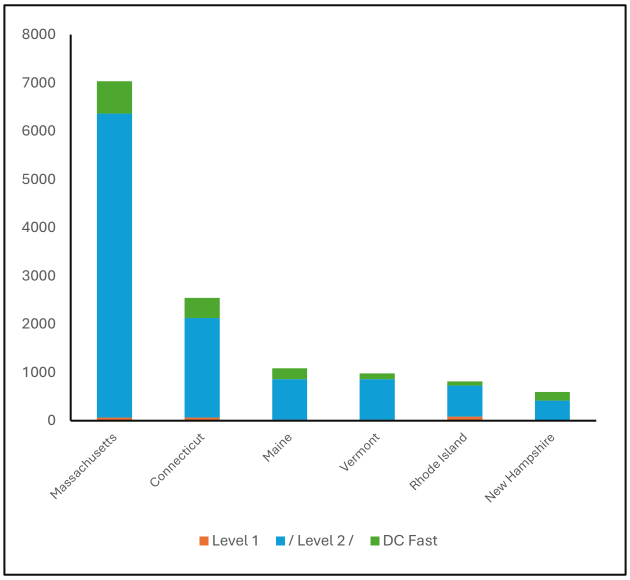
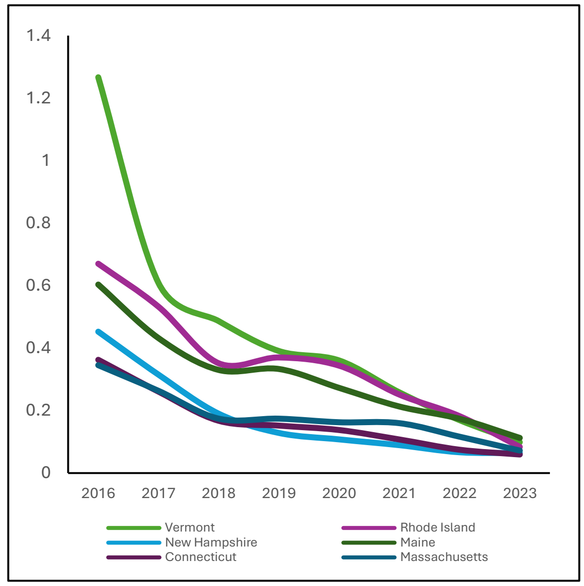


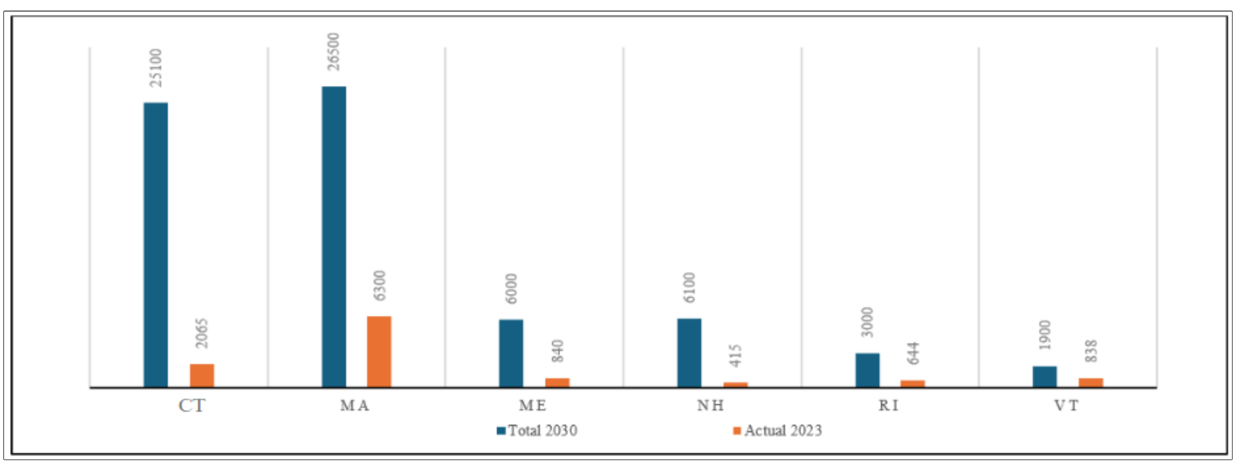
Figure 21: Ratio of charging capacity to EV



Source: Alternative Fuels Data Center – U.S. Department of Energy (DoE).

According to NREL, by 2030, New England will require approximately 68,600 charging points to accommodate about 2.1 million PEVs. The largest shortfall in public charging infrastructure is expected to be in L2 chargers, varying by state.

Figure 22: Charger gap - Number of public charging outlets



Source: National Renewable Energy Laboratory.

New Hampshire has the largest gap in the percentage of L2 charging points, with only 7 percent of the total chargers needed by 2030 currently available. This means New Hampshire lacks 93 percent of the required chargers (see Figure 25). In contrast, Vermont and Massachusetts are better positioned, with 45 percent and 25 percent of the needed chargers already in place, respectively. The gap for DC-Fast chargers is notably smaller, with 20 percent of the required chargers for 2030 already installed (Figure 26).

Figure 23: L2 chargers' gap (chargers needed by 2030 as percentage of current number of chargers)

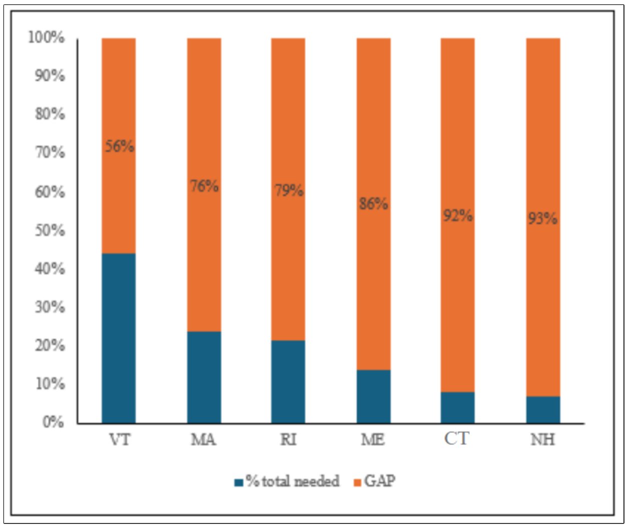
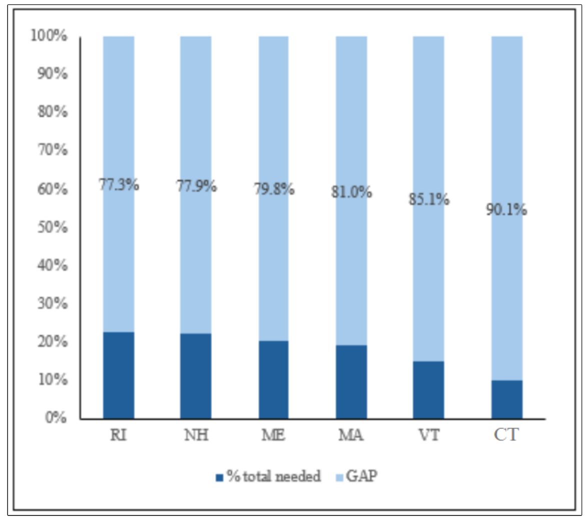


Figure 24: DC- Fast chargers' gap (chargers needed by 2030 as percentage of current number of chargers)



Source: National Renewable Energy Laboratory.

The state of New Hampshire faces a growing challenge in keeping up with the EV market. With only 5 percent of New England's charging stations and just 597 charging ports statewide, New Hampshire is drastically behind in meeting the needs of its growing fleet of light-duty BEVs. Neighboring states, such as Massachusetts, Connecticut, Maine, and Vermont, are accelerating their EV adoption, creating a clear infrastructure gap that will have ripple effects on New Hampshire's economy. As EV owners increasingly travel through New England, they are more likely to choose destinations with reliable charging options, putting New Hampshire's tourism and local businesses at risk.

To address this challenge, New Hampshire must close the charging infrastructure gap and accelerate investments in EV infrastructure. This will not only help meet the demands of a growing fleet of electric vehicles but also ensure the state remains competitive in attracting both residents and visitors.

2. Economics of EVs: Demand, Supply, Externalities, Market Failures and the Case for Public Intervention

The demand for EVs and public charging infrastructure is deeply interconnected: more chargers drive EV adoption, while greater EV ownership increases the need for charging stations. This creates a classic *chicken-and-egg dilemma*, where market forces alone fail to provide sufficient investment in either, slowing mass adoption and limiting environmental and economic benefits.

This section explores the key factors influencing EV and charger supply and demand, highlighting market entry barriers that distort prices and lead to suboptimal outcomes, such as unequal access to EV technology. While research shows that expanding charging networks creates positive feedback loops, boosting both EV adoption and infrastructure investment, no single market player has the incentive to build a nationwide network fast enough to meet climate goals. Public investment in charging infrastructure is a proven, cost-effective solution to overcome these market failures. This section demonstrates how public policies can mitigate market barriers and promote the rapid growth of EV infrastructure and EV adoption.

2.1. A Two-Sided Market Framework: Demand and Supply

2.1.1. Demand for EVs

Vehicle buyers face the decision of choosing among various vehicle models available in the market, including both internal combustion vehicles (ICVs) and electric vehicles (EVs). To maximize their utility, individuals consider three primary factors: Total Ownership Cost (TOC), charging availability, and their specific preferences.

Total Ownership Cost (TOC):

The TOC includes the up-front cost (retail price) of acquiring a vehicle and the expected operational expenses and savings over its lifetime, such as maintenance, insurance, depreciation, and the cost of powering the vehicle. Currently, the TOC of EVs is higher than that of internal ICVs. This is primarily because battery electric vehicles (BEVs) have upfront prices that are about $3,000 to $25,000 greater than their gasoline counterparts as of 2022.[14] The cost of BEV models has been decreasing considerably in recent years, thanks to technological advances, increased competition, the availability of more models, and reductions in battery prices.

In the United States, the sales-weighted average price of electric cars decreased over the 2018-2022 period, primarily driven by a considerable drop in the price of Tesla cars, a brand that holds a significant share of sales.[15] EVs offer higher fuel efficiency and lower maintenance costs compared to ICVs. In 2023, the average price for all LDVs increased by 1.5 percent, which narrowed the price gap between battery electric vehicles (BEVs) and the overall industry average LDV transaction prices to $2,000 at the end of 2023, down from a $19,000 gap in June 2022.[16]

EVs offer higher fuel efficiency and lower maintenance costs compared to ICVs, resulting in savings on fuel and overall ownership expenses due to the high efficiency of their components. These savings are not negligible; gasoline consumption represents a significant portion of direct energy-related spending for U.S. households, particularly those with lower incomes. According to the American Council for an Energy-Efficient Economy (ACEEE), many lower-income U.S. households spend nearly one-fifth of their income on gasoline, which is three times more than the national average.[17]

According to the National Renewable Energy Laboratory (NREL), when comparing the Levelized Cost of Charging Electric Vehicles in the United States, driving an EV instead of a comparable conventional vehicle can save a driver as much as $14,500 on fuel costs over 15 years. Additionally, a study on Sizing, Energy Consumption, and Cost of Advanced Vehicle Technologies demonstrates significant improvements in fuel economy over time. By 2045, plug-in hybrid electric vehicles (PHEVs) could achieve a 73 percent to 96 percent improvement in fuel economy.[18]

Empirical research finds that there are indeed significant savings. The average cost of electricity for charging battery electric vehicles (EVs) is $0.15/kWh and $0.14/kWh for plug-in hybrid electric vehicles (PHEVs) in the United States. However, these costs vary considerably, ranging from $0.08/kWh to $0.27/kWh for battery EVs, depending on charging behaviors and equipment costs. This variation

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[14] https://theicct.org/wp-content/uploads/2022/10/ev-cost-benefits-2035-oct22.pdf

[15] https://www.iea.org/reports/global-ev-outlook-2024

[16] https://www.eia.gov/todayinenergy/detail.php?id=61344

[17] https://www.aceee.org/white-paper/2021/05/understanding-transportation-energy-burdens

[18] https://afdc.energy.gov/fuels/electricity-research

corresponds to total projected fuel cost savings of between $3,000 and $10,500 over a 15-year period compared to gasoline vehicles.[19]

Survey results confirm that savings play a crucial role in driving the demand for electric vehicles (EVs). For instance, in a 2023 EV driver survey by Plug In America, 20 percent of participants cited cost savings, while 35 percent mentioned national security[20]. In Maine, survey results indicated that 79 percent of residents bought or leased EVs to reduce air pollution and combat climate change, and 44 percent did so to save money on gasoline. Additionally, Maine EV owners reported significant savings, with 97 percent finding their EVs easy and affordable to maintain, 56 percent saving $50 or more per month on gasoline costs, and another 23 percent saving over $25.[21]

While energy costs for EVs are typically lower than those for comparable conventional vehicles, their purchase prices can be considerably higher. It is expected that as production volumes rise and battery technologies advance, EV prices will converge with those of conventional vehicles. However, cost remains a significant barrier to the widespread adoption of EVs. According to a Consumer Report survey in 2022, 58 percent of respondents indicated that the purchase price would prevent them from buying an EV[22] Similarly, 48 percent of Americans said that tax rebates at the time of purchase would encourage them to consider buying an EV. [23]

Size and Density of the EV Charger Network

The EV charger network's size and density affect EV drivers' capacity on the road to power their vehicles as fast and often as they need to reach their destination points.

EV driving range: EV range refers to the number of miles an EV can travel using the energy stored in its battery without needing a recharge. This range is typically influenced by the vehicle's battery capacity and driving behavior. The uncertainty and discomfort associated with whether an EV can reach its destination or the next charging station without completely depleting the battery is known as "range anxiety." Range anxiety is a significant factor that has impacted demand for EVs.

According to the Environmental Protection Agency (EPA), the EV range has significantly improved in recent years. The number of electric car models with a range of over 300 miles per charge in the US has increased fivefold since 2021. For example, the total range of new electric vehicle models at the end of 2023 varied from 263 miles to 410 miles, compared to a range of 185 to 310 miles in 2021.[24] According to the 2023 EV Driver Survey by Plug In America, over 90 percent of electric vehicle owners have access to home charging, but most also charge in public, at least occasionally. By adjusting their charging preferences, EV consumers can reduce their electricity bill costs by charging during specific hours (Time of Use).

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[19] https://www.sciencedirect.com/science/article/pii/S2542435120302312

[20] https://pluginamerica.org/wp-content/uploads/2023/05/2023-EV-Survey-Final.pdf

[21] https://www.nrcm.org/wp-content/uploads/2022/08/2022-NRCM-EV-survey-results.pdf

[22] https://article.images.consumerreports.org/image/upload/v1657127210/prod/content/dam/CRO-Images-2022/Cars/07July/2022_Consumer_Reports_BEV_and_LCF_Survey_Report.pdf

[23] https://advocacy.consumerreports.org/wp-content/uploads/2024/02/CR_2023EV-Survey_Facthseet_Final.pdf

[24]https://www.fueleconomy.gov/feg/PowerSearch.do?action=noform&path=3&year1=2021&year2=2023&vtype=Electric&srchtyp=newAfv&pageno=1&rowLimit=50

Figure 25: Frequency of Public Charging

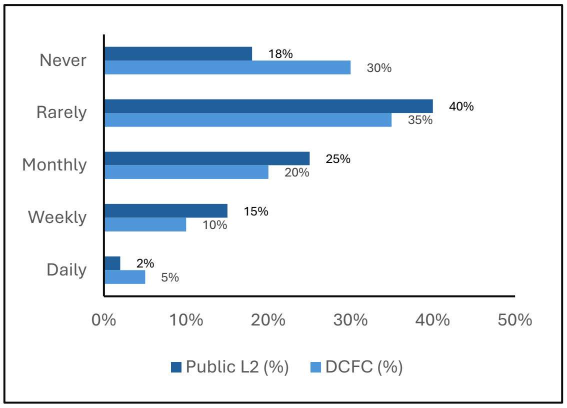
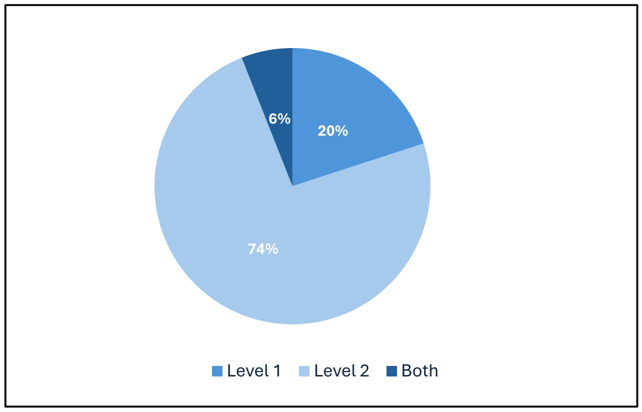


Figure 26: Home Charging



Source: Plug in America 2023 EV Driver Survey

Unlike home charging, individual EV owners have limited influence on improving the availability and cost of public charging infrastructure. Even if a group invests in charging stations, the network will remain too small to drive widespread EV adoption. Extending the range between home charges and allowing access for drivers without home charging is essential.

EVs and public charging infrastructure are interconnected through positive network effects. Network effects occur when an increase in the existing stock of a good leads to a rise in the value of a complementary good for prospective consumers. In the EV market, indirect network effects are particularly significant. The availability of essential complementary goods, such as charging infrastructure, not only provides benefits but also enhances the value of EVs.[25]

Due to positive network effects, the demand for EVs and the supply of EV chargers are jointly determined. The demand for EVs depends on the size and density of the EV charger network: the more extensive and widespread the charging infrastructure, the more drivers can travel to various destinations and recharge easily, increasing the utility of EVs. Conversely, the supply of chargers depends on EV sales: the larger the EV fleet, the more each charger is used and the more revenue it generates over time.[26]

The positive network externalities between the two sides (EV drivers and Charging stations) have important implications for policymaking. The current fast-charger network has been built ahead of demand,[27] which helps accelerate EV adoption, since a robust charging network boosts consumer confidence in EVs. According to a 2022 Consumer Report Survey, 59 percent of respondents stated they would hesitate to buy an EV without sufficient public charging stations.[28]

Consumer Preferences

Consumer preferences play a significant role in purchasing EVs, especially as the market shifts into the mass consumer segment and barriers to entry, such as cost, are being overcome through credits and

[25] https://www.nber.org/system/files/working_papers/w29093/w29093.pdf

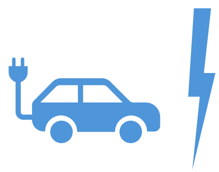
[26] https://scholar.harvard.edu/files/stock/files/policies_for_electrifying_the_light-duty_vehicle_fleet_in_the_united_states.pdf

[27] https://www.pwc.com/us/en/industries/industrial-products/library/electric-vehicles-charging-infrastructure.html

[28] https://www.consumerreports.org/cars/hybrids-evs/interest-in-electric-vehicles-and-low-carbon-fuels-survey-a8457332578/

rebates. Once the initial cost hurdle is addressed, preferences related to the inherent utility of EVs become more important in the decision to purchase an EV instead of an ICV.

Environmental stewardship is a key driver in the increasing adoption of EVs. These vehicles typically have a lifecycle emissions advantage over comparable conventional vehicles running on gasoline or diesel, enabling buyers to significantly reduce their carbon footprint. The Plug In America Survey 2023 revealed that over 40 percent of EV owners were primarily motivated by environmental and air quality concerns. Furthermore, 57 percent of them considered it vital or very important for EVs to be charged with renewable energy, further enhancing their environmental benefits.[29]



Two main barriers to entry for EV demand remain:

- **High Purchase Cost:** The relatively high purchase cost of EVs compared to internal combustion vehicles (ICVs) makes it particularly difficult for low- and middle-income segments to acquire EVs.
- **Availability of Public Charging Infrastructure:** The availability of public charging infrastructure is crucial to alleviating consumer apprehension about reliability and range.

2.1.2. Charging Infrastructure Supply

The U.S. Department of Energy defines EV infrastructure as the structures, machinery, and equipment necessary and integral to support EVs, including battery chargers and rapid chargers, also known as electric vehicle supply equipment (EVSE)[30]. Therefore, it includes the infrastructure needed to supply electricity to the EVSE, the EVSE itself, and the connectors that transfer the charge to the vehicle— all essential components for powering an EV. The cost of upgrading the electrical infrastructure required to make a commercial site ready for EV charging, called "make-ready," can account for up to 30 percent of the total cost of charging for fleets[31]. There are three types of chargers:[32]

Table 2: Overview of EV Chargers

	Level 1	**Level 2**	**Direct Current (DC)-Fast**
Voltage	120 V AC	208 - 240 V AC	400 V - 1000 V DC
Typical Power Output	1 kW	7 kW - 19 kW	50 - 350 kW
Estimated PHEV Charge Time from Empty	5 - 6 hours	1 - 2 hours	N/A
Estimated BEV Charge Time from Empty	40 - 50 hours	4 - 10 hours	20 minutes - 1 hour[6]

[29] https://pluginamerica.org/wp-content/uploads/2023/05/2023-EV-Survey-Final.pdf

[30]https://afdc.energy.gov/laws/6534#:~:text=EV percent20infrastructure percent20is percent20defined percent20as,chargers percent2C percent20and percent20battery percent20exchange percent20stations.

[31] https://www.edf.org/media/worth-investment-report-finds-utilities-fleet-owners-consumers-benefit-when-utilities-cover

[32] https://afdc.energy.gov/laws/6534

Estimated Electric Range per Hour of Charging	2 - 5 miles	10 - 20 miles	180 - 240 miles
Typical Locations	Residential	Residential, Multi-family, Workplace, and Public	Public, Highway corridors (on -the go).
Equipment cost per connector[33]	0- $900	$380 - $690	$38,000 - $90,000
Installation cost	$400 to $600	$1,300 - $2,500	$20,000 - $60,000
Source: U.S. Department of Transportation (DoT)[34].			

There are typically three main agents involved in the supply of charging infrastructure: host locations, charging equipment providers, and utilities. Since investments in electric charging infrastructure include make-ready expenses (in front of the meter and behind the meter), the purchase and installation of EVSE, and the costs associated with its operation and maintenance, it is common to see hybrid models in which utilities, equipment providers, and infrastructure operators assume a share of the costs (See Table 2 and Appendix B).

Utilities: As the demand for EVs continues to grow, utilities play an important role in supporting the projected future growth of charging infrastructure and managing energy efficiency optimization for charging stations and the electrical grid. Likewise, utilities have been playing an increasingly larger role in facilitating EV charging infrastructure under different business models: Make -Ready Model, utility - owner operator/ end-to-end model and administering rebates for ESVE (See Table 4). Utilities can also offer a variety of incentives that encourage residential, commercial, and multi-unit customers to purchase certain alternative fuel vehicles and install EVSE to support vehicle charging.

Table 4: Utility Investment Models

Type	Description
Make -Ready Model	It limits a utility's investment to the equipment necessary to connect the PEV charging infrastructure to the grid.
Owner operator/ end-to-end model	The utility owns and operates all components of the PEV charging infrastructure.
Rebates for ESVE	Utilities administer and provide rebates for PEV charging infrastructure installation and make-ready investment costs in bot public and private locations
Source: Georgetown Climate Center.	

Utilities are incentivized to actively support electric vehicle adoption to manage grid impact and promote energy efficiency. Investor-owned utilities, however, typically operate under the supervision of regulatory commissions. These commissions oversee investment amounts, usage, and cost recovery mechanisms, such as demand charges, to ensure fairness for ratepayers. Approval from these commissions is necessary, as they evaluate whether the investments align with the public interest.

[33] https://afdc.energy.gov/fuels/electricity-infrastructure-development

[34] https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds

Utility investments in charging infrastructure have been, and will remain, crucial in expanding EV charging networks to support the accelerating adoption of electric vehicles. As of December 2022, Atlas Public Policy reports that investor-owned utilities had been approved nearly $2 billion for publicly accessible charging stations in 31 states. 60 percent has been directed towards make-ready investment; 12 percent has been allocated for direct rebates and incentives to lower the cost of EVSE to customers; and 24 percent has been approved for utility ownership and operation of EVSE. Of the $2 billion, 50 percent across 25 states is intended for public EV charging. Additionally, utilities had proposed another $1 billion for transportation electrification in 26 states, pending commission approval. 23 percent of utility funding for electric vehicles has targeted underserved communities. New York leads with the largest approved investment amount at $560 million, followed by California with $537 million, Massachusetts with $229 million, and Florida with $143 million. The costs for ratepayers of the different programs vary depending on the proposed pilot and regulatory commission approvals (see Appendix C).

Private charger equipment providers: Currently, there are over 20 charging equipment providers in the U.S. The largest ones include Tesla, Electrify America, ChargePoint, and EVgo. These providers operate two kinds of stations: networked charging stations and non-networked charging stations. Networked charging stations typically require membership, a card, or an app to access, and they may or may not have a fee. The two most common EV charging network providers in New England are ChargePoint and EVgo. Non-networked charging stations do not require any membership to activate and are usually free. Users can simply connect when they plug in or may need an access code.[35]

Host locations: Host locations may include homes, multi-family housing, workplaces, and public places such as parking lots, malls, grocery stores, hotels, and tourist destinations. These sites have incentives to invest in charging infrastructure to attract customers and grow their businesses as the EV market expands. Destination charging also provides economic opportunities as EV drivers engage in activities while their vehicles charge.

Markets have seen increased benefit from partnerships between private suppliers of loading equipment and companies or host sites with a broad customer base, ensuring sufficient utilization in the future. For example, Starbucks partnered with Volvo and ChargePoint to install fast chargers at 15 locations between Denver and Seattle. Subway and GenZ EV Solutions partnered to develop charging parks equipped with picnic tables, Wi-Fi, bathrooms, and playgrounds near some of Subway's locations. Airbnb reported that searches using their EV charger filter increased by over 80 percent from 2022 to 2023 leading to a partnership with ChargePoint.[36] However, non-corporate or small and medium-sized businesses may struggle with the high cost of investing in chargers and limited customer base for such investments.

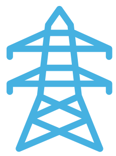
Depending on the business model, investments in EVSE are usually recovered through the charging price, which reflects the Levelized Cost of Charging (LCOC). This cost includes expenses related to the purchase and installation of charging equipment, as well as retail electricity prices. However, due to network effects, charging infrastructure needs to be installed before demand materializes. Suppliers in this market face risks associated with high initial capital investment and demand uncertainty, resulting in substantially higher sunk costs. For example, the use of a direct current fast charging (DCFC) station can incur a demand charge that significantly increases the electric bill for the operator. In the early stages of

[35] https://www.ene.org/ene-drives-electric/ev-charging-guide/#:~:text=The percent20two percent20most percent20common percent20EV,may percent20require percent20an percent20access percent20code.

[36] https://news.airbnb.com/airbnb-and-chargepoint-partner-to-support-growing-demand-for-ev-chargers/

EV adoption, there are not enough EV drivers to offset these demand charges, making the cost of providing EV charging services prohibitively expensive.[37]

To boost EV adoption, one approach is to spread the customer site and distribution system infrastructure costs across all utility customers. This would significantly lower electrification costs for vehicle owners. The effect on other electricity ratepayers would hinge on whether the program generates more revenue through increased electricity sales than the utility incurs in costs.[38]



Entry Barriers for Private Investment in EV Charging Infrastructure:

- **High Up-Front Investment Costs:** The significant initial costs of electric vehicle supply equipment (EVSE) and make-ready investments.
- **Uncertainty About Future Demand**: Future demand uncertainty affects the utilization of charging infrastructure and the ability to offset demand charges.
- **Regulatory Landscape:** Utilities and other private parties face a highly regulated environment when investing in charging infrastructure.
- **Compliance**: Investments in EV charging must comply with existing building codes, ordinances for parking, and applicable regulations and standards, which results in high transaction costs.

2.2. Externalities and Market Failures in EV Markets

High costs and structural barriers discourage private investment in electric vehicles (EVs) and charging infrastructure. Consumers, businesses, and investors make decisions based on perceived costs and benefits, but they often fail to account for broader societal impacts. This gap, where private choices don't reflect social costs or benefits, leads to market failures, resulting in fewer EVs on the road and underinvestment in charging networks.

One major cause of market failure is externalities—costs or benefits that extend beyond the buyer or seller. For example, internal combustion vehicle buyers perceive a lower purchase price but do not account for the pollution and public health costs their vehicles impose on society. Conversely, EV buyers see higher upfront costs while overlooking the societal benefits of cleaner air and lower greenhouse gas emissions. These price distortions lead to fewer EV purchases and inadequate charging infrastructure, reinforcing a cycle of low adoption.[39]

Most externalities fall into the category of indirect effects when an agent's private decision impacts the consumption and production opportunities of others. Externalities can be negative or positive. A negative externality occurs when one party indirectly imposes a cost on another. This is the case with ICVs, which have lower prices but high environmental and health costs. Conversely, a positive externality occurs when one party's actions directly benefit another, creating a difference between private and social gains, as is the case with EVs. However, with positive externalities, as opposed to negative externalities, private returns are usually smaller than social returns, making it particularly challenging to surpass the effect of distorted prices.

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[37] https://www.chargeaheadpartnership.com/sites/default/files/2024-01/CAP percent20COMMENTS percent20PA percent20PUC percent20Proposed percent20Policy percent20Statement percent20M-2023-3040755.pdf

[38] https://www.edf.org/media/worth-investment-report-finds-utilities-fleet-owners-consumers-benefit-when-utilities-cover

[39] https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Externalities

2.3. Market Failures in EV Markets

Unless all costs and benefits are internalized by households and firms making buying and production decisions, market outcomes can lead to underproduction or overproduction relative to society's overall well-being. This situation, known as market failure, occurs when private market-based decisions fail to yield efficient outcomes from a general welfare perspective. In the context of EV markets, market failures result in insufficient investment in charging infrastructure, which in turn leads to inadequate demand for EVs and prevents the realization of extensive margin effects.

Expanding the EV market is particularly challenging due to network externalities – in this case, where the value of charging infrastructure depends on the number of EVs on the road, and vice versa. A single charging station might struggle to attract enough users if other stations are scarce along the route. This uncertainty discourages private investment, despite the long-term benefits of a robust charging network.

Even when multiple companies enter the market, infrastructure gaps persist. For instance, a single company may build enough chargers to support 1,000 EVs a day and turn a profit. But a more efficient outcome might involve multiple companies installing chargers in key locations, supporting ten times as many EVs while lowering costs and boosting adoption. If barriers prevent this optimal scenario, the result is a market failure that limits economic and environmental benefits.

Market failures also create inequities in EV adoption. Lower-income, rural, and underserved communities (all of which stand to benefit most from lower fuel and maintenance costs) often have limited access to charging infrastructure. Rural drivers, for example, travel longer distances and spend more on fuel, yet charging networks remain sparse in these areas. High infrastructure costs and lower expected EV demand discourage private investment, leaving these communities behind.

Addressing these market failures requires targeted policies and incentives to correct price distortions, encourage investment, and ensure equitable access to EV benefits. Without intervention, New Hampshire risks falling behind in EV adoption, missing out on economic growth, job creation, and environmental improvements.[40]

2.4. Overcoming Market Failures Through Policy Interventions

Market participants can be expected to internalize some, but not all, of the benefits of network effects if there are low barriers to entry and firms can achieve sufficient scale[41]. This is usually the objective of policy interventions that seek to correct EV market failures. Since the early stages of the EV market, policymakers have recognized the presence of such failures and the challenges they pose for widespread EV adoption. Policy interventions can correct market failures by eliminating entry barriers and reaching the scale necessary for externalities to be internalized by agents so that society can benefit from an optimal market equilibrium from a societal standpoint. They are not meant to be sustained over time, but they level the playfield for market mechanisms to take over.

EV adoption in the U.S. has not been driven solely by market forces; government intervention has played a crucial role from the outset. Early movers like Tesla benefited significantly from such support. In January 2010, the Department of Energy issued a $465 million low-interest loan to Tesla Motors to produce specially designed, all-electric plug-in vehicles and develop a manufacturing facility. This policy

[40] https://www.transportation.gov/rural/ev/toolkit

[41] https://www.nber.org/system/files/working_papers/w29093/w29093.pdf

intervention helped overcome entry barriers for the first innovator in the U.S. EV industry, enabling Tesla to release the first zero-emissions, full-size EV to the market.[42]

Another example of how government funding spurred early private investment in EV charging is ChargePoint, Inc., a private EV service provider. ChargePoint received a $15 million matching grant from the 2009 American Recovery and Reinvestment Act (ARRA) through the Transportation Electrification Initiative, administered by the Department of Energy (DoE). Additionally, the California Energy Commission allocated $3.4 million to ChargePoint for installing residential and public electric vehicle charging infrastructure in California. Using these funds, the company deployed 4,600 charging ports by 2013.

Policy interventions to alleviate market failures in EV markets have primarily focused on:

- **Correcting price distortions:** Most policy interventions in the last decade have focused on incentivizing the purchase of EVs and the investment in charging infrastructure by addressing the two main barriers that create price distortions in the EV market: high purchase costs and high up-front investment costs for chargers. These measures typically take the form of **financial incentives such as grants, loans, tax credits, exemptions, rebates, and low-interest loans.** These incentives partially or fully subsidize or reduce the up-front cost of purchasing an EV and the sunk entry costs of charging investments to reflect the social benefits (real price), thereby alleviating the price distortions that prevent agents from entering the market.
- **Addressing inequality of market outcomes:** These types of policy interventions aim to **mitigate the inequitable effects that competitive markets can have on vulnerable populations and communities**. They also acknowledge that existing financing mechanisms can perpetuate structural and social inequalities, failing to provide adequate resources to those most impacted by societal issues such as climate change. For example, the Federal Charging and Fueling Infrastructure Grants - Community Charging and Fueling Grants (Community Program) prioritize funding for low-income, underserved, rural, and high-density communities.

  Other policy measures include **levers to ensure the investments create community benefits and jobs while reducing income inequality through funding set-asides and prioritization for underserved and environmental justice communities**.
- **Capacity building, technical assistance, and awareness raising measures involve** allocating resources and efforts to improve the capacity of states and local governments to apply for federal funds, commissioning, or funding studies, and designing plans and roadmaps. These measures also include initiatives to increase awareness of existing policies and funds, particularly in underserved communities. For instance, many consumers are unaware of incentives for purchasing EVs. According to research, 39 percent of Americans have not heard of incentives available to EV owners. Only 47 percent are aware of tax credits for the purchase of new EVs, and just 19 percent are aware of tax credits for the purchase of used EVs.
- **Enacting EV-friendly laws and regulations:** Implementing measures to incentivize, coordinate, regulate, and monitor the adoption of EVs and charging infrastructure. These measures include:
  - ***Alleviate regulatory barriers that involve high transaction costs:*** Regulations can streamline the approval process for EV charging infrastructure projects, increasing clarity and transparency for applicants. Regulators can adapt compliance requirements, such as building codes, parking ordinances, and zoning ordinances, to make them more EV-friendly. For example, updating building codes can mandate that all new construction and major renovations incorporate EV charging infrastructure. EV-friendly building codes can also reduce the overall cost of EV charging infrastructure development if EV-ready

[42] https://www.energy.gov/lpo/tesla#:~:text=In percent20January percent202010 percent2C percent20the percent20Department,for percent20powering percent20specially percent20designed percent20all percent2D

spaces are included in new construction. It costs 4-6 times more to add EV-ready elements post-construction compared to during construction or major renovation.[43]

- ***Establishing goals and setting regulatory targets*****:** Setting regulatory targets and establishing goals involves creating and enacting laws to achieve climate objectives by reducing greenhouse gas (GHG) emissions from the transportation sector and adopting stringent standards. Implementing such policies sends a clear message about policy priorities, enabling better policy alignment and budget allocations to support these goals. Additionally, these policies provide clear signals to markets. (Appendix E)
- ***Regulation of Utility Investment in EV Charging:*** Utility regulation influences at least three major areas related to DCFC infrastructure viability: demand charges, make-ready work, and equipment incentives. Several states have enacted legislation to mandate or encourage electric utilities to support transportation electrification and invest in PEV charging infrastructure. Typically, these laws mandate utilities to present comprehensive investment proposals to public utility commissions. These proposals usually include customer incentives, charging and rate programs, customer education initiatives, and investments in charging infrastructure. The goal of these measures is to boost EV adoption rates and effectively manage the costs and reliability impacts of EV charging[44]. Requiring utilities to develop comprehensive plans for transitioning to electric transportation as part of a state electrification strategy is considered the best practice. Once these plans are approved, utilities usually submit specific program proposals to their commissions for implementation, either through a general rate case or a separate proceeding.[45] The best practice calls for a phased or "iterative" approval of utility investment.

Careful planning and regulatory processes can leverage utilities' unique roles as critical partners in accelerating infrastructure development. Utility investment can enhance coordination and adoption, leading to more efficient outcomes as part of a larger coordinated plan. For example, in 2011, the California Public Utilities Commission (CPUC) largely halted efforts by investor-owned utilities (IOUs) to promote transportation electrification due to concerns about the impact of utility investments on the private market. This led to uneven and inequitable development of EV infrastructure in California, despite increased adoption. In response, the CPUC acted in 2014, followed by the state legislature’s enactment of Senate Bill 350 in 2015. This legislation emphasized the crucial role of regulated utilities in market transformation, declared comprehensive EV planning to be in the public interest, and mandated that each utility submit detailed plans and programs, including tariffs, to the Commission for review and approval.[46]

Utilities across the country are increasingly gaining state regulatory approval to invest in electric transportation. Various programs have been enacted by state governments or through executive orders aiming to mandate the implementation of pilot programs. These programs typically seek to achieve state goals related to zero-emission vehicle deployment, EVSE (Electric Vehicle Supply Equipment) infrastructure, or reducing greenhouse gas emissions. Examples of such regulations include New Jersey's Senate Bill 2252, Florida's House Bill 296 (2020), and Utah's SB 7018 (2020). Similar programs have been initiated by commissions to encourage utilities to offer incentives for plug-in electric vehicles (PEVs) and EVSE, often as part of their energy efficiency and green power regulations. Utilities are required to complete an application and review process to ensure that the program design is appropriate and in the public interest. Some examples are

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[43] https://afdc.energy.gov/fuels/electricity-codes-and-ordinances

[44] https://www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf

[45] https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

[46] https://www.csis.org/analysis/utility-involvement-electric-vehicle-charging-infrastructure-california-vanguard

Southern California Edison Company in California and Dayton Power and Light Company (DP&L) in Ohio. Furthermore, there have been utility-driven initiatives where utilities seek approval to develop pilot programs. Examples of these measures include New Jersey, Delaware, Pennsylvania, and Wisconsin.[47]

The impact of investing in charging infrastructure on electricity rates is a major concern for utilities, regulators, advocates, and consumers. These regulations show how government policies can address market failures by seeing the positive effects of developing electric vehicle infrastructure, which are advantageous to the public. Ultimately, regulators need to determine if the potential benefits to the grid, customers, and society justify the costs of utility investments in developing PEV charging infrastructure. This includes establishing a model of utility involvement to determine the most effective approach in each area. Utility regulators will play a crucial role in ensuring that investments in PEV infrastructure are sound, fair, and reasonable. They will align these investments with other policy objectives, ensure fairness for ratepayers, and secure a reasonable return on investment for utilities.[48]

Twenty-four states offer incentives such as grants or tax credits to support the deployment of EV charging stations (See Appendix E Figure 1 & 2)[49]. Additionally, Figure 29 illustrates the significance of these financial incentives in promoting the adoption of EVs.

2.5. Funding Sources for EV Charging Infrastructure

Public investments in EV public charging stations began over a decade ago with federal funding for competitive grants. Since then, funding for EV infrastructure has diversified and grown, coming from multiple sources and sectors. These include federal and state governments, private investments, approved programs from investor-owned utilities, and government-mandated supplemented by the Volkswagen (VW) settlement.[50] Strategic public investment has been a direct way to overcome market failures that limit the expansion of charging infrastructure and the adoption of EVs.

Federal Government:

The federal government has been the largest investor in charging infrastructure for over one decade. Since 2009, American Recovery and Reinvestment Act of (ARRA) funds began accelerating the public EV charging network at the regional or state level[51]. A decade later, in 2021, the Infrastructure Investment and Jobs Act (IIJA) included an unprecedented $7.5 billion EV charging investment dedicated to supporting EV adoption through dedicated funding for vehicles and charging infrastructure. In addition, in 2022 the 2021 IIJA allocated an additional $47 billion to support EVs.[52] Most of the resources are intended to supplement, match, and subsidize state, local government, and community funding.

The IIJA set aside two primary sources of funding for strategic grants to states and local governments to deploy EV chargers. The $2.5 billion Charging and Fueling Infrastructure (CFI) Discretionary Grant Program administered by the Federal Highway Administration (FHWA) provided funding over 5 years

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47 https://afdc.energy.gov/laws/utility-examples#/mandates

48 https://www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf

49 https://afdc.energy.gov/laws/matrix?sort_by=reg

50 https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

51 https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

52 https://www.atlasevhub.com/data_story/3-billion-in-federal-funding-for-evs-to-date/

and is open to state, regional, Tribal, and local government entities. The program provides two funding categories of grants:

(1) Community Charging and Alternative Fueling Grants (Community Program)[53]

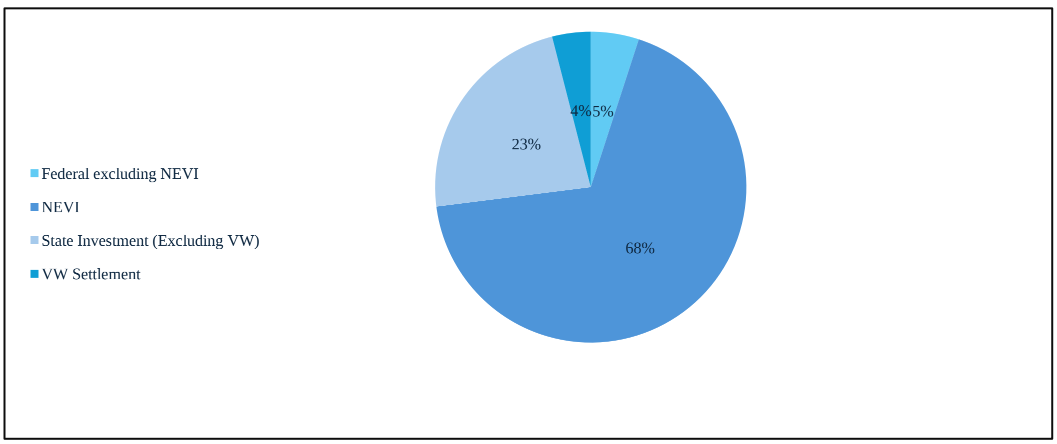
(2) Charging and Alternative Fuel Corridor Grants (Corridor Program)[54]

The second program is the $5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program that provides funding to States covering up to 80 percent of the total cost to strategically deploy EV charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability. Initially, funding under this program is directed to designated Alternative Fuel Corridors for EVs to build out this national network, particularly along the Interstate Highway System. The act includes an additional $32.5 billion eligible to support EVs, plus $10.5 billion for grid upgrades and battery development. Additionally, 10 percent of NEVI Formula funding is set aside each Fiscal Year for DOT to fund grants for states and localities requiring additional assistance to strategically deploy EV charging stations under this Program. Funds are made available each fiscal year (FY) through FY 2026, so that each state receives an amount equal to the state funding formula.[55]

State Governments:

Since 2016, governors and state legislatures have been actively investing in EV charging infrastructure to encourage the adoption of plug-in electric vehicles (PEVs) and take advantage of the significant environmental and economic benefits associated with the transition to electric transportation (see Appendix F). State agencies have directly funded the installation of EV charging stations through legislative appropriations. According to Atlas, as of February 2023, nationally, 23 percent of state public investment in EV charging had been funded by direct budgetary appropriations not funded with VW Trust funds, the second largest source after resources from the NEVI formula.[56]

Figure 28: State government investment in EV charging by funding source



Source: Atlas Public Policy (2023)

[53] https://www.transportation.gov/rural/grant-toolkit/charging-and-fueling-infrastructure-grant-program

[54] https://www.fhwa.dot.gov/environment/cfi/

[55] https://afdc.energy.gov/laws/12744

[56] https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

The total state investment by early 2023 had reached $1,405 million mainly focused on financial incentives. The biggest state funded programs have been implemented by the electricity Commissions of New York (Evolve NY - $250 million[57]) and California (Clean Transportation Program - $207 million[58] and CaleVIP – $29.5 million). Smaller programs include Colorado (Charge Ahead Colorado - $9 million[59]) and Massachusetts (VW settlement Climate Protection and Mitigation Expendable Trust – 14 million).[60]

These investments have been bolstered by federal resources and funds from the Volkswagen (VW) Settlement Environmental Mitigation Trust Fund, established in 2016 that have represented 4 percent of total funding. The fund provides $2.7 billion to states for transportation sector emissions reduction projects. Up to 15 percent of each state's allocation can be used to support PEV charging infrastructure for passenger vehicles. By March 2023, states had collectively awarded over $250 million from this fund for EV charging station projects. Section 3 of this report explores the use of direct investment policies and mechanisms in five New England states, including New Hampshire, providing a comparative analysis.

3. Policy Approaches to Support EV Adoption in New England

How are New England states accelerating the shift to electric transportation, and what can New Hampshire learn from them? This section explores the policy strategies fueling transportation electrification across New Hampshire and its neighbors—Massachusetts, Connecticut, Maine, and Vermont (see Appendix H for state-specific figures). It includes information on financial incentive programs for the purchase of EVs and charging infrastructure, utility incentives, and public-private partnerships. Additionally, it provides a roadmap to funding sources, including federal allocations and VW settlement funds, along with state-specific strategies to maximize these resources. Lastly, this section compares these policy approaches, revealing how they shape New Hampshire's competitiveness in the EV landscape.

3.1. New Hampshire

New Hampshire has established some priority measures as part of the 2023 climate action plan. These measures include supporting the adoption of EVs by providing monetary incentives for consumers who purchase electric and plug-in hybrid electric vehicles. However, New Hampshire's policy approach has primarily focused on utilizing federal funds and resources from the VW mitigation trust to fund grant programs for charging infrastructure and to build charging stations along corridors. These initiatives have not been supplemented with state allocations. Nevertheless, in 2022, a program was approved to allow utilities to make investments in readiness for electric vehicle charging infrastructure.

Aggressive approaches to securing federal funding, as seen in states like Massachusetts, rely on matching funds rather than just using the VW and NEVI formula funds. This poses a significant challenge for New Hampshire in competing for those funds. While New Hampshire is just beginning to define policy priorities and actions, other states have advanced far beyond this stage and now possess a wealth of information and data from their interventions. This advantage enables them to set benchmarks and make

[57] harging,implement percent20this percent20funding percent20in percent20phases.

[58] https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program

[59] https://energyoffice.colorado.gov/charge-ahead-colorado

[60] https://atlaspolicy.com/wp-content/uploads/2023/05/Investment-in-Publicly-Accessible-EV-Charging.pdf

informed decisions, reflected in the quality of their funding applications and their ability to establish well-defined and realistic benchmarks.

As a result, there is an inequality in the development of charging infrastructure networks and the adoption of electric vehicles among New England states, as well as in the distribution of competitive federal funds. This inequality favors states that are better positioned to match those funds and have well-defined benchmarks.

The divergence of New Hampshire's policy approach from its neighbors poses four significant challenges for the state:

1. **Lack of Competitiveness in Securing Federal Funding:** At a crucial time of funding opportunities, New Hampshire struggles to secure federal funding, increasing inequity in the development of the EV network in New England, preventing NH from the economic and environmental benefits of EV adoption.
2. **Impact on Tourism:** Massachusetts's policy supporting a massive deployment of EV infrastructure attracts more visitors from Massachusetts entering the state using EVs. Without the necessary charging infrastructure to serve them, New Hampshire's tourism sector loses competitiveness. In addition, Vermont's and Maine's policies are leading to the development of an extensive EV charging network, attracting more visitors. This presents a challenge to New Hampshire, which competes with these states for visitors.
3. **Disadvantages for Rural Businesses and Communities**: An uneven outcome is occurring where rural New Hampshire businesses and communities cannot compete with other states where businesses are supported by state funds to develop EV charging infrastructure.

In recent years, the state has seen several efforts to create and implement pro-environmental policies and regulations by promoting the use of electric vehicles and building charging infrastructure. However, these efforts have not received significant support from the state legislature and regulators. Instead, the primary policy approach has been to establish study commissions and committees to assess impacts and evaluate potential policy options.

3.1.1. Funding

New Hampshire's National Electric Vehicle Infrastructure (NEVI) Planning:

The NEVI program apportioned approximately **$17 million** of funding allocated over the next five years for New Hampshire. The state intends to administer the NEVI funds to develop direct DCFC stations along the State’s Alternative Fuel Corridors (AFCs). The funding will enable growth of EV infrastructure development throughout the State by serving as a resource for a comprehensive EV charging infrastructure network that is intended to equitably support the needs of the State. [61]Specifically, the state received $2,556,450 in FY2022, $3,678,794 in FY2023, and it will receive $3,678,786 in FY2024 to cover an estimated of **682 miles.**[62]

U.S. Department of Transportation discretionary Charging and Fueling Infrastructure Grant Program (CFI):

New Hampshire is looking to apply for the CFI Round 2 that offers up to $1.3 billion in funding for new applications and for previously submitted applications. $521 million is reserved for unawarded

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[61] https://www.dot.nh.gov/sites/g/files/ehbemt811/files/inline-documents/updated-nevi-plan-8-1-2023.pdf

[62] https://driveelectric.gov/state-plans/

applications from the previous FY2022/2023 competition. The state missed $15 million in federal funding for EV charging infrastructure through the CFI Round 1 FY 2022/2023.

3.1.2. New Hampshire Volkswagen Mitigation Trust (NH VW Trust)

New Hampshire received a total of approximately $31 million from the VW Settlement, of which **$4.6 million (15 percent)** were allocated to EV charging infrastructure. The New Hampshire Department of Environmental Services (NHDES) in September 2021 opened a DCFC Request for Proposals (RFP) to cover the cost for contracting for installation plus operation and maintenance for five years and up to 80 percent of eligible costs, or up to 100 percent of eligible costs for EVSE located on state or local government-owned property.[63] Proposals were evaluated and scored in 2022. Over **$4 million** were allocated for the selected proposals in the form of a reimbursement program across twelve locations.[64]

3.1.3 Policy Approaches

The New Hampshire Clean Diesel Grant Program – (DERA funds):

The program is funded by Environmental Protection Agency (EPA) through the Diesel Emissions Reduction Act (DERA) with additional funding from the NH VW Mitigation Trust. Funding is available for up to 100 percent of eligible project costs is available for businesses, individuals, and local or state agencies that reduce diesel emissions by converting engines to alternative fuels, retrofitting exhaust controls, purchasing new vehicles, or adding idle reduction equipment. Eligible alternative fuels include electricity. Grants are awarded on a competitive basis, with equity and environmental justice considerations as part of the evaluation criteria.[65]

Other approaches:

During the 2018 legislative session, Senate Bill 517 established the Electric Vehicle Charging Stations Infrastructure Commission. The commission's purpose was to make recommendations on eight areas related to electric vehicle adoption and charging infrastructure deployment. The committee released a final report in 2018, which recommended "*prioritizing EV charging infrastructure initial investment from the Volkswagen Settlement and other potential sources along the Electric Vehicle Charging Stations Infrastructure Commission - interstate highway system, the NH turnpike system, and other roadways; and prioritized as deemed suitable as determined by OSI, NHDES, and NHDOT in consultation with the commission*".[66]

In 2021, The Legislature encouraged facilitation of EVs through Senate Bill 131 which requires the state to implement various programs and funding related to electric vehicle charging infrastructure and design Electric Vehicle Charging Station Rate Design Standards.[67]

In 2022, New Hampshire Bill 92 proposed the adoption of the California Low Emission/Zero Emission Vehicle (LEV/ZEV) standards in New Hampshire, in alignment with section 177 of the federal Clean Air Act.[68] However, the bill was rejected. Instead, a committee proposed to address the challenge of market

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[63] https://www.das.nh.gov/purchasing/docs/bids/RFP percent20DES percent202022-06.pdf

[64] https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/eligible-projects-received.pdf

[65] https://www.des.nh.gov/business-and-community/loans-and-grants/dera

[66] https://www.dot.nh.gov/sites/g/files/ehbemt811/files/imported-files/20201030-final-report.pdf

[67] https://legiscan.com/NH/text/SB131/id/2340294

[68] https://legiscan.com/NH/text/HB92/id/2621513

readiness and infrastructure in New Hampshire for the incoming wave of low emissions vehicles. In 2022, the New Hampshire Department of Transportation (NHDOT) established an EV Working Committee to oversee and participate in the NH NEVI plan.[69]

In 2023, SB52[70] established a session to form a committee to study electric vehicle charging infrastructure funding, and another to study electric vehicle charging stations for residential renters. The Legislature also modernized electric vehicle charging station statutes for construction projects. The committee, among other things, must:

- Review currently available funding for EV charging stations.
- Identify additional non-ratepayer sources of funding for EV charging stations and determine their feasibility.
- Review non-ratepayer funding mechanisms for EV charging stations utilized in other states. The committee must report its findings and any policy recommendations by November 1, 2024.

In 2023, House Bill 2 passed, establishing an annual fee of $100 for electric vehicle (EV) owners and a $50 annual fee for plug-in hybrid electric vehicle owners, in addition to standard vehicle registration fees.[71]. Some states that have imposed similar fees also allocate some of the revenue to support electric vehicle infrastructure or other priorities. For example, Alabama designates $50 of its $200 fee for new electric vehicle infrastructure, while Washington added an extra $75 fee in 2019 to support charging stations. Colorado dedicates $20 of the $50 EV fee to the Electric Vehicle Grant Fund to support charging stations.[72]

3.1.4 Utility Incentives

The New Hampshire Department of Business and Economic Affairs commissioned a study in 2019 which highlighted "make-ready" investments by utility companies as the most commonly recommended policy that could help develop EV infrastructure in New Hampshire.[73] In 2022, New Hampshire Public Utility Commission (NHPUC) approved Eversource $2.1 million Make Ready program to fund DCFC installations along travel corridors to support EV travel throughout the state. This funding will supplement grants awarded by the New Hampshire Department of Environmental Services (NH DES) through the Volkswagen Mitigation Trust to help cover the costs of EV charging infrastructure.[74]

However, in May 2022, state regulators rejected a proposal for Unitil[75] of $2.8 million. Regulators expressed concern that EV charging would only benefit Unitil's wealthier customers, and worried that the utility's charging stations could compete with those built by businesses or municipalities [76]

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[69] https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/nh_nevi_plan.pdf

[70] https://www.gencourt.state.nh.us/

[71] https://legiscan.com/NH/text/HB2/id/2826213

[72] https://www.ncsl.org/energy/special-fees-on-plug-in-hybrid-and-electric-vehicles

[73] https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/20190524-nh-ev-infrastructure-analysis.pdf

[74] https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-078/LETTERS-MEMOS-TARIFFS/21-078_2022-07-07_EVERSOURCE_SETTLEMENT-AGREEMENT.PDF

[75] https://www.puc.nh.gov/regulatory/Docketbk/2021/21-030/LETTERS-MEMOS-TARIFFS/21-030_2022-03-11_UES_CLOSING-STATEMENT.PDF

[76] https://www.nhpr.org/latest-from-nhpr/2022-05-04/n-h-regulators-reject-unitil-electric-vehicle-proposal

In June 2024, NHPUC received a request for general increases in distribution rates by Eversource by approximately $181.9 million for effect August 1, 2024, through increases to the distribution portion of the Company's rates. For residential customers, Eversource seeks to increase distribution rates by approximately 46.82 percent, with a 16.89 percent increase impact on total residential bills from permanent rates, with further increases potentially to follow as part of its proposed performance-based ratemaking plan and other proposed rate programs.[77]

3.1.5. Comparative Analysis of Policy Approaches and Their Implications For New Hampshire

The New England states discussed in this section have shown a strong commitment to reducing GHG emissions by focusing on electrifying the transport sector. This includes promoting the adoption of EVs and building the necessary charging infrastructure. All New England states, except New Hampshire, have adopted California's low emissions vehicle standards and are part of the ZEV Task Force. These efforts have facilitated the setting of ambitious climate targets supported by investments and concrete policy actions to facilitate mass EV adoption and the deployment of charging infrastructure. By setting clear targets and commitments, these states have established well-defined policy frameworks that lead to effective actions and programs to support widespread EV adoption and the expansion of charging infrastructure. Their approach includes a broad set of interventions such as financial incentives, exemptions, utility involvement, and regulations.

Table 12: Overview policy approaches to support EV adoption.

	Incentives			Market - Based Approaches	Utility Involvement				Regulations and Comissions	
	Grants	Rebates	Exemptions	Flexible Loans - Public- Private partnerships	Make -ready investment	Manage charging / Time-of-Use	Rebates	EVSE Leasing	Approved EV friendly regulations	Establishment of commissions and working groups
MA	✓	✓	✓		✓	✓	✓		✓	✓
CT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VT	✓	✓	✓	✓	✓	✓	✓		✓	✓
ME	✓	✓	✓	✓					✓	✓
NH					✓					✓

[77] https://www.puc.nh.gov/Regulatory/Docketbk/2024/24-070/LETTERS-MEMOS-TARIFFS/24-070-2024-07-03-EVERSOURCE-AFFIDAVIT-PUBLICATION.PDF

In New England, Massachusetts, Connecticut, and Vermont are leading the way in providing various interventions for EVs (see Appendix G for state-specific figures). They are offering incentives, involving utilities, and implementing regulations to support EV adoption. Financial incentives such as grants and rebates are widely used to alleviate barriers to EV adoption and support the development of charging infrastructure. For example, Massachusetts has the MassEV and MOR-EV programs, Connecticut offers the CHEAPR rebate program, and Vermont benefits from Efficiency Maine and Charge Vermont initiatives.

Massachusetts and Connecticut are also focused on comprehensive programs involving investor-owned utilities to support charging infrastructure. These programs not only address EV charging infrastructure readiness but also offer rebates for EVSE, managed charging, and Time-of-Use programs. Funded through ratepayers as part of distribution charges, these initiatives are considered public utility investments.

The utility programs in Massachusetts and Connecticut were strategically designed to unfold in phases, beginning with pilot initiatives. These programs incorporate education and outreach strategies to increase awareness among ratepayers. They also feature evaluation mechanisms to facilitate necessary adjustments or propose changes. A key focus is on prioritizing vulnerable communities and encouraging users to seek additional funding sources for the purchase of EVSE. The overarching goal is to prevent the establishment of end-to-end models that could result in a monopoly by utilities in the EV charging segment.

Maine, Connecticut, and Vermont have pursued market-based approaches to leverage public funds to match private investment to support EV adoption and other green initiatives in addition to their financial incentive's programs. The Connecticut Green Bank, the Maine Clean Energy and Sustainability Accelerator, and The Vermont State Infrastructure Bank (SIB) all provide flexible, low-interest loans for the acquisition of charging infrastructure.

New Hampshire's approach to interventions significantly differs from that of the other four New England states in terms of both number and diversity. While the state has recently enacted legislation to establish committees and study groups aimed at proposing policy measures, which are essential for planning and coordinating efforts to transition to cleaner transportation modes, it lacks a defined policy for expanding electromobility. Unlike its neighbors, New Hampshire currently does not have established and continuous programs that offer incentives for the installation of charging infrastructure or the purchase of EVs.

New Hampshire's policy approach is still in its early planning stages, whereas neighboring states began their initiatives over seven years ago, giving them a comparative advantage in information and knowledge. Massachusetts and Vermont have made significant strategic investments to match federal funds through budget appropriations, while New Hampshire has relied almost entirely on federal funds and resources from the VW settlement and the Diesel Emissions Reduction Act (DERA). Massachusetts and Vermont have adopted an aggressive approach, strategically using public investments to match federal funds and supplementing with 15 percent of the VW settlement resources allocated to each state. This strategy has enhanced their competitiveness in applying for additional federal funds.

Maine has utilized resources from the Maine Jobs and Recovery Act, which uses funds from the American Rescue Plan Act (ARPA), while Connecticut has generated supplemental funding sources, such as the "Clean Air Act" fee on new motor vehicle sales and registrations, to fund rebate programs. In contrast, New Hampshire's reliance on federal funds and VW settlement resources highlights its differing approach and underscores the state's need to develop a more robust and diverse funding strategy to support its EV infrastructure initiatives.

Table 13: Number of incentives to support EV adoption

State	State Incentives	Utility / Private Incentives	Laws and Regulations
MA	13	12	36
CO	8	10	32
ME	8	1	25
VE	8	10	21
NH	1	5	23

Source: Alternative Fuel Data Center (AFDC)

A comparative analysis reveals a policy gap in New Hampshire regarding support for EV adoption compared to the rest of the country. This deficiency affects policy outcomes related to the electrification of the transportation sector. The American Council for an Energy-Efficient Economy (ACEEE) scorecard assesses states based on their efforts to promote transportation electrification in both the light-duty and heavy-duty sectors. States are awarded points on a 100-point scale in five policy areas: Electric vehicle (EV) and EV charging infrastructure planning and goal setting, Incentives for EV deployment, Transportation system efficiency, Electricity grid optimization, and transportation electrification outcomes.[78]

Table 14: 2023 Transportation electrification scorecard

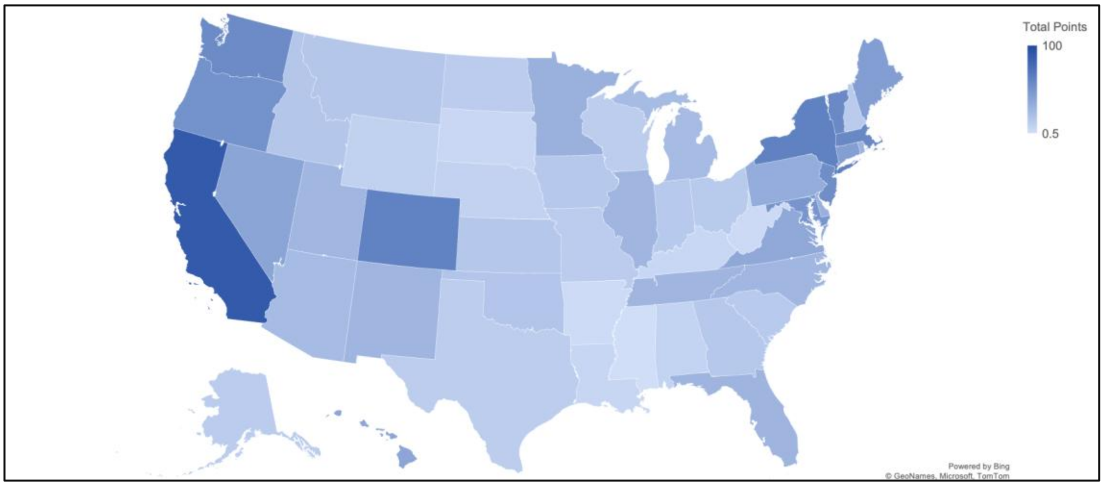
State	Position (Out of 50)	Planning and goals (15 pts.)	Incentives (36 pts.)	Transportation system efficiency (17 pts.)	Electricity grid optimization (9 pts.)	Outcomes (23 pts.)	Total
CA	1	15	30.5	14.5	10	18	88
NY	2	12	25	7	9	9	62
CO	3	11	17	9.5	9	14.5	61
MA	4	10	21.5	8.5	6	11.5	57.5
VT	12	12	14	5.5	7	18.5	57
ME	11	5	16	4	7	11.5	43.5
CT	12	6.5	17	8	5	6	42.5
NH	37	0.5	4	1.5	2	5	13

Source: American Council for an Energy-Efficient Economy (ACEEE)

[78] https://www.aceee.org/sites/default/files/pdfs/T2301.pdf. Huether, P., C. Cohn, B. Jennings, J. Mah, E. Taylor, C. Tolentino, and S. Vaidyanathan. 2023. 2023 State Transportation Electrification Scorecard. Washington, DC: ACEEE. aceee.org/research-report/t2301.

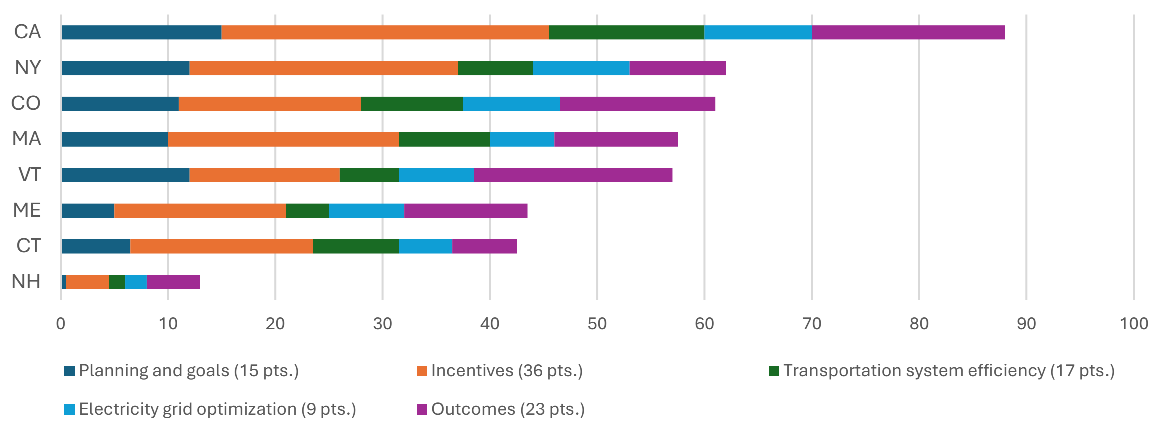
Massachusetts and Vermont are ranked in the top 10, followed by Maine and Connecticut. In contrast, New Hampshire ranks 37th out of 50, with significant deficiencies in the areas of Planning and Goals and Incentives (Figure 32). When analyzing the score and EV adoption, except for Maine, the northeastern states with higher scores also have a higher number of registered electric vehicles per 10,000 residents (Figure 33).

Figure 29: 2023 Transportation electrification scorecard by U.S. state.



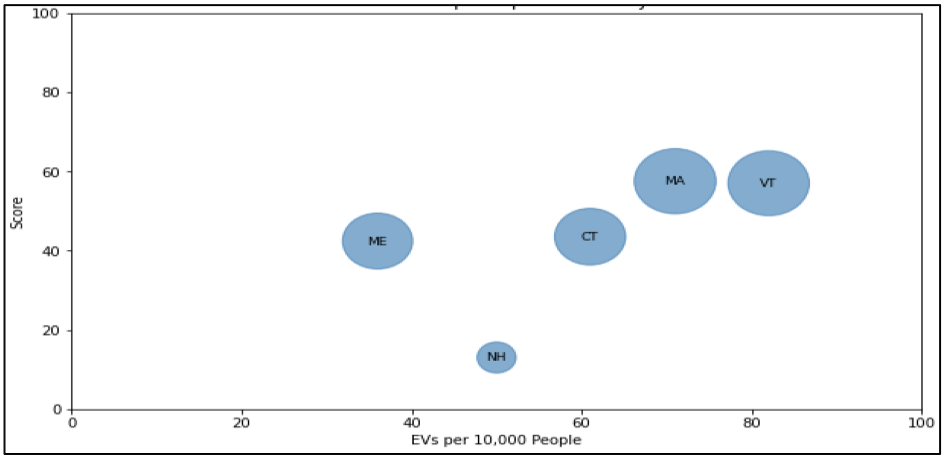
Source: American Council for an Energy-Efficient Economy (ACEEE)

Figure 30: 2023 Transportation electrification scorecard – Policy areas



Source: American Council for an Energy-Efficient Economy (ACEEE)

Figure 31: Policy approach and EV adoption in selected New England States.



Source: American Council for an Energy-Efficient Economy (ACEEE) – Score Card and Alternative Fuel Data Center (AFDC)

The policy approaches followed by several New England states aim to address market failures by providing funding and prioritizing climate goals and communities. This approach not only supports competitiveness at the state government level but also encourages private actors such as residents and businesses to overcome barriers to entry into the EV market and achieve more equitable outcomes.

By leveling the playing field, state governments are ensuring that all stakeholders can benefit from widespread EV adoption. However, timing is critical. New Hampshire is currently in the early stages of defining policy priorities and actions, while federal funding available until 2026 represents a historical funding opportunity. The opportunity cost of not taking advantage of this funding is significant. As demonstrated in the previous section, these funds aim to correct a market failure and are not intended to be sustained over time. Seizing this opportunity is crucial to addressing the market failure effectively.

Aggressive approaches to securing federal funding, as seen in states like Massachusetts, rely on matching funds rather than just using the VW and NEVI formula funds. This poses a significant challenge for New Hampshire in competing for those funds. While New Hampshire is just beginning to define policy priorities and actions, other states have advanced far beyond this stage and now possess a wealth of information and data from their interventions. This advantage enables them to set benchmarks and make informed decisions, reflected in the quality of their funding applications and their ability to establish well-defined and realistic benchmarks.

As a result, there is an inequality in the development of charging infrastructure networks and the adoption of electric vehicles among New England states, as well as in the distribution of competitive federal funds. This inequality favors states that are better positioned to match those funds and have well-defined benchmarks.

4. Economic Impacts Estimates

As stated in previous sections, New Hampshire is lagging in EV charging infrastructure compared to other states. Neighboring states are pursuing policies to support the mass adoption of electric vehicles in line with their ambitious climate change goals. This poses significant challenges for New Hampshire' economy, particularly for sector that rely on visitors. For this analysis, a Monte Carlo simulation was performed to determine the effects of reduced visitor arrivals under different scenarios of charging supply (see Appendix I Figure 1).

Figure 32: Visitors driving EVs – Baseline Scenario

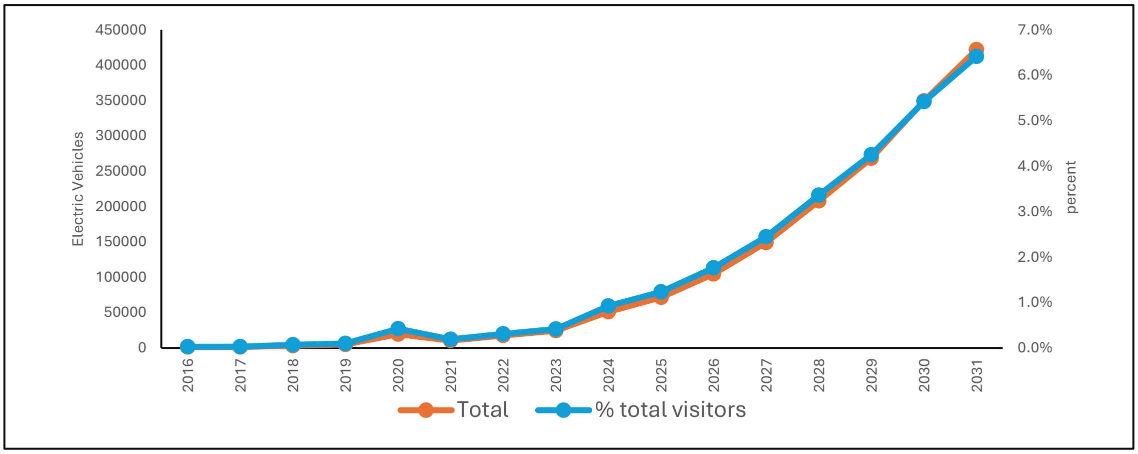
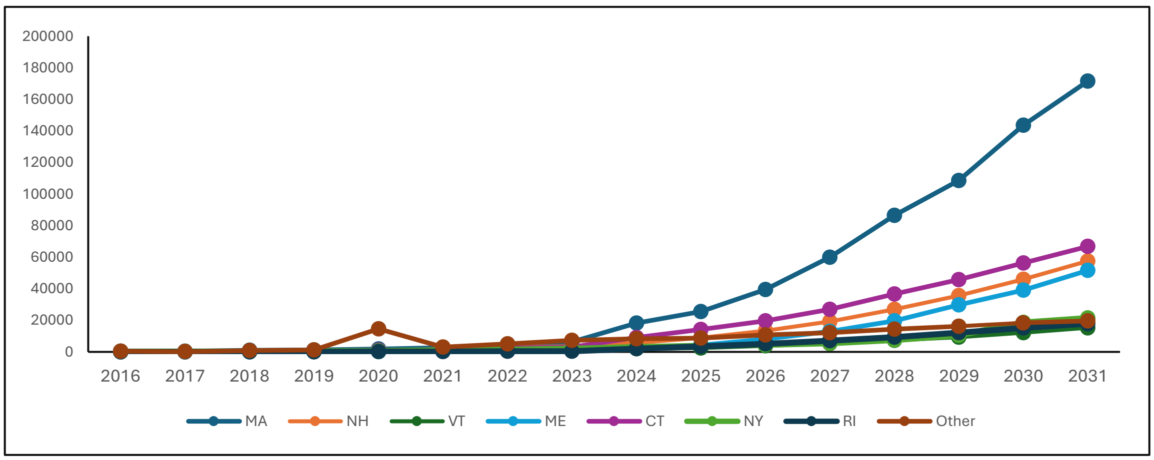


Figure 33: EVs by Origin



4.1 Estimated Economic Impacts at State Level under the Baseline Scenario

Under the baseline scenario, by 2031, our analysis projects that **6 percent** of visitors traveling to the state will drive EVs. However, **39 percent** might not travel to the state due to inadequate charging infrastructure. This shortfall could lead to cumulative tourism spending losses of **$461 million**, with a NPV of **$329.3 million**. The overall economic impact, including direct, indirect, and induced consumption, is estimated to be approximately **$1.4 billion,** with a Net Present Value (NPV) of **$1 billion**.

Additionally, the state is expected to face losses of around **$31 million** in tax receipts and **$287** million in earnings (see Appendix H Figure 2). This could also result in the loss of an estimated **9,000 jobs** across the state (See Appendix H Figure 3).

Table 1: Economic Impacts – Baseline Scenario – State Level

New Hampshire - Baseline

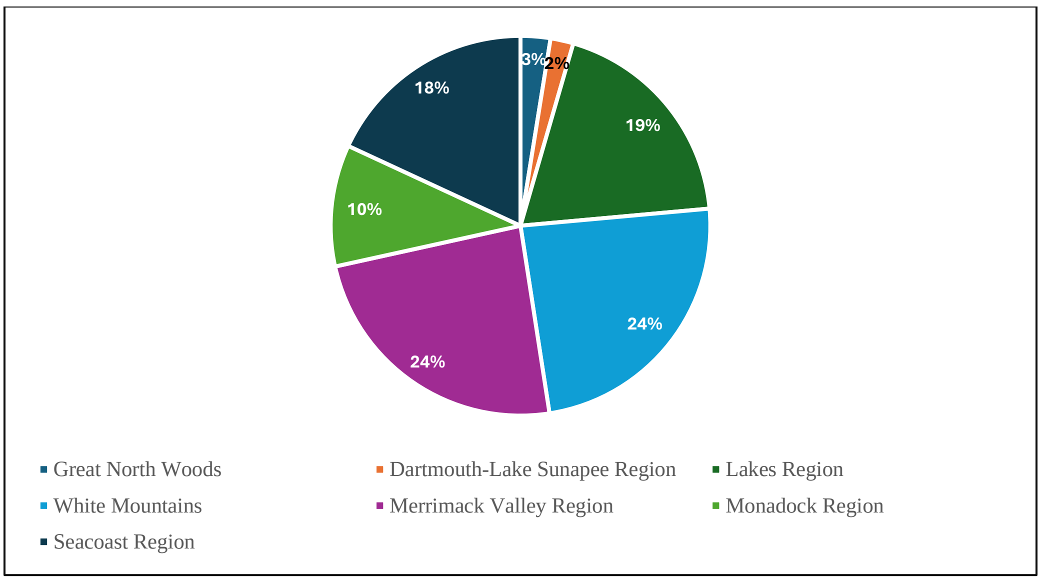
Scenario 1

	Tourist spending	Total spending in the economy	Tax receipts	Total Employment	Earnings
2024	$ 10,214,137	$ 31,357,400	$ 870,127	202	$ 5,507,776
2025	$ 15,872,121	$ 48,727,410	$ 1,355,664	310	$ 10,872,864
2026	$ 25,577,519	$ 78,522,983	$ 2,287,502	506	$ 14,704,661
2027	$ 39,061,455	$ 119,918,668	$ 3,634,794	787	$ 23,497,515
2028	$ 56,819,445	$ 174,435,695	$ 5,449,814	1150	$ 35,558,900
2029	$ 76,722,770	$ 235,538,904	$ 7,214,492	1497	$ 47,364,983
2030	$ 102,408,339	$ 314,393,601	$ 9,721,844	1977	$ 64,245,044
2031	$ 134,479,702	$ 412,852,684	$ 12,917,547	2573	$ 85,808,971
Net present value as 2024	$ 329,309,830	$ 1,010,981,177	$ 30,926,115	N/A	$ 204,838,916
Cumulative loss	**$ 461,155,487**	**$ 1,415,747,344**	**$ 43,451,785**	**9002**	**$ 287,560,714**

Scenario 2

	Tourist spending	Total spending in the economy	Tax receipts	Total Employment	Earnings
2024	$ 8,148,402.09	$ 25,015,594.41	$ 679,806.96	159	$ 4,295,490.90
2025	$ 10,730,421.30	$ 32,942,393.38	$ 879,266.03	203	$ 7,037,427.75
2026	$ 15,011,771.33	$ 46,086,137.98	$ 1,280,318.76	284	$ 8,197,501.15
2027	$ 20,621,139.30	$ 63,306,897.66	$ 1,813,160.13	396	$ 11,664,977.40
2028	$ 27,322,611.56	$ 83,880,417.48	$ 2,469,339.52	525	$ 16,033,482.74
2029	$ 34,437,866.81	$ 105,724,251.09	$ 3,013,196.50	632	$ 19,664,916.81
2030	$ 42,694,037.06	$ 131,070,693.78	$ 3,752,003.19	770	$ 24,628,909.47
2031	$ 53,504,382.74	$ 164,258,455.01	$ 4,737,138.92	953	$ 31,248,185.32
Net present value as 2024	$ 155,288,380.66	$ 476,735,328.62	$ 13,582,294.61	N/A	$ 89,678,400.21
Cumulative loss	**$ 212,470,632.18**	**$ 652,284,840.80**	**$ 18,624,230.00**	**3922**	**$ 122,770,891.53**

4.2 Distribution of Economic Impacts by Region under the Baseline Scenario



4.3 Induced Demand by Use Charging Stations

The losses associated with induced demand due to the lack of EV charging stations and their spillover effects are estimated by analyzing the percentage of total spending in the tourism sector attributed to the accommodation and retail sectors. We determine the portion of this spending that corresponds to tourists driving EVs who stop visiting New Hampshire (See Appendix H). This portion is then adjusted by applying spillover effect percentages: 20 percent for the accommodations sector and 7.5 percent for the retail sector. These percentages are based on empirical estimates of the spillover effects of EV charging station use on businesses located nearby.[79]

Total Losses State Level

	Scenario 1			Scenario 2		
	Lower Bound	Baseline	Upper bound	Lower Bound	Baseline	Upper bound
2024	$ 3,599,041	$ 7,507,335	$ 10,981,699	$ 3,821,235	$ 8,097,301	$ 11,659,675
2025	$ 5,542,001	$ 11,093,000	$ 15,996,650	$ 4,864,687	$ 10,256,734	$ 14,041,625
2026	$ 8,704,482	$ 17,312,282	$ 24,744,459	$ 6,649,829	$ 13,037,806	$ 18,903,642
2027	$ 14,180,994	$ 27,910,416	$ 40,335,890	$ 9,864,990	$ 19,192,254	$ 28,059,608
2028	$ 20,613,860	$ 40,440,962	$ 58,426,148	$ 13,165,277	$ 25,386,315	$ 37,314,526
2029	$ 26,542,945	$ 53,058,678	$ 76,727,035	$ 15,302,203	$ 30,778,454	$ 44,233,701
2030	$ 36,848,033	$ 69,482,247	$ 98,206,107	$ 19,795,241	$ 37,539,168	$ 52,757,594
2031	$ 48,639,615	$ 94,966,882	$ 134,866,994	$ 24,974,359	$ 49,084,737	$ 69,248,425
NPV	$ 117,451,905	$ 229,900,932	$ 329,176,315	$ 71,925,826	$ 141,630,505	$ 202,483,002
Cummulative	**$ 164,670,972**	**$ 321,771,802**	**$ 460,284,982**	**$ 98,437,821**	**$ 193,372,769**	**$ 276,218,795**

Cumulative losses are estimated at **$321 million** under the baseline scenario, compounding the economic strain on New Hampshire's tourism sector. **With total spending losses approaching $700 million,** the state risks negative economic impact and a diminished appeal as a travel destination compared to neighboring states with stronger EV infrastructure.

Summary

New Hampshire stands at a critical crossroads in the future of its travel and tourism sector. By failing to seriously invest in EV charging infrastructure, the state is missing a significant opportunity to attract and engage the growing number of EV-owning travelers. Neighboring states like Maine and Vermont are already capitalizing on this shift, positioning themselves as attractive destinations for EV drivers. Without a comprehensive strategy to develop the necessary infrastructure, New Hampshire risks falling behind, potentially losing millions in tourism revenue and diminishing its competitive edge.

To bridge this gap, New Hampshire must take decisive action: establish clear policies with measurable targets to promote EV adoption, secure both state and federal funding to enhance infrastructure, encourage utility investment in EV programs, and foster public-private partnerships to expand charging networks. By investing in EV infrastructure, New Hampshire can unlock new economic opportunities, sustain tourism revenue, and ensure it remains a leading destination for both leisure and business travelers.

[79] https://lebanonnh.gov/CivicAlerts.aspx?AID=2945

To reference this Report’s Appendix, please scan the QR code below.