2023 STATE TRANSPORTATION ELECTRIFICATION SCORECARD

Peter Huether, Charlotte Cohn, Ben Jennings, Jasmine Mah, Ethan Taylor, Carolin Tolentino, and Shruti Vaidyanathan

ACEEE
Smart Energy. Clean Planet. Better Lives.

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Contents

About ACEEE

The **American Council for an Energy-Efficient Economy** (ACEEE), a nonprofit research organization, develops policies to reduce energy waste and combat climate change. Its independent analysis advances investments, programs, and behaviors that use energy more effectively and help build an equitable clean energy future.

About the Authors

Peter Huether conducts research and analysis for the transportation program at ACEEE, with a focus on light-duty fuel efficiency and electric vehicles. Peter works on promoting equitable access to electric vehicles and leads the annual life-cycle emissions analysis of light-duty vehicles for ACEEE's Greenercars.org.

Charlotte Cohn conducted research and analysis on utility energy efficiency policy.

Ben Jennings assisted ACEEE's transportation program with various projects, including research tasks related to ACEEE's *City Scorecard* and *International Scorecard*.

Jasmine Mah conducts research for ACEEE's health and environment program. Prior to joining ACEEE, Jasmine worked for the National Center for Sustainable Transportation.

Ethan Taylor assists with various research projects and administrative duties. He joined ACEEE in 2022. Prior to joining ACEEE, Ethan worked at the House of Representatives and the Maryland Department of Housing and Community Development.

Carolin Tolentino assists the ACEEE buildings team with research on energy codes and low- and zero-energy buildings. She joined ACEEE in 2020, following her internship with the Sustainable Resources Team at ICLEI–Local Governments for Sustainability. Before that, she interned with the Urban Green Council's Education Department.

Shruti Vaidyanathan oversees research on vehicle efficiency and statewide transportation efficiency. She has 10 years of experience in transportation efficiency issues; her recent work has focused on passenger and freight mobility best practices at the state and local levels and on the role of emerging mobility options and autonomous vehicles in sustainable urban transportation systems.

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Glossary of Frequently Used Terms

VEHICLE CLASSES

Light-duty (LD): These vehicles, including passenger cars, SUVs, and light trucks, have a gross vehicle weight rating (GVWR) of 8,500 lb. or less. GVWR refers to the maximum weight of a vehicle safely loaded with passengers, fuel, and accessories.

Heavy-duty (HD): These medium-size and large commercial vehicles, buses, and heavy pickup trucks have a GVWR of more than 8,500 lb.

TYPES OF CHARGERS

Level 1 (L1): This level provides charging through a 120 V AC plug and does not require installation of additional charging equipment. For light-duty vehicles, it can deliver 2–5 miles of range per hour of charging. Most often used in homes, L1 is sometimes used in workplaces.

Level 2 (L2): This level provides charging through a 240 V (for residential) or 208 V (for commercial) plug and requires installation of additional charging equipment. It can deliver 10–20 miles of range per hour of charging for light-duty vehicles. L2 is used in homes, at workplaces, and for public charging.

DC fast charge (DCFC): This level provides charging through 480 V AC input and requires specialized, high-powered equipment as well as special equipment in the vehicle itself. DCFC is used for public charging of light- and heavy-duty vehicles. Plug-in hybrid electric vehicles typically do not have fast-charging capabilities.

ELECTRIC VEHICLE INFRASTRUCTURE

EVSE: Electric vehicle service equipment includes charger, plug, software, and more. Alternative terms include EV charging stations, electric recharging points, or just charging points.

Make-ready: These utility-led programs prepare sites for installation of EVSE through upgrades to electrical equipment on the customer side of the meter (Colorado PUC 2019).

COMMUNITY TYPES

Low-income: In these communities, the median household income is lower than the statewide median income. The specific threshold varies by state.

Economically distressed community: This is a community with a high proportion of residents who are living in poverty. The federal government sets poverty guidelines based on income, but the definition used in each jurisdiction may vary.[1]

Environmental justice (EJ) community: Such a community bears a disproportionate burden of environmental harms, such as poor air quality, and suffers negative impacts as a result.

HOUSING TYPE

Multiunit dwelling (MUD): Also known as multifamily housing, this is housing where multiple units are contained within a building or complex.

KEY POLICIES

Advanced Clean Cars II (ACCII): This California light-duty zero-emissions vehicle (ZEV) sales mandate requires 100% sales of zero-emissions vehicles by 2035 and can be adopted by other states. The precursor was Advanced Clean Cars I (ACCI).

Advanced Clean Trucks (ACT): This California heavy-duty zero-emissions vehicle sales mandate requires greater sales of zero-emissions vehicles by 2035 and can be adopted by other states. Sales requirement varies by vehicle class: 40% ZEVs by 2035 for class 7–8 tractor trucks, 55% for class 2b–3, and 75% for class 4–8 non-tractor trucks.

Inflation Reduction Action (IRA): This 2022 law invests $369 billion in energy and climate investments, including tax credits for new and used plug-in vehicles, commercial plug-in vehicles, at-home charging equipment installations, and advanced manufacturing, including battery manufacturing. It also includes investments in electrifying postal service and other governmental fleets and programs to reduce diesel and climate pollution in communities.

Infrastructure Investment and Jobs Act (IIJA): Also known as the Bipartisan Infrastructure Law this 2021 law invests significant sums in transportation investment, including $7.5 billion to expand electric vehicle charging infrastructure along key corridors.

[1] We chose to use the terms *economically distressed* and *environmental justice community* because they are commonly used in state transportation electrification policymaking, but we understand that some communities may not want to be referred to in this way. We recommend decision makers refer to communities in the way they prefer.

Executive Summary

The transportation sector is responsible for 28% of greenhouse gas (GHG) emissions in the United States.[2] Electric vehicles (EVs) stand to play a critical role in reducing emissions, improving air quality and public health, and achieving aggressive climate goals— alongside other transportation decarbonization policies like mode shift and miles reduction strategies. However, EVs currently account for only approximately 7% of the U.S. new vehicle market. U.S. states have the power to remove many of the barriers to EV adoption, support the EV market, and ramp up the building of EV charging infrastructure, particularly for those who have been most underserved by our current transportation system. This report evaluates the activities of the states plus the District of Columbia and ranks the top 33 on their policy and program efforts to electrify transportation.

KEY FINDINGS

- First place goes to **California,** which is the national leader in transportation electrification policy for the second *Scorecard* in a row. It received the maximum number of points in two policy areas and the most points in all but one policy area. It is a leader in advancing equitable outcomes through its programs; establishing standards for electrification, namely ACCII and ACT; and preparing its grid for millions of EVs to be sold in the state.
- Rounding out the top 10 are **New York, Colorado, Massachusetts, Vermont, Washington, New Jersey, the District of Columbia, Oregon, and Maryland.** Six of these states have adopted both ACCII and ACT, another has adopted just ACT and plans on adopting ACCII, and the rest are planning on adopting one or both in the near future. In addition to planning via these programs, the top 10 states were also particularly strong in transportation system efficiency (which assesses how states are reducing overall emissions from the transportation sector, including by reducing personal vehicle usage) and electricity grid optimization. These states are driving electrification with strong vehicle standards and planning for the impacts of electrification on the transportation and electricity sectors.

[2] "Greenhouse Gas Emissions; Sources of Greenhouse Gas Emissions." U.S. Environmental Protection Agency. Accessed October 1, 2020. epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

- Outside the top 10, regional standouts are **Minnesota** in the Midwest and **Virginia** in the Southeast. Minnesota excels at policies that support grid optimization for electric vehicles while Virginia has taken strong actions in planning.
- The most improved state compared to the 2021 edition by rank is **Oklahoma**. The state is first in the number of DCFC chargers per capita and is investing heavily in electric school buses. The most improved state by score is **Colorado**, which has improved across the board but particularly in optimizing its electricity grid for EVs and accelerating the adoption of HD EVs.
- **California** and **New York** are again leaders on incorporating equity considerations into their transportation electrification (TE) policies. Both incorporate equity-related goals into their planning efforts and have dedicated considerable portions of their EV programs—including 42% and 16% of their utility EV spending, respectively—toward low-income, economically distressed, or EJ communities.
- States are moving to adopt critical programs developed by California that will drive EV penetration: ACC II and ACT. These standards will increase light- and heavy-duty EV deployment in the states that adopt them and drive development in the EV and EV charging markets. As of May 1, 2023, seven states have adopted ACCII with three more planning on doing so while eight states have also adopted ACT with one more planning to do so. More states adopting these standards will accelerate EV deployment nationwide.
- Since our 2021 edition, states have progressed in creating supportive policy environments for transportation electrification, but considerable room to grow remains. In addition to adopting or planning to adopt ACCII and ACT, states have increased their ambitions by approving record amounts of utility spending on transportation electrification and investing in transit and school bus electrification. We changed our methodology for this *Scorecard* to represent the rising ambition among states. As a result, the average score for the top 33 states and Washington DC declined from 39 to 36 points, as states needed to demonstrate more ambition to receive full credit. States are still underperforming in the transportation system efficiency category, indicating the need for stronger policies to decarbonize the transportation sector. States could also do considerably more to prioritize equity in their policymaking.
- State legislatures, executive agencies, and public utility commissions (PUCs) have diverse policy options to improve transportation electrification. They should look to existing state efforts nationwide for instructive examples of electrification goals and mandates, incentives for vehicle and charging infrastructure purchases, and approvals for prudent utility investments in charging infrastructure and rate designs. Federal support has also increased considerably due to the Inflation

Reduction Act and the Infrastructure Investment and Jobs Act, and states should take advantage of this support by increasing their ambitions.

- The top 10 ranked states performed well on EV planning and optimizing their electricity grids for EVs but still have a lot of work to do on incorporating equity into their efforts. While the next 20 states showed similar progress and challenges, they could improve considerably on EV planning through the sound adoption of ACCII and ACT and could improve the efficiency of the whole transportation system by having sector-wide emissions reductions goals and investing in transit and school bus electrification.

ACEEE's *State Transportation Electrification Scorecard* evaluates the progress that state legislatures and agencies (e.g., public utility commissions, departments of transportation) are making to implement policies to scale up deployment of light-duty electric vehicles (passenger cars, SUVs, and trucks) and heavy-duty electric vehicles (large commercial vehicles, such as freight trucks and buses) and build out the necessary charging infrastructure for personal, commercial, fleet, and public transit use.

POLICY AREAS

The *Scorecard* evaluates states on their actions to support transportation electrification in the light-duty and heavy-duty sectors. States received points in the following policy areas, based on a 100-point scale:

- **Electric vehicle (EV) and EV charging infrastructure planning and goal setting (15 points):**[3] government-led planning actions for transportation electrification as well as binding and nonbinding target setting for EV and charging infrastructure deployment
- **Incentives for EV deployment (36 points):** financial and nonfinancial incentives to spur EV purchases and the installation of necessary charging infrastructure
- **Transportation system efficiency (17 points):** policies that support the deployment of EVs while maximizing emissions reduction and improving accessible, cost-effective, equitable, and clean mobility options for all

[3] The *Scorecard* uses the terms *EV charging infrastructure* and *EV chargers* throughout the report. This infrastructure is also sometimes referred to as electric vehicle supply equipment (EVSE).

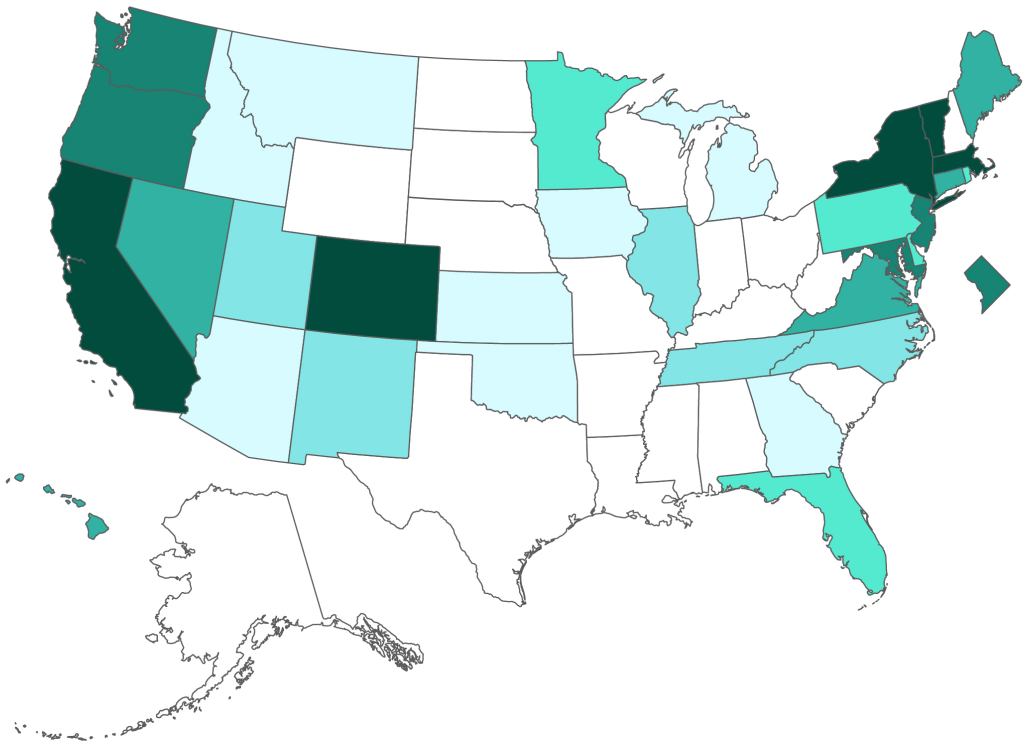
- **Electricity grid optimization (9 points):** actions taken by public utility commissions (PUCs) to support utility management of EV charging to maximize reliability and minimize costs and greenhouse gas (GHG) emissions
- **Transportation electrification outcomes (23 points):** metrics that track progress or evaluate results on EV adoption, infrastructure installation, and GHG emissions

This year, instead of being highlighted as a separate policy area, the *Scorecard's* equity metrics were incorporated throughout the report, because addressing the needs of low-income, economically distressed, and EJ communities is fundamental to successful transportation electrification policy. Overall, the metrics and portions of metrics that addressed equity constituted 17.5 points.

SCORES

Figure ES-1 shows the state ranking divided into six tiers. Our evaluation in the *Scorecard* focuses on the states that have demonstrated some level of progress on transportation electrification. We do not present scores beyond the top 33 because states ranked lower than that each achieved no more than 15% of the total available points in the *Scorecard*. However, throughout the report we do highlight the efforts of some unranked states that have made progress in a certain category; detailed scores for all states are available in Appendix A.

The State Transportation Electrification Scorecard



1–5
1. California
2. New York
3. Colorado
4. Massachusetts
5. Vermont

6–10
6. Washington
7. New Jersey
8. District of Columbia
8. Oregon
10. Maryland

11–15
11. Maine
12. Connecticut
13. Nevada
14. Hawaii
15. Virginia

16–20
16. Pennsylvania
17. Delaware
17. Minnesota
19. Rhode Island
20. Florida

21–24
21. New Mexico
21. Illinois
23. Tennessee
24. Utah
24. North Carolina

26–33
26. Arizona
26. Michigan
28. Oklahoma
29. Idaho
29. Montana
31. Kansas
32. Georgia
33. Iowa

Unranked

Figure ES-1. State scores in the *Transportation Electrification Scorecard*

Table ES-1 describes states that were leaders in the specific policy areas evaluated. For more information about leading states, refer to the scorecard chapter corresponding to each policy area.

Table ES-1. Policy area leaders

Area	States	Achievements
Planning and goal setting	California, Oregon, and Washington	Developed or adopted both of California's standards: Advanced Clean Cars II and Advanced Clean Trucks Require comprehensive transportation electrification planning by their utilities Adopted Low Carbon Fuel Standards (LCFS)
Incentives for EV deployment	California, New York, and Massachusetts	Offer a wide range of incentives for EVs and EV charging infrastructure Considerable utility investment in charging infrastructure, including for low-income, economically distressed, and EJ communities Have low or no EV fees as well as nonfinancial incentives for EVs
Transportation system efficiency	California, Maryland, and the District of Columbia	Have transportation sector GHfiG reduction goals Require the purchase of zero-emission transit buses by a target year and provide financial support for zero-emission transit and school buses
Electricity grid optimization	California, New York, Colorado, and Hawaii	Provide signals to effectively integrate EVs into the grid through time-varying L2 rates and DCFC-specific rates Set targets to reduce the emissions of the power sector
Outcomes	Vermont and California	Have strong per capita EV charging infrastructure deployment and LD and HD EV registrations

POLICY RECOMMENDATIONS

States have made varying levels of progress on transportation electrification. However, more must be done to meet state EV deployment and climate targets while complementing economic development. **States that are not included in the top 33 have the most work to do to plan for and accelerate transportation electrification, and our**

recommendations reflect that. For these states we continue to recommend the following policy actions as important foundational steps to move transportation electrification ahead:

- Engage in comprehensive planning that defines a coordinated strategy to build out electrified transportation, include specific goals for EVs and the deployment of EV charging infrastructure, and benchmark progress on transportation electrification. Comprehensive planning can and should go beyond EVs to incorporate sector-wide greenhouse gas goals, improve system efficiency, and address the planning needs of different modes of transportation.
- Collect data on key metrics to establish a baseline and track progress on EV adoption and integration, and EV charging infrastructure deployment. These data could include EV registration information for light- and heavy-duty vehicles, location and count of EV charging facilities, and demographic information on EV use by race and income. Data should be made publicly available, with the status of milestones shared through regular public reporting.
- When investing in vehicle and infrastructure deployment, begin with equity in mind. Incorporate spending carve-outs or funding adders for low-income, economically distressed, and EJ communities in state and utility EV planning to ensure that the benefits of transportation electrification are distributed equitably. Track spending and program impacts to ensure benefits for those most in need.
- Leverage existing funding sources such as the recently passed IIJA and the federal Low or No Emission Program to support EVs and EV charging infrastructure deployment while evaluating other opportunities to create sustained funding for programs.
- Establish clear policy direction to encourage utility and third-party investment in EV charging infrastructure, such as exempting third-party EV charging providers from being defined as a public utility and approving utility electric vehicle charging programs and demonstration projects such as electric school buses.
- Engage with communities early and throughout the planning process to incorporate their viewpoints and build trust. Invest in internal engagement capacity and knowledge and support the capacity of the communities themselves. Prioritize community participation in mobility needs assessments and use these assessments to guide investment.

While all of the states and DC in our top 33 are making progress, there are varying approaches and plenty of room for improvement for many. **For states that are represented in our top 33 but are earlier in the process of developing a robust environment for transportation electrification, we recommend the following next steps to help accelerate their market and GHG reductions:**

- Codify targets for the deployment of EVs and EV chargers and prioritize the adoption of ACC II and ACT rules for vehicles.
- Offer on-the-hood incentives for the purchase of light- and heavy-duty EVs to offset the additional upfront cost of these vehicles.
- Encourage utilities to make fair and reasonable investments in EV charging infrastructure that are supported by local communities and provide appropriate safeguards for low-income ratepayers. Encourage utilities to also implement EV rates or managed charging programs that encourage integration of EVs into the grid; benefit ratepayers, EV drivers, and grid stability; and reduce emissions.
- Encourage grid-scale decarbonization by establishing clean energy and energy efficiency targets for the electric industry, thereby reducing the life-cycle emissions of every EV on the road.
- Set a GHG emissions reduction goal and commitment for the transportation sector to ensure that EV deployment complements other efforts to reduce transportation GHG emissions.
- Increase the amount and percentage of state and utility funding going toward low-income, economically distressed, and environmental justice communities. Consider setting a funding goal in line with the Justice40 initiative's objective of directing 40% of benefits to underserved communities. This can help ensure no communities are left behind in the transition to electrified transportation.
- Engage with communities early and throughout the planning process to incorporate their viewpoints and build trust. Invest in internal engagement capacity and knowledge and support the capacity of the communities themselves. Prioritize community participation in mobility needs assessments and use these assessments to guide investment.

Chapter 1. Introduction, Methodology, and Results

The transportation sector is responsible for 28% of greenhouse gas (GHG) emissions in the United States and has overtaken the electric power sector as the largest source of GHG emissions in the country. Most of these emissions are from on-road vehicles (EPA 2020b). Because they generate no tailpipe emissions, electric vehicles (EVs) can play a critical role in achieving significant GHG emissions reductions, meeting aggressive climate goals, and reducing localized air pollution. If charged with clean electricity, EVs can be almost entirely zero emission. Existing literature demonstrates that electrification can lead to reductions in light-duty (LD) vehicle GHG emissions of 36–50% by 2050. For heavy-duty (HD) vehicles, the projected emissions reduction can be as high as 69% by 2050 (Ledna et al. 2022). The recently released National Blueprint for Transportation Decarbonization relies heavily on the switch to electric vehicles to meet the United States' long-term GHG reduction goals while acknowledging the importance of electricity grid decarbonization and the need to switch to cleaner and more efficient forms of mobility (DOE 2023b).

EV sales have climbed steadily since 2010; as of December 2021 over 2.4 million EVs were on the road in the United States, more than double the number in 2018 (EEI 2018a, 2022). Additionally, cities and states are signaling their commitment to addressing climate change and reducing pollution through EV uptake by adopting aggressive deployment goals for the near future. Despite significant growth in the past few years, EVs account for only approximately 7% of new LD vehicle sales in the United States (Mock and Yang 2022). Together these factors suggest that much remains to be done to grow and maintain the market for EVs. In particular, ambitious state actions will be needed to ramp up deployment of light- and heavy-duty EVs and build out the necessary charging infrastructure.[4]

States can help remove many of the barriers to widespread EV adoption. They can create supportive policy environments to reduce the higher upfront costs of EVs for both personal and fleet ownership, establish a comprehensive network of charging facilities, and encourage the creation of complementary utility programs to push EV uptake and maximize GHG reductions and societal benefits. They can also provide complementary education and outreach to support market transformation alongside private sector efforts to raise customer awareness (Barnes and Jones 2020). States can work with communities, community leaders, and nonprofit partners to design policies ensuring that investments center environmental

[4] For the purpose of this *Scorecard*, the term *heavy-duty* refers to both medium- and heavy-duty vehicles.

justice and equity and promote broader access to EVs; such policies would address historical inequities in transportation access, environmental impacts, and economic mobility while avoiding future burdens on low-income communities and communities of color.

In 2022, the Federal Highway Administration and the Department of Transportation proposed a national rule that would require states to track and reduce GHG emissions from the transportation sector. The rule gives states flexibility in setting their targets, as long as the targets align with preexisting climate goals. EV deployment will be critical to achieving state targets if the proposal is adopted. Additionally, given the interconnected nature of our transportation systems and vehicle markets, regional efforts can play a role in spurring EV uptake as a way to reduce transportation-sector emissions. States, through the actions of governors and executive branch agencies, often collaborate with one another or engage in regional coalitions to encourage vehicle sales and deploy the required charging infrastructure. Efforts such as the REV WEST Memorandum of Understanding (MOU) among eight western states, the Multi-State Zero-Emission Vehicle (ZEV) Task Force, and the Multi-State Medium- and Heavy-Duty Zero Emission Vehicle MOU help states work toward shared deployment targets and allow the exchange of best practice policies and programs. In 2023 the Environmental Protection Agency (EPA) proposed new GHG standards for model years 2027–2032 light- and medium-duty vehicles that would drive electrification of new vehicles with EPA expecting two-thirds of new vehicles to be electric by 2023 as a result.

As with many aspects of our energy system, the impacts of transportation electrification may have a more pronounced effect—negative or positive—on economically distressed and EJ communities. Low- and moderate-income families are more likely to spend a disproportionate share of their household income on transportation energy–related costs compared with the general public (Vaidyanathan, Jennings, and Huether 2021). Low-income communities and communities of color are also more likely to experience harmful health impacts relating to air pollution from internal combustion engines (Reichmuth 2019). In the wake of the COVID-19 pandemic, which has deepened existing inequalities and disproportionately impacted low-income communities and communities of color, it is even more necessary to deliver solutions that ameliorate systemic injustice. Considering the distinctive needs of low-income, EJ and economically distressed communities is essential to achieving equitable and sustained GHG reductions while also ensuring that state transportation systems work for all residents.

If states and utilities do not make deliberate efforts to include these groups in EV incentives and infrastructure development plans, there is a risk that transportation electrification will reinforce existing racial and economic inequities. Rising electricity costs could disproportionately impact households that already experience high energy burdens.[5] Investments in EV charging infrastructure may not reach the most disadvantaged communities if not prioritized. The health and pocketbook benefits of electrification may only accrue to higher income drivers and communities without targeted policies. Two recent federal laws, the IIJA and the IRA, provide funding for priority projects in low-income and underserved communities. Now is an opportune time for states to access federal funds and drive EV adoption for underserved households.

ACEEE's *State Transportation Electrification Scorecard* aims to evaluate the progress that state legislatures and agencies (e.g., public utility commissions, departments of transportation, state energy offices, departments of environmental protection) are making to implement policies to scale up deployment of light-duty EVs (passenger cars, SUVs, and trucks) and heavy-duty EVs (larger commercial vehicles, such as freight trucks and buses) and the necessary charging infrastructure for personal, commercial, fleet, and public transit use. Prior to our 2021 edition, no existing research comprehensively tracked and benchmarked state policies to promote transportation electrification for all states.

This report scores states on the adoption of policies with an impact on vehicle deployment, charging infrastructure creation, and operational reliability. We prioritize policies that have clear impact on these objectives, as well as outcome-based metrics that track progress toward deployment and GHG reduction goals. We also score policy efforts that address equity in planning efforts or prioritize funding for marginalized groups.

The *Scorecard* demonstrates how EV-specific policies can work in tandem with other transportation and utility sector policies to maximize relevant GHG reduction in addition to ramping up EV deployment in the light- and heavy-duty vehicle sectors. This can help decision makers as well as stakeholders—including community organizations and businesses—to identify the most promising policies in their respective states to scale both EVs and the associated infrastructure.

The *Scorecard* is divided into seven chapters. This chapter discusses our approach to equity in transportation electrification, our scoring methodology, and the overall results of our analysis. It also spotlights the leading states and key policy trends underlying the rankings. Subsequent chapters present detailed results for four major EV policy categories: state planning and goal setting for EV deployment, incentives for deployment, transportation

[5] *Energy burden* is defined as the share of annual household income per year that goes toward energy and fuel costs. ACEEE considers households in which more than 6% of income is spent on energy as *energy burdened*, while households that spend more than 10% are *severely energy burdened*.

system efficiency, and the optimization of the electricity system. We also include a chapter that evaluates the outcomes of these policies, followed by our conclusions.

SCORING METHODOLOGY

ACEEE's methodology for evaluating state progress on transportation electrification reflects the policies needed to ramp up EV deployment in the light-duty and heavy-duty vehicle sectors in addition to maximizing GHG emissions reductions from the transportation sector more broadly. We first describe the methodology used in this year's *Scorecard*; toward the end of this section we compare to our prior *Scorecard*.

We evaluated states on their actions to deploy electric vehicles in the following policy areas:

- **EV and EV charging infrastructure planning and goal setting.** Metrics in this category rate states on their government-led planning actions for transportation electrification and their binding and nonbinding target-setting activity for EV and charging infrastructure deployment.
- **Incentives for EV deployment.** This category evaluates financial and nonfinancial incentives to spur EV purchases and the installation of the necessary charging infrastructure.
- **Transportation system efficiency.** Here we assess policies that support the deployment of EVs while maximizing emissions reductions and improving accessible, cost-effective, equitable, and clean mobility options for all.
- **Electricity grid optimization.** We award points for actions PUCs take to support utility management of EV charging to maximize reliability and minimize costs and greenhouse gas emissions.
- **Transportation electrification outcomes.** Metrics track progress or evaluate efforts on EV adoption, infrastructure installation, and GHG emissions.

Figure 1 shows the points allocation for each of these categories.

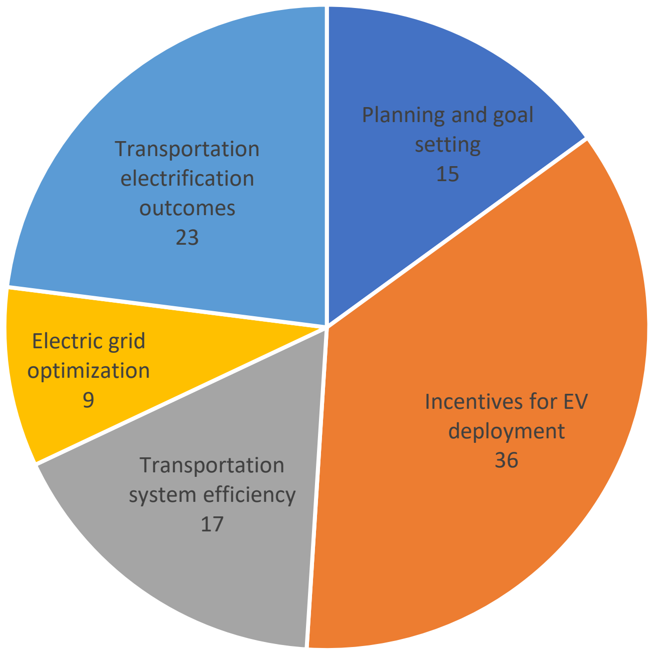


Figure 1. Total points (out of 100) by scoring category

States could earn a maximum of 100 points in the *Scorecard*. We allocated points among the policy areas to reflect the magnitude of their impact on EV deployment. To create this weighted approach, we relied on an analysis of existing literature and the judgment of ACEEE and external experts.[6] Our review of transportation electrification policy levers identified three policy areas that are likely to have the greatest impact on EV uptake: zero-emission vehicle (ZEV) mandates and EV deployment targets; financial incentives for vehicle purchases; and incentives for charging infrastructure installation (Morrison et al. 2018; Lutsey 2015; Mersky et al. 2016; EEI 2018b). Based on these findings about policy impact and feedback from subject matter experts, we gave the greatest weight to state actions on incentives and allocated 36 points out of 100 to this section.

[6] ACEEE convened a group of subject matter and state experts to guide the creation of our methodology. These experts provided written and verbal feedback on research questions, scoring methodology, and weighting for individual metrics.

We assigned 15 points to planning and goal setting to reflect the importance of activities that provide states with a road map and benchmarks for transportation electrification efforts, with the most points in this category going to EV deployment targets. We allotted 17 points to policies at the intersection of electrification and transportation system efficiency, which signal that states are thinking through the EV use cases that will achieve the greatest systemwide GHG reductions without stalling EV uptake.

Grid optimization was assigned 9 points. Integration of EVs into the grid is critical, and proactive attention to managed charging can make owning and operating an EV less expensive and can allay some of the concerns that may stymie EV deployment, such as the potential for EV charging to overload already taxed grid infrastructure. However, those activities are relatively nascent, so this section received fewer total points than most others. We allocated 23 points to the outcomes section—which credits, among other things, EV registrations and public charging facilities—to evaluate whether state policies are having their intended effect on the number of light- and heavy-duty vehicles on the road, the proliferation of charging infrastructure locations, and reduction of greenhouse gas emissions.

We recognize the importance of ensuring that the benefits of EVs accrue to low-income, economically distressed, and environmental justice communities as states embark on their transportation electrification efforts. We have chosen for this *Scorecard* to not separate out our equity metrics into a separate chapter—a change from our 2021 edition—but instead to include equity metrics throughout other chapters, since equity is not an add-on to existing policies but should be core to a state's transportation electrification strategy. Collectively, 17.5 points across three chapters include equity considerations. This includes metrics that are exclusively equity focused but also points within broader metrics that reward actions to achieve more equitable outcomes. Additionally, the terminology used to refer to various groups that have experienced disproportionate burdens and disinvestment differs from state to state; in this report, we consider policies that impact low-income, economically distressed, and environmental justice communities.[7]

ACEEE's methodology attempts to capture the policy landscape for both light-duty and heavy-duty vehicle deployment.[8] A number of our metrics apply to actions that cover both

[7] California uses the term *disadvantaged communities* (DACs) in its policies to refer to non-low-income groups that have been historically underserved.

[8] We do not separately track activities around medium-duty vehicles because our research indicates that medium-duty vehicles are typically included in state policy actions targeting the heavy-duty vehicle sector.

vehicle categories. Where possible, we have created unique light-duty and heavy-duty scoring criteria. Nevertheless, it is important to note that the heavy-duty EV market is in a nascent stage; states are just starting to understand the policies needed to ramp up deployment. To the best of our ability, we have captured heavy-duty EV policies that states are using to grow the market for electrified trucks and buses, but we recognize that states have plenty of scope to expand their policy toolkits in the future to ensure that they are properly planning for mass heavy-duty vehicle deployment. As mentioned above, opportunities to reduce GHG emissions by both light- and heavy-duty vehicles are sizable, and sound policy will be needed to accelerate and sustain deployment for both markets.

Within each policy category, we developed a scoring methodology based on a diverse set of criteria that we outline in each of the subsequent chapters. States were awarded points based on data collected from centralized data sources, additional Internet research, and feedback from subject matter experts and in-state contacts during our external review process.[9] While we strive to provide the most up-to-date information possible, this *Scorecard* relies on secondary sources of information detailed in descriptions of the relevant metric and in appendix tables, which authors validated independently where possible. New policy developments after internal review (February 15, 2023) were not included in the report. We look forward to inclusion of these policy developments in future ACEEE publications.

The metrics reflect policies frequently discussed as necessary to address common barriers and spur EV market growth. They are outlined in table 1 (Singer 2017; EEI 2018b; Bui, Slowik, and Lutsey 2020). It is important to note that data availability played a significant role in the metrics that were chosen and, subsequently, in the breakdown of points for each scoring category.

Table 1. Scoring by policy category and metric

Metric	Maximum points
Electric vehicle and charging infrastructure planning and goal setting	*15*
EV and EV charging infrastructure plans	2

[9] We used a number of centralized data sources, including Atlas EV Hub, the NC Clean Energy Technology Center's *50 States of Electric Vehicles* reports for Q3 of 2022, and the U.S. Department of Energy Alternative Fuels Data Center.

Metric	Maximum points
Light-duty EV adoption goals and ZEV mandates	4
Heavy-duty EV adoption goals and ZEV mandates	4
Utility EV charging infrastructure goals	2
EV-supportive building codes	2
Low-carbon fuel standard	1
Incentives for EV deployment	36
Light-duty EV purchase incentives	4
Heavy-duty EV purchase incentives	4
(New) Used LD EV purchase incentives	1
Statewide EV investment and programs prioritizing low-income, economically distressed, or environmental justice communities	6
State EV incentives for L2 chargers	2
State incentives for DCFC chargers	2
EV fees*	2
Utility incentives for L2 charging	1
Utility incentives for DCFC charging	1
Utility incentives for commercial fleet charging	1
Utility spending on EV charging infrastructure incentives	5
Utility EV programs focused on low-income, economically distressed, or environmental justice communities	2
EV charger exemption from public utility definition	1
Volkswagen settlement fund allocation for electrification	2
Nonfinancial incentives	1

Metric	Maximum points
Direct sales regulations	1
Transportation system efficiency	17
Transportation sector GHG reduction targets	3
GHG pricing policies	3
Transit agency bus goals and procurement	4
State investment for electric transit bus deployment	2
State requirements for electric school bus (ESB) deployment	2
(New) State investment for ESB deployment	2
Policies to encourage shared EV fleets	1
Electricity grid optimization	9
Time-varying charging rates for L2 chargers	2
DCFC-specific charging rates	2
Managed charging programs	1
Electric power sector emissions goals	4
Vehicle-to-grid (V2G) programs (bonus point)	1
Transportation electrification outcomes	23
Public L2 charging facilities per 100,000 people	4
Public DCFC charging facilities per 100,000 people	4
Light-duty EV registrations per 100,000 people	4
Heavy-duty EV registrations per 100,000 people	4
Percentage change in transportation GHGs over a five-year period	4
Electric transit buses per 100,000 people	2
(New) Total electric school buses (ESBs) committed or ordered	1

Metric	Maximum points
Total	100

*For the EV fee metric, states can earn up to 2 negative points if their EV fees are deemed too punitive.

Each metric has specific criteria for scoring. Depending on the metric, points may be achieved through formal actions taken by a governor, agency, state legislature, or PUC, or awarded for ongoing state planning activities or multistate coordination efforts. Given that the EV market is still young and states are in the early stages of considering strategies and policies likely to have the greatest impact on EV uptake, our scoring also recognizes state activities that are in the planning phase by awarding partial points, where possible, in a number of metrics.

STATE ACTORS

Multiple arms of state government can influence the trajectory of transportation electrification in a state, and responsibility for particular policies may vary from state to state. We focus on actions that can be taken by state legislatures, the executive branch (which includes governors, departments of transportation, and state energy offices), and quasi-judicial/quasi-legislative state PUCs. Under each policy category, we illustrate progress by different state actors and highlight leaders among each type of state policymaker. For outcome-based metrics, we do not designate a particular actor, as multiple state agencies can influence successful deployment, GHG reduction, and system efficiency metrics. Table 2 lists our metrics by actor.

Table 2. Metrics by state actor

Policy category	*Metric*
LEGISLATURE	
EV and EV charging infrastructure planning and goal setting	EV-supportive building codes
	EV and EV charging infrastructure plans
	Heavy-duty EV adoption goals and ZEV mandates
	Light-duty EV adoption goals and ZEV mandates
	Low-carbon fuel standard
	Utility EV charging infrastructure goals
Incentives for EV deployment	Direct sales regulations
	EV fees
	EV charger exemption from public utility definition

Policy category	*Metric*
	Heavy-duty EV purchase incentives
	Light-duty EV purchase incentives
	Used EV purchase incentives
	State incentives for DCFC charging
	State incentives for L2 charging
	Statewide EV investment and programs prioritizing low-income, economically distressed, or environmental justice communities
	Volkswagen settlement fund allocation for electrification
Transportation system efficiency	Policies to encourage shared EV fleets
	Transportation sector GHG reduction targets
	State investment for electric transit bus deployment
	Transit agency bus goals and procurement
	State requirements for ESB deployment
	State investment for ESB deployment
	GHG pricing policies
Electricity grid optimization	Electric power sector emissions goals

PUC

EV and EV charging infrastructure planning and goal setting	Utility EV charging infrastructure plans
Incentives for EV deployment	Utility incentives for L2 charging infrastructure
	Utility incentives for DCFC charging infrastructure
	Utility incentives for commercial fleet charging infrastructure
	Utility investment in EV charging infrastructure
	Utility EV programs prioritizing low-income, economically distressed, or environmental justice communities

Policy category	*Metric*
	EV charging exemption from public utility definition
Electricity grid optimization	Time-optimized charging rates for L2 chargers Business-enabling charging rates for DCFC chargers Managed charging programs Electric power sector emissions goals Utility EV programs prioritizing low-income, economically distressed, or environmental justice communities

Executive branch	
EV and EV charging infrastructure planning and goal setting	EV and EV charging infrastructure plans Light-duty EV adoption goals and ZEV mandates Heavy-duty EV adoption goals and ZEV mandates EV-supportive building codes Low-carbon fuel standard
Incentives for EV deployment	Statewide EV investment and programs prioritizing low-income, economically distressed, or environmental justice communities Volkswagen settlement fund allocation for electrification
Transportation system efficiency	GHG pricing policies Transit agency bus goals and procurement State investment for electric transit bus deployment State requirements for ESB deployment State investment for ESB deployment Transportation sector GHG reduction targets

METRICS NOT INCLUDED

This report does not generally assess city-led or federal actions to drive EV uptake. However, where necessary, certain metrics capture policies implemented at the local level that are likely to have an impact on deployment of vehicles and charging infrastructure. This is particularly the case for home rule states, which allow local governments autonomy in the policy adoption process. As an example, EV-supportive building codes in home rule states are defined entirely at the local level; therefore, we award points to those local codes that cover a significant portion (over 20%) of the state's population and are therefore likely to ramp up EV and infrastructure deployment. Colorado is one such state: Several of its jurisdictions, including the City of Denver and Boulder County, have adopted or are in the process of adopting EV-supportive building codes, impacting a combined 26% of the state population (SWEEP 2020).

Lastly, there are a few policy areas that we do not include in our assessment of state progress on transportation electrification. These include the following:

- Community-centered stakeholder engagement processes and interagency coordination for EV deployment
- EV consumer protection issues such as battery and vehicle warranty policies
- Utility and government EV education offerings
- Utility and government EV marketing and promotion

While these are important topics for states to examine and consider, we omitted them from the scoring framework largely because they did not fit well into the state focus of our research or we could not find an existing data source that would enable us to capture information for all states without conducting a data request. In particular, good community and stakeholder engagement is a crucial part of effective policymaking. However, assessing the efforts of states in this area across the variety of their programs and quantifying the degree and quality of the engagement is difficult given the differences in approaches and the lack of consistent information on these approaches. Additionally, we chose not to ask states to fill out a data request for this evaluation as ACEEE surveyed state energy offices and PUCs in 2022 for information related to the *State Energy Efficiency Scorecard* and surveyed major utilities for information related to the *Utility Energy Efficiency Scorecard*. The data already available to us from that request and the availability of quality secondary source material for key metrics were compelling reasons to not overburden state governments with an additional data request for the *State Transportation Electrification Scorecard*.

CHANGES IN METHODOLOGY

We made a number of changes for the 2023 edition of the report. These changes included a greater focus on equitable EV policies as well as medium- and heavy-duty electrification, especially electric school buses (ESBs), which received two new metrics. We also added a new metric that scores states on their used EV purchase incentives and modified several others as detailed below in table 3.

Equity should be considered from the beginning in all decision-making processes and when crafting policy from the ground up. While we have removed the chapter on equitable EV policies, choosing instead to integrate equity-related metrics throughout our other chapters, a compilation of all equity-related scores is shown in table 5. We have also increased the number of points for equitable vehicle electrification policies by dedicating a portion of preexisting metrics' points toward equity where no consideration existed in our 2021 edition and by introducing new metrics that are partially or wholly equity focused.

Table 3. Summary of metric additions and adjustments compared to the *2021 TE Scorecard*

Metric (with 2023 point allocation breakdown)	2023 point allocation	2021 point allocation
Electric vehicle and charging infrastructure planning and goal setting	15	17
EV and EV charging infrastructure plans • 1 pt. for having an EV action plan • 0.5 pts. for including HD vehicles • 0.5 pts. for addressing equity *(New)*	2	4
Light-duty EV adoption goals and ZEV mandates • 4 pts. for adopting Advanced Clean Cars II (New) • 2 pts. for intention to adopt Advanced Clean Cars II (New) • 1 pt. for LD EV target, adopting Advanced Clean Cars I, or signing multi-state MOU	4	4
Heavy-duty EV adoption goals and ZEV mandates • 4 pts. for adopting Advanced Clean Trucks (New)	4	4

Metric (with 2023 point allocation breakdown)	2023 point allocation	2021 point allocation
• 2 pts. for intention to adopt Advanced Clean Trucks (New) or signing multi-state MOU • 1 pt. for aspirational HD target		
Utility EV charging infrastructure goals • 2 pts. for requirement for utilities to file TE plan (New) • 1 pt. for PUC signal encouraging EVSE investment	2	2
EV-supportive building codes	2	2
Low-carbon fuel standard	1	1
Incentives for EV deployment	36	30
Light-duty EV purchase incentives	4	4
Heavy-duty EV purchase incentives	4	4
(New) Used LD EV purchase incentives	1	-
Statewide EV investment and programs focused on low-income, economically distressed, or environmental justice communities[10]	6	*
State EV incentives for L2 chargers	2	2
State incentives for DCFC chargers	2	2
EV fees*	2	2
Utility incentives for L2 charging	1	1
Utility incentives for DCFC charging	1	1
Utility incentives for commercial fleet charging	1	1
Utility spending on EV charging infrastructure incentives	5	6

[10] Previously this metric was split into two: Statewide EV Investment and State EV Programs. This year they are combined but remain otherwise unchanged.

Metric (with 2023 point allocation breakdown)	2023 point allocation	2021 point allocation
• 3 pts. for spending per customer (previously 6 pts.) • 2 pts. for percentage of spending on low-income, economically distressed, or environmental justice communities (New) • Updated for spending approved or submitted on January 1, 2019 or later		
Utility EV programs prioritizing low-income, economically distressed, or environmental justice communities	2	*
EV charger exemption from public utility definition	1	1
Volkswagen settlement fund allocation for electrification • 1 pt. for percentage of funds awarded to support electrification • 1 pt. for prioritizing LMI and EJ communities	2	4
Nonfinancial incentives	1	1
Direct sales regulations	1	1
Transportation system efficiency	17	12
Transportation sector GHG reduction targets • 1 pt. for goal • 1 pt. for binding target • 1 pt. for vehicle-miles traveled reduction goal (New)	3	2
GHG pricing policies	3	3
Transit agency bus goals and procurement	4	4
State investment for electric transit bus deployment	2	2

Metric (with 2023 point allocation breakdown)	2023 point allocation	2021 point allocation
State requirements for Electric School Bus (ESB) deployment[11] • 1 pt. for binding target for school districts • 0.5 pt. for non-binding target • 1 pt. for prioritizing equity (New)	2	*
(New) State investment for ESB deployment • 1 pt. state program supporting purchase of ESBs • 1 pt. based on number of ESBs applied for under the Clean School Bus program as a percentage of the buses in the state	2	-
Policies to encourage shared EV fleets	1	1
Electricity grid optimization	9	10
Time-varying charging rates for L2 chargers • 1 pt. for general time-of-use rate • 2 pts. for EV-specific time-varying rate	2	3
DCFC-specific charging rates	2	2
Managed charging programs	1	1
Electric power sector emissions goals	4	4
Vehicle-to-grid (V2G) programs (bonus point)	*1*	*1*
Transportation electrification outcomes	23	21
Public L2 charging facilities per 100,000 people	4	4
Public DCFC charging facilities per 100,000 people	4	4
Light-duty EV registrations per 100,000 people	4	4

[11] A metric with this name was included in our 2021 edition; however, that metric assessed state funding for ESB purchases, which is now included in the next metric on state investment.

Metric (with 2023 point allocation breakdown)	2023 point allocation	2021 point allocation
Heavy-duty EV registrations per 100,000 people	4	3
Percentage change in transportation GHGs over a five-year period	4	4
Electric transit buses per 100,000 people	2	2
(New) Total ESBs committed or delivered	1	-
Total	100	100

* These metrics comprised the "EV Equity" chapter in the 2021 edition, totaling 10 points, and are not included in the 2021 point allocation chapter subtotals but are included in the overall total.

Three of the four metrics previously included in the "EV Equity" chapter were reallocated to the "Incentives for EV Deployment" chapter, resulting in the largest change in points for any chapter, increasing from 30 to 36. However, the metrics that were previously in "Incentives for EV Deployment" chapter collectively lost 3 points while new and reallocated metrics increased the chapter by 9 points. Transportation System Efficiency saw the second largest increase, from 12 to 17 points. This was a result of the reallocation of one metric previously in the "EV Equity" chapter, one new metric, and another metric receiving an additional point reflecting its importance to broader GHG reduction goals of transportation electrification. The "EV and EVSE Planning and Goal Setting" and "Electricity System Optimization" chapters both lost points, 2 and 1 points, respectively, while the "Transportation Electrification Outcomes" chapter gained a new metric and 2 points.

RESULTS

Our evaluation in the *Scorecard* focuses on the states that have demonstrated some level of progress on transportation electrification to highlight the diverse array of policies available for all states to consider. We do not present scores beyond the top 33 because each state ranked below that level achieved no more than 15% of the total available points in the *Scorecard*. A number of states earned very few points or no points at all in several categories.

However, throughout the report we do highlight the efforts of some unranked states that have made progress in a certain category. Detailed scores for all states and the District of Columbia are available in Appendix A. Information on policy and program activities for all 50 states and the District of Columbia is given in Appendixes B through G. We included two additional tables which detail results for every state for two topic areas, equity and heavy-duty vehicles in Appendix A. The *Scorecard* omits U.S. territories due to lack of complete data and comparable program activity.

Table 4. Top 33 scores by states and the District of Columbia

Rank	State	Planning and goals (15 pts.)	Incentives (36 pts.)	System efficiency (17 pts.)	Grid optimization* (9 pts.)	Outcomes (23 pts.)	Total (100 pts.)
1	California	15	30.5	14.5	10	18	88
2	New York	12	25	7	9	9	62
3	Colorado	11	17	9.5	9	14.5	61
4	Massachusetts	10	21.5	8.5	6	11.5	57.5
5	Vermont	12	14	5.5	7	18.5	57
6	Washington	14.5	13	8	5.5	15	56
7	New Jersey	9.5	21.5	6	7	9.5	53.5
8	District of Columbia	6.5	16.5	9.5	6	13	51.5
	Oregon	15	12	6	7	11.5	51.5
10	Maryland	5.5	14	9	7	13.5	49
11	Maine	5	16	4	7	11.5	43.5
12	Connecticut	6.5	17	8	5	6	42.5
13	Nevada	5.5	14.5	2	7	9.5	38.5
14	Hawaii	5.5	10	1	8.5	13	38
15	Virginia	9.5	9	3	6	8.5	36
16	Pennsylvania	3.5	21.5	1	4	3	33
17	Delaware	2.5	12	1	5	10	30.5
	Minnesota	4.5	11	4	6.5	4.5	30.5
19	Rhode Island	4	11.5	1.5	2	10.5	29.5
20	Florida	2	11.5	1	5	8.5	28
21	Illinois	5	10.5	4	4	4	27.5
	New Mexico	3	10.5	2	4	8	27.5

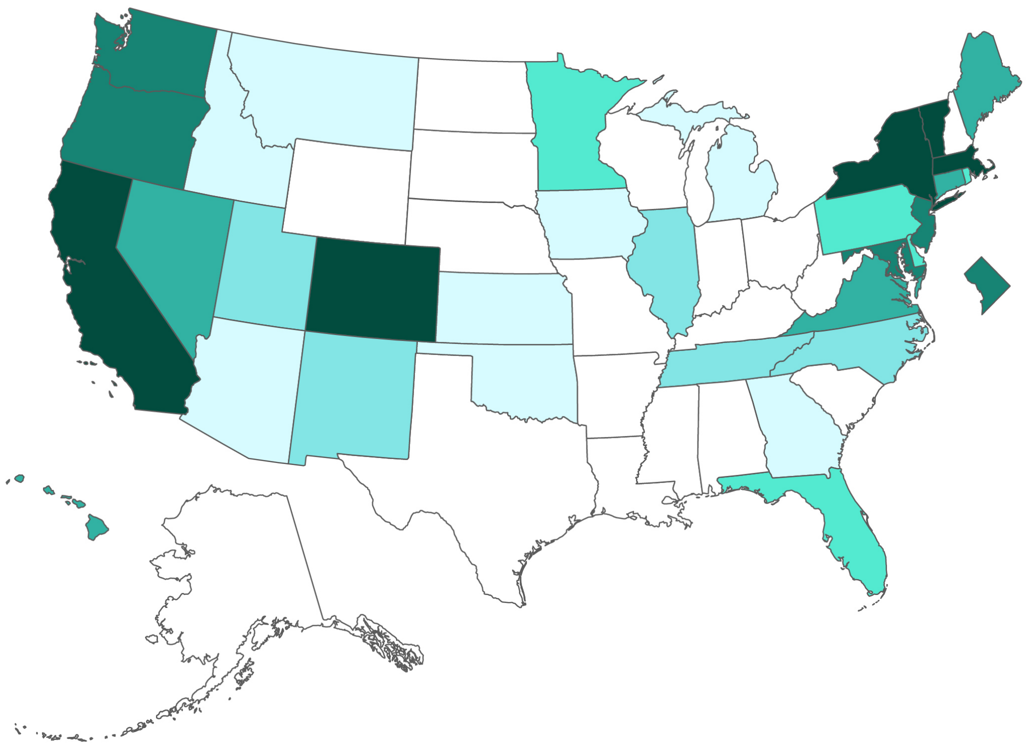
Rank	State	Planning and goals (15 pts.)	Incentives (36 pts.)	System efficiency (17 pts.)	Grid optimization* (9 pts.)	Outcomes (23 pts.)	Total (100 pts.)
23	Tennessee	3.5	7.5	4	8	4	27
24	North Carolina	4	9.5	1	6	6	26.5
	Utah	2	9	1	3	11.5	26.5
26	Arizona	2.5	7	3.5	4	6.5	23.5
	Michigan	1	7.5	5	5	5	23.5
28	Oklahoma	0	5	3	2	7	17
29	Idaho	0.5	6	1	2	7	16.5
	Montana	0.5	7	1	1	7	16.5
31	Kansas	0	5.5	1	3	6.5	16
32	Georgia	0	3	1.5	3	8	15.5
33	Iowa	1.5	4	1	2	6.5	15

* This section includes a bonus point for states that have vehicle-to-grid pilot programs.

Table 4 shows that states tend to do best in their efforts to integrate electric vehicles into the electricity system through rate design and improvements to the cleanliness of the grid. States also did well in their efforts to plan and set goals for the deployment of EVs and their EV incentive offerings. While not directly shown here, states have much scope to improve in the way they address equitable access to electrified transportation for low-income, economically distressed, and EJ communities (see appendix A). There is considerable room for improvement in how or if states take steps to improve the overall efficiency of the transportation system. This can involve setting deployment requirements and offering financial support to electrify transit and school buses, which provide essential trips that move people more efficiently than cars. More states could also set goals for transportation sector emissions reductions and provide a price signal that encourages this reduction.

Even states that have been early adopters of transportation electrification still have considerable room to improve their policies. Indeed, only seven states and the District of Columbia achieved at least half of the available points in the *Scorecard.* Figure 2 shows the geographical distribution of the top 33 among states and DC.

The State Transportation Electrification Scorecard



1–5
1. California
2. New York
3. Colorado
4. Massachusetts
5. Vermont

6–10
6. Washington
7. New Jersey
8. District of Columbia
8. Oregon
10. Maryland

11–15
11. Maine
12. Connecticut
13. Nevada
14. Hawaii
15. Virginia

16–20
16. Pennsylvania
17. Delaware
17. Minnesota
19. Rhode Island
20. Florida

21–24
21. New Mexico
21. Illinois
23. Tennessee
24. Utah
24. North Carolina

26–33
26. Arizona
26. Michigan
28. Oklahoma
29. Idaho
29. Montana
31. Kansas
32. Georgia
33. Iowa

Unranked

Figure 2. State scores in the *Transportation Electrification Scorecard*

NATIONAL AND REGIONAL LEADERS

California is the national leader on transportation electrification policy and home to policies not present (or not as robust) in other states. It received the maximum number of points in both the "EV Planning" and "Electricity Grid Optimization" chapters, committing to full electrification of light-duty vehicle sales, electricity and transportation sector emissions reductions, and planning for considerable changes to its electricity grid to prepare for a sharp rise in EV uptake. The state is also a leader in incorporating equity considerations into its EV policy and sets aside a significant amount of funding for disadvantaged communities.

The runner-up, **New York**, has heavily incentivized the purchase of EVs and EV charging infrastructure, including from its investor-owned utilities, and taken considerable steps to integrate EVs onto the grid. It has also committed heavily to electrifying its school bus fleet and was one of two states to include equity considerations in its school bus electrification plans.

Third place **Colorado** performed well overall and scored particularly well in optimizing its electricity grid for EVs. It performed well in most categories and is investing considerably in electrifying HD vehicles, including its transit bus fleet. Colorado also adopted Advanced Clean Trucks (ACT) for HD EVs.

In the Northwest, **Washington** has taken many steps toward planning and setting binding targets for EV deployment and has seen strong outcomes in terms of deployment, including the highest number of HD EVs per capita at 4.06 per 100,000 people. The state has also enacted legislation requiring utilities to file a plan with the PUC detailing investments in EV charging infrastructure.

In the Southwest, **Nevada** has laid considerable groundwork to optimize its electricity grid for EVs and its utilities are investing considerably in the state's EV charging infrastructure. The state has both time-varying rates for L2 chargers and DCFC-specific rates and has the third highest utility investments per customer of any state.

In the Midwest, **Minnesota** has made significant progress toward optimizing its grid for EVs with both time-varying L2 charging rates and DCFC-specific rates. The state also has very significant utility EV infrastructure investments in the pipeline, over $325 million, making it the third largest proposed utility spending pot per capita and in total. Its utilities have also established programs to support economically distressed and environmental justice communities.

In the Southeast, **Virginia** has made progress toward planning for an electric future, including considerations for HD vehicles and its electricity grid. The state is requiring its utilities to plan for an electric future as grid emissions continue to decline, increasing the benefits of electrification by reducing the emissions from charging EVs.

Leaders by State Policy Actor

Although multiple arms of state government can influence the trajectory of transportation electrification in a state, we find that some states use many actors to accomplish their goals while others have a particularly strong legislature, public utilities commission, or executive branch with regard to EV policy.

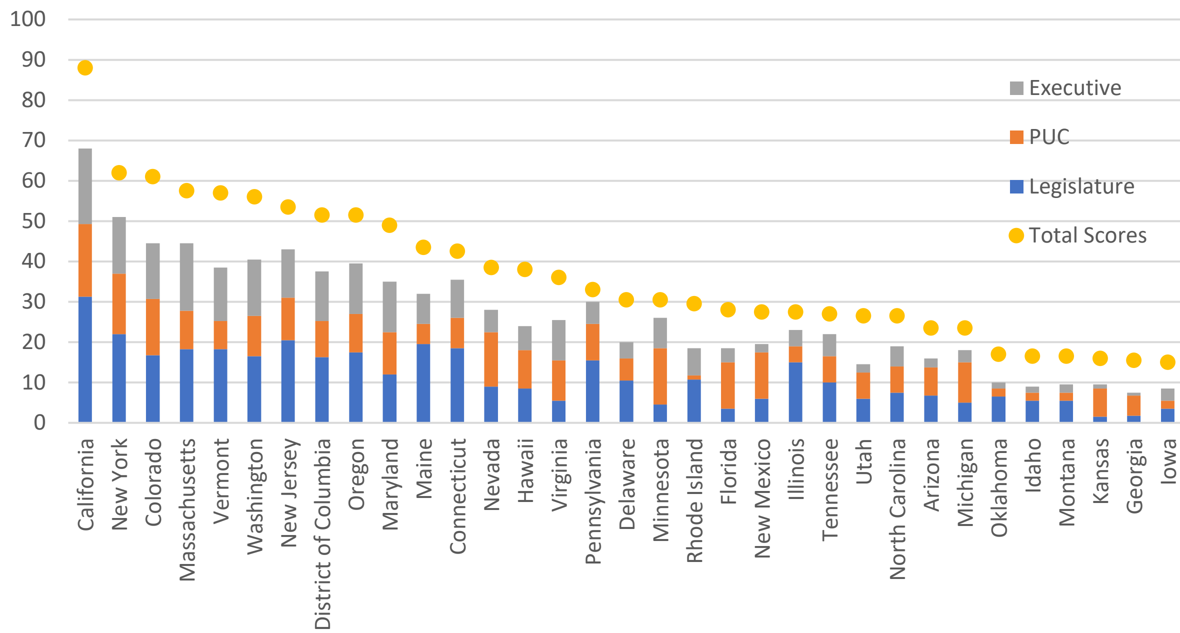


Figure 3. Scores by state actor[12]

As shown in figure 3, among the top 10, California's TE policy is created and implemented evenly across all branches of government. Similarly, in New York and Colorado, each arm of the state plays an active role in TE-related policymaking. The executive branch played a disproportionate role in Massachusetts and Maryland in part due to their adoption of mandates for electrification.

Outside of the top 10, we found legislatures to be more proactive in driving vehicle purchase and charging incentives in Connecticut, Maine, and Illinois. The PUC was the dominant actor in Minnesota, Florida, and New Mexico, with utilities in these states investing considerably in a wide variety of TE programs.

[12] In this chart, most metrics were assigned to one actor based on who was the lead actor or contributed more toward the state receiving points for that metric. Four metrics were split between Legislature and Executive branches because both were involved in a state receiving points for these metrics. These are transit agency bus goals and procurement, state investment for electric transit bus deployment, state requirements for ESB deployment, and state investment for ESB deployment. Scores from the outcome section were not included as multiple state agencies can influence successful deployment of policies reflected by these metrics.

Leaders in Equitable Transportation Electrification

Equity must be central to a state's TE policy actions. While we chose to integrate equity throughout all the policy areas, assessing how states are including equity in their policies is still valuable. In table 5 we include metrics that are wholly equity focused, meaning they score based on policies that target low-income, economically distressed, or EJ communities, as well as portions of metrics that target these communities in our assessment. Performance on these metrics mirrored performance overall, with California and New York performing the best followed by DC, which ranked eighth overall in this analysis. Pennsylvania also performed well on equity compared to its overall performance.

Table 5. Top 33 scores for equity by states and the District of Columbia

State	EV Plans (0.5 pts.)	New EV Incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 incentives (1 pt.)	DCFC incentives (1 pt.)	State EV investment and programs for disadvantaged communities (6 pts.)	Utility spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
California	0.5	1	0	0	1	4.5	2	2	1	1	0	13.0
New York	0.0	0	0	1	0	2	1	2	0	0	1	7.0
District of Columbia	0.5	0	0	0	0	2	0	2	1	0	0	5.5
Pennsylvania	0.0	1	1	0	0	0	0.5	2	1	0	0	5.5
Maine	0.5	1	1	0	0	2	0	0	0	0	0	4.5
Massachusetts	0.0	0	0	0	0	1.5	0	2	1	0	0	4.5

State	EV Plans (0.5 pts.)	New EV Incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 incentives (1 pt.)	DCFC incentives (1 pt.)	State EV investment and programs for disadvantaged communities (6 pts.)	Utility spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
Oregon	0.5	1	1	0	0	0	0	1	0	1	0	4.5
Washington	0.0	0	0	0	0	2	0	1	0	1	0	4.0
Connecticut	0.5	0	1	1	0	0	0	0	0	0	1	3.5
Minnesota	0.5	0	0	0	0	0	0	2	1	0	0	3.5
Rhode Island	0.0	1	1	0	0	0	0	0	1	0	0	3.0
New Jersey	0.5	0	0	1	0	1	0	0	0	0	0	2.5
Delaware	0.0	0	0	0	0	0	0	1	1	0	0	2.0
Hawaii	0.0	0	0	0	0	1	0	0	1	0	0	2.0
Illinois	0.0	0	0	1	1	0	0	0	0	0	0	2.0
Maryland	0.0	0	0	0	0	0	0	1	1	0	0	2.0
New Mexico	0.0	0	0	0	0	0	1	1	0	0	0	2.0
Colorado	0.5	0	0	0	0	1	0	0	0	0	0	1.5
Florida	0.5	0	0	0	0	0	0	1	0	0	0	1.5
Iowa	0.0	0	0	0	0	0	0	0	1	0	0	1.0
Nevada	0.0	0	0	0	0	0	0	1	0	0	0	1.0

State	EV Plans (0.5 pts.)	New EV Incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 incentives (1 pt.)	DCFC incentives (1 pt.)	State EV investment and programs for disadvantaged communities (6 pts.)	Utility spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
North Carolina	0.0	0	0	0	0	0	0	1	0	0	0	1.0
Tennessee	0.0	0	0	0	0	0	0	0	1	0	0	1.0
Vermont	0.0	1	0	0	0	0	0	0	0	0	0	1.0
Arizona	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Georgia	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Idaho	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Kansas	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Michigan	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Montana	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Oklahoma	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Utah	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Virginia	0.0	0	0	0	0	0	0	0	0	0	0	0.0

Disadvantaged communities = Low- and moderate-income communities, environmental justice communities, and underserved communities

Comparison to 2021 Scorecard

The average score for the top 33 ranked states and the District of Columbia declined slightly from 39 to 36 compared to the 2021 edition due to methodology updates that put more emphasis on mandates over targets, and on equity and electric school buses. The top 10 states remained the same as in the 2021 edition, although there was movement within this group. Twenty-nine states appeared in the top 33 for both editions, further indicating that while progress has occurred in the past two years, it is largely among the same states.

The most improved state by rank is Oklahoma, which moved up 10 spots, from being unranked (would have ranked 37th) in 2021 to now being ranked 27th. Oklahoma achieved this partly by having the highest number of DCFC chargers per capita in the country by a wide margin. This is to some extent due to a focus on DCFC charging and reducing range concerns by the state's electric vehicle charging program, which is funded by a portion of the state's VW settlement fund (Oklahoma DEQ 2022). The program is also investing heavily in electric school buses and has received funding from the federal Clean School Bus program to transition the highest percentage of their school bus fleet (18%) in 2022.

The state that improved its overall score the most was Colorado, which increased its score from 48 to 61 points and now ranks third. It improved in almost all policy categories, only slightly declining in EV planning, with particular improvement in transportation system efficiency, electricity grid optimization, and outcomes. It ranks highly on registered LD and HD EVs and chargers per capita and has multiple dedicated funding streams for HD electrification. It also has the second highest utility investment per capita, with Xcel Colorado being a national leader on transportation electrification.

California is again the top state by a wide margin; however, its score fell by 3 points. Washington DC fell by 7.5 points compared to the 2021 edition of the *Scorecard,* the largest among the top 10. Both declines are largely due to changes in our methodology, not to weakening ambition or a retreat in action by these states. California's loss of points largely stemmed from a reduction in points for EV and EVSE Planning, for which the state received full points in both prior editions, and the introduction of new metrics for ESBs. California has no mandate or target for school districts to electrify their fleets, spends relatively less on ESB support, and has comparatively fewer ESBs in service. DC's score dropped because it has yet to adopt either of California's latest zero-emissions vehicle standards, ACCII and ACT, and because DC.'s actions have not led to the same outcomes as its peers. While DC may perform well with the number of HD EVs on its roads per capita and the second highest number of L2 ports per capita, it has few DCFC ports and has not progressed in reducing transportation GHG emissions in recent years.

Chapter 2. Planning and Goal Setting

INTRODUCTION

State legislatures, governors, and PUCs are creating plans and setting targets for the number of EVs on the road in an effort to guide overall transportation electrification efforts. A systematic approach to transportation electrification should include interrelated efforts in the transportation, power generation, and buildings sectors. A systemic planning approach would factor in all that is necessary to transition our vehicles—their upfront costs; their charging needs; equity and distributional considerations; education; stakeholder involvement, including utilities; and supply-chain challenges—and would quantify and track progress across these fronts. Although states are in different phases of progress, every state can do more. In this chapter we review government-led initiatives to plan for transportation electrification; we also assess targets created for EV adoption and installation of EV charging infrastructure. We evaluate initiatives by state governments and PUCs to require and coordinate action through EV and EV charging infrastructure plans, EV adoption goals, and ZEV mandates; to remove barriers to EV deployment in new construction through building codes; to incentivize and create funding streams for low-emission vehicles through low-carbon fuel standards (LCFSs); and to encourage utility goal setting through EV charging infrastructure plans and filings.

Points are allotted as follows:

- EV and EV charging infrastructure plans (2 points)
- LD EV adoption goals and ZEV mandates (4 points)
- HD EV adoption goals and ZEV mandates (4 points)
- Utility EV charging infrastructure goals (2 points)
- EV-supportive building codes (2 points)
- Low-carbon fuel standard (1 point)

RESULTS AND KEY TAKEAWAYS

The scores that each state and the District of Columbia in the top 33 earned in this chapter are captured below in table 6.

Table 6. Scores for planning and goal setting

Rank	State	EV plans (2 pts.)	LD EV goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
1	California	2	4	4	2	2	1	15
	Oregon	2	4	4	2	2	1	15
3	Washington	1.5	4	4	2	2	1	14.5
4	New York	1.5	4	4	1	1	0.5	12
	Vermont	1.5	4	4	1	1.5	0	12
6	Colorado	2	1	4	2	2	0	11
7	Massachusetts	1.5	4	4	0	0.5	0	10
8	New Jersey	2	2	4	0	1.5	0	9.5
	Virginia	1.5	4	2	2	0	0	9.5
10	Connecticut	2	1	2	0	1.5	0	6.5
	District of Columbia	2	1	2	0	1.5	0	6.5
12	Hawaii	1.5	0	2	0	2	0	5.5
	Maryland	1.5	2	2	0	0	0	5.5
	Nevada	1.5	0	2	2	0	0	5.5
15	Illinois	1	0	0	2	1.5	0.5	5
	Maine	2	1	2	0	0	0	5
17	Minnesota	2	1	0	1	0	0.5	4.5
	North Carolina	1	1	2	0	0	0	4
	Rhode Island	1	1	2	0	0	0	4

Rank	State	EV plans (2 pts.)	LD EV goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
20	Pennsylvania	1.5	0	2	0	0	0	3.5
	Tennessee	1.5	1	0	1	0	0	3.5
22	New Mexico	0.5	0	0	2	0	0.5	3
23	Arizona	0.5	0	0	2	0	0	2.5
	Delaware	0.5	2	0	0	0	0	2.5
25	Florida	2	0	0	0	0	0	2
	Utah	1	0	0	1	0	0	2
27	Iowa	1.5	0	0	0	0	0	1.5
28	Idaho	0.5	0	0	0	0	0	0.5
	Michigan	0.5	0	0	0	0	0.5	1
	Montana	0.5	0	0	0	0	0	0.5
31	California	2	4	4	2	2	1	15
	Kansas	0	0	0	0	0	0	0
	Oklahoma	0	0	0	0	0	0	0

In our discussion of each metric below, we outline how states earned points by advancing transportation electrification planning and goal setting through formal actions taken by a governor or agency, state legislature, or PUC, or by continuing their state planning activities or multistate coordination efforts.

Unlike in the *2021 Scorecard*, California is not alone in receiving the maximum number of points in any category. Both California and Oregon achieved all available points in the planning and goal-setting section. In California, Senate Bill 350 (the Clean Energy and Pollution Reduction Act of 2015), for example, initiated widespread transportation electrification efforts to meet the state's 2030 and 2050 climate goals and its air quality requirements. Oregon, alongside Washington, New York, Massachusetts, and Vermont, recently adopted California's Advanced Clean Cars II regulations, putting those states on a path toward 100% electric vehicle sales by 2035. Oregon also included considerations of equity in their EV and EV charging plan, unlike Washington, which achieved full points in all other metrics.

Regionally, Washington in the West, Colorado in the Southwest, Vermont in the Northeast, Virginia in the Southeast, and Minnesota in the Midwest are all leaders in this category. These states have developed robust individual EV action plans or participate in comprehensive multistate planning efforts. These regional leaders have also made commitments to getting more EVs on their roadways through shared executive action MOUs, legislative requirements, or agency action.

Despite these achievements, only nine states earned more than half of the points available in this chapter. Clearly, abundant opportunities exist for states across the spectrum of transportation electrification policy to make progress.

The most important early step is to develop a long-term, systematic planning effort around EVs and EV charging infrastructure to help government leaders and stakeholders create a shared understanding of the energy landscape and chart a pathway to meeting overall state energy and emissions reduction goals. As state energy planning is a recurring process, it is likely the best opportunity for states to take early action on EVs and create benchmarks for progress. The best plans incorporate both LD and HD EVs and address equity in addition to charting out the necessary steps that governmental and non-governmental actors need to take to prepare for an electric future.

While long-term EV and EV charging infrastructure planning efforts are an important first step for every state, the maturing of the EV market means states can take bolder steps to accelerate electrification. States have the opportunity to adopt two policies that go beyond planning and mandate greater electrification. These policies, Advanced Clean Cars II and Advanced Clean Trucks, will catalyze the market and provide a path to electrification in tandem with other complementary policies by mandating that an increasing percentage of new vehicle sales be electric for the light-duty and medium- and heavy-duty markets, respectively.

State legislatures and/or PUCs should also establish clear policy direction to encourage utility investment in EV charging infrastructure. Fourteen states have defined the parameters for appropriate utility investment in EV charging or have identified metrics to track the impact of such investments.

EV and EV Charging Infrastructure Plans

Several states have taken steps to guide the development, management, and implementation of EVs and EV charging infrastructure through coordinated planning initiatives. These plans often establish nonbinding commitments that set the parameters of a comprehensive transportation electrification strategy. Varying in detail and scope, these plans may consider EVs as a means of reducing environmental impacts in the transportation sector while also including grid integration (or how the electricity grid should handle the load increase from EV charging), charging infrastructure, general education efforts, and attention to low-income, economically distressed, or EJ communities. Other plans may focus on a specific segment of vehicles or on elements of transportation electrification, like charging infrastructure along interstate or highway corridors.

Initiated through the executive branch or the legislature, planning efforts come in several forms. They can be self-contained efforts that identify barriers to adoption and set milestones for progress while creating pathways for future advancement once goals have been achieved or other obstacles have been identified. They can also be included in broader state energy planning (as discussed above) in which the goal of getting more EVs on the road is one component of the overall state energy or climate strategy. Multistate planning efforts are also underway, with varying levels of rigor. In 2014 eight states released the Multi-State ZEV Action Plan, which includes collaborative actions on education, incentives, and charging infrastructure. This plan, now covering 10 states, was updated in 2018 to reflect accomplishments since 2014.[13] It prioritizes the next steps for participating states in meeting their collective objectives of EV and EV charging infrastructure deployment and emissions reductions from the transportation sector.

States could earn 1 point for having an EV action plan or partial credit of 0.5 pts for multistate coordination as well as an additional 0.5 pts for plans including HD EVs. States could receive another 0.5 pts for plans considering equity, which can involve detailing how to improve EV uptake in low-income communities, communities of color, or EJ communities or assessing what electrification will mean for these communities. Minnesota's plan, for example, discusses explicitly the many benefits of electrification for EJ communities; Black, Indigenous, People of Color (BIPOC) communities; women; disabled residents; and rural residents and sets out strategies to increase access and benefits for these groups specifically.

[13] In 2014 the participants were California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont. New Jersey joined in 2018 and Maine in 2019.

Twenty-eight states received points for this metric with 9 receiving the full 2 points.

Light-Duty and Heavy-Duty EV Adoption Goals and ZEV Mandates

Through executive action, regulation, and legislation, states are increasingly setting binding targets for LD EV adoption to meet emission reduction targets, accomplish other state priorities, and signal their dedication to electrifying the transportation sector. EV deployment targets are the most direct policy action for EV uptake. The Plug-in Electric Vehicle Policy Evaluation Rubric developed by the National Association of State Energy Officials indicates that such targets are among the most impactful policies that states can use to advance EV deployment (Morrison et al. 2018). Similarly, a report from the International Council on Clean Transportation and another from the Center for American Progress found that ZEV mandates are the single strongest predictor of EV market share (Lutsey et al. 2015; Cattaneo 2018).

California has historically been a leader in electrification and has the unique authority to set standards for vehicles that other states may adopt. California's Air Resources Board (CARB) has recently approved a plan to phase out LD internal combustion engine vehicles by 2035. This program, Advanced Clean Cars (ACC) II, starts with a requirement that 35% of new vehicles be plug-in hybrids or battery electric vehicles for model year 2035. Numerous states have already adopted its predecessor, Advanced Clean Cars I, which also required automakers to meet certain annual ZEV requirements.

While the HD EV market is in its early stages, the potential for emission reductions is substantial. Electrification of heavy-duty vehicles could yield 69% reductions in heavy-duty vehicle GHG emissions by 2050 (Ledna et al. 2022). States are still just starting to address the policies for ramping up deployment. The California Air Resources Board (CARB) recently approved the first zero-emission commercial truck requirement in the United States, the Advanced Clean Trucks (ACT) regulation. In 2024 it will begin a phased transition from trucks using diesel and gas power, replacing them with zero-emission equipment over the next three decades. Other states are considering action in this area as well. Seventeen states and Washington DC, (along with the Canadian province of Quebec) have developed a Zero-Emission Medium- and Heavy-Duty Vehicle Action Plan to inform HD EV actions in their jurisdictions. They are also pledging to make sales of all new medium- and heavy-duty vehicles in their jurisdictions zero emission by no later than 2050.

States earned 4 points for adopting ACC II or 2 points if they signed an intention to adopt ACC II via executive order or the establishment of a rulemaking progress. States could also earn 1 point if they have adopted an LD EV deployment target, have adopted ACC I, or signed a LD multistate MOU. States earned 4 points for adopting ACT, 2 points for signaling intention to adopt ACT or signing onto the HD Action Plan, or 1 point for a nonbinding target.

Eighteen states scored points for setting LD targets, through the cooperative efforts discussed, by adopting one or both of California's LD ZEV programs, or by pledging to adopt ACCII. Seven states, including California, have adopted ACCII while Maryland, Delaware, and New Jersey plan to adopt ACCII in 2023 and have received partial credit as a result. Eight states, including California, have adopted ACT and received full points for that metric while another ten have received partial credit for signing onto the HD action plan or signaling intent to adopt ACT. For all other metrics our cutoff for data was February 15, 2023; however, for the LD and HD goals and ZEV mandates metrics we chose to extend that deadline until April 30 given the impact they will have on the policy landscape for vehicle electrification.

Utility EV Charging Infrastructure Goals

Planning for the impacts of EVs and EV charging infrastructure on the grid is critical to ensure efficient deployment while also preparing for the potential benefits and effects for ratepayers. Investor-owned and other regulated utilities can play an important role in the deployment of EV charging infrastructure, but they often need clear direction on the types of investments (e.g., in make-ready programs or utility-owned chargers) they are allowed to earn a return on as part of their rate base; otherwise, they may not invest out of fear of under-recovery on their investments.[14] Regulators and legislatures can encourage investment in EV charging infrastructure by requiring that utilities file plans for deployment in their service territories.

A handful of states require their utilities to file TE plans, either through legislation or a PUC order. Nevada recently enacted Senate Bill 448, which required utilities to develop transportation electrification plans by September 2021. While not requiring plans from all its utilities, in 2019 Minnesota's PUC issued an order finding that utilities have an important role in policy and investment strategy for transportation electrification. The order also stated that further integration of those efforts in rate design will improve system efficiency and benefit ratepayers, including through rate redesigns that incentivize EV drivers to charge at times that limit strain on the electricity grid and avoid the need for costly upgrades.

States earned 1 point for a PUC order that provides a policy signal encouraging investment in EV charging infrastructure, like Minnesota's PUC order, and clarity about which

[14] A utility's rate base is the net investment of a utility in property to serve the public, typically major capital expenditures; utilities can earn a rate of return on these investments. State approaches vary as to which types of investments are allowable in the rate base, as well as in which situations (e.g., for underserved populations or for segments with market barriers, such as multiunit dwellings).

investments are appropriate or what criteria will be used to evaluate those investments.[15] States could earn 2 points if their PUC or legislature had created a requirement that utilities file a plan for EV charging infrastructure investment. We capture whether these plans result in approved utility investments in the Incentives for EV Deployment chapter, so to avoid double counting, we do not take into account the outcomes of these PUC actions in this section.[16]

EV-Supportive Building Codes

Buildings have long life spans; as such, it is important that minimum building requirements incorporate the necessary infrastructure to support the EVs of current and future residents. As EVs multiply across the United States, there is a growing recognition that EV charging infrastructure can support building energy efficiency and load management, and should be a consideration in the design and construction of buildings. To avoid the challenges of modernizing older buildings while supporting ambitious EV deployment goals, states (as well as some local governments that can set minimum building standards) are beginning to integrate elements of vehicle charging into their building codes.

While including these provisions in all building codes is important, the multiunit dwellings (MUD) sector is particularly critical. MUD properties often serve low- to moderate-income populations and provide shared amenities, like parking, to tenants or owners. Without expanding the availability of and access to EV charging infrastructure, multiunit residents will be unable to reap the full benefits of EVs—and states cannot meet their aggressive EV and emissions targets without reaching everyone.

State adoption of EV-related building codes has generally taken one of two approaches. EV-capable regulations require electrical capacity and conduit for future charging build-out. EV-ready codes require not only electrical capacity and conduit but also installation of wiring for charging stations, allowing the owner or occupant of a building to easily add an EV charging device. These requirements are being applied with varied levels of stringency[17] and to different building types. For this reason, we label these actions as *EV-supportive*.

[15] We did not award points for studies, investigative activities, or demonstration programs by states or PUCs.

[16] In our review of approved plans, we observed small investment in EVs; the overwhelming funding is directed toward EV charging infrastructure investment.

[17] Drafts of the 2021 International Energy Conservation Code (IECC) included mandatory code provisions for commercial and residential builders to wire garages and parking places for future installation of EV chargers. However, those provisions were removed through the appeals process.

Our findings show that to date, commercial buildings are more likely than other types of buildings to have EV-supportive requirements. Massachusetts requires an EV-ready parking space for every 15 parking spaces in a commercial building, while Washington requires buildings to provide EV-charging capability to 20% of parking spaces in a commercial building project. There are six statewide code requirements (in California, Connecticut, District of Columbia, New Jersey, Oregon, Vermont, and Washington) for MUDs. California, Oregon, and Washington are the only states with EV-capable code requirements in place for single-family residential construction, although some local governments (in Atlanta, Denver, Honolulu, Seattle, Tucson, and others) also have such codes for single-family buildings.

We awarded states for taking proactive steps to adopt EV-supportive codes. States earned 0.5 points for a statewide single-family code requirement, 1 point for a MUD code requirement (to acknowledge the additional challenges to installing EV charging in these properties, which often serve economically distressed populations), and 0.5 points for commercial building requirements. We also awarded partial credit of 0.5 points to states with cities and counties that have adopted EV-supportive codes covering at least 20% of the state population. Twelve states have adopted requirements for charging-related infrastructure for some building types as part of their minimum construction standards—up from five states in the *2021 Scorecard*.

Low-Carbon Fuel Standard (LCFS)

California, Oregon, and Washington use an LCFS to reduce the carbon intensity of transportation fuels that are sold or supplied in the state. Fuel suppliers may comply with the regulations by blending gasoline or diesel with fuels that have lower-carbon attributes or by purchasing credits from a category that includes electric-powered vehicles. These credits have created a pool of revenues that can be used, as in California, to support EVs and the deployment of EV charging infrastructure (as well as to promote other low-carbon fuels) (Barbose and Martin 2018). LCFS funds in California are now being used to offer a point-of-sale price reduction of up to $1,500 for the purchase or lease of an EV or plug-in hybrid electric vehicle, supporting the state’s progress toward its carbon reduction goals (CARB 2020). Illinois, Michigan, Minnesota, New Mexico, and New York have LCFS bills under consideration, while some other states have commissioned feasibility studies. States earned 1 point for adoption of an LCFS and 0.5 points for initiating the lawmaking process to adopt an LCFS.

UNSCORED METRICS

Interagency Collaboration and Coordination

The coordination and outcomes necessary to advance EVs require agencies or branches of state government to work together to facilitate a shared vision and collective responsibility for state action. In advance of (or as a manifestation of) state EV planning, governors or agency heads are using interagency working groups, councils, and other, informal efforts to create an environment conducive to EV and EV charging infrastructure goals. The designation of an individual and/or agency to lead coordination efforts is an important element to ensure that milestones are met through state agency synchronization. Due to a lack of available data, we are unable to track how states prioritize interagency collaboration but recognize that this coordination is an integral component of any statewide transportation electrification strategy.

Inclusive Processes for Equitable Policy and Program Design

As the transportation sector continues to evolve and electrification becomes a key strategy to reduce GHG emissions, states will need to ensure that electrified transportation is accessible to all. This is critical not only to maximizing emission reductions but also to adequately addressing the transportation needs of historically disadvantaged and marginalized communities.

In addition, states must commit to designing an equity-driven approach to transportation electrification and transportation planning more broadly that fosters an inclusive decision making process and ensures accountability around equitable outcomes. The Greenlining Institute's "make equity real" efforts have laid the groundwork for operationalizing equity in state processes and, most recently, have been used to help shape the development of California Public Utilities Commission's (CPUC) Transportation Electrification Framework Equity Chapter (A. Sanchez and L. Aguayo, Greenlining Institute, pers. comm., September 25, 2020).

Guiding this vision is the principle that states should commit to equity as a foundational goal for all their policies and programs. If equity is prioritized from the very beginning of the policy design process, along with sustained stakeholder engagement, then well-developed and impactful policies for low-income and EJ groups are more likely to result. Community and stakeholder engagement is fundamental to equitable policy design. Some best practices include engaging early and throughout the process, following up during and after the project is over, co-creating plans and policies, learning about the communities involved and engaging with the relevant people, building capacity internally and providing such resources to communities, and being transparent about decision making processes and responsibilities. These actions can improve not only the outcomes of current project but also future projects by building trust, deepening relationships and understanding, and limiting future conflicts with communities (Samarripas and Jarrah 2021).

Finally, to measure whether programs are having the desired impacts on the targeted communities, states should have a methodology for measuring and evaluating the impacts of their policies through an equity lens (A. Sanchez and L. Aguayo, Greenlining Institute, pers. comm., September 25, 2020). Developing a metric to gauge how well a state performs on integrating equity into its transportation electrification policymaking is difficult given the lack of accessible data and the fact that we did not undertake a data collection survey for this report.

However, states can take specific actions to signal their commitment to equity and to ensure that equity as a practice is a crucial element in the decision making process. These actions include structuring public engagement during policy and program planning in a way that increases feedback from marginalized groups, as well as appointing residents from these communities or community-based organization leads to formal roles in decision making to guarantee that their viewpoints and lived experiences are incorporated into program design (Ribeiro et al. 2020). Mobility needs assessments are another tool to identify the specific transportation needs and challenges that exist in a specific community (Greenlining 2019). Finally, identifying performance metrics that hold state governments accountable for their commitments will ensure that planning efforts are having the desired impacts on residents of marginalized communities (Ribeiro et al. 2020).

Chapter 3. Incentives for EV Deployment

INTRODUCTION

Despite growing EV offerings from manufacturers, the higher purchase cost and the significant cost of installing associated charging infrastructure remain barriers to entry into the marketplace. Over the lifetime of a vehicle, EV owners will save $6,000–10,000 in ownership costs (e.g., for fuel and maintenance) relative to vehicles with an internal combustion engine (Harto 2020). Still, the initial cost of EVs inhibits greater adoption. Charging an EV is different from filling up the tank of a gasoline-powered car and both perceived and actual barriers to charging infrastructure and the need to shift how one thinks about refueling can delay the purchase of an EV. As a result, both financial and nonfinancial policies that incentivize EV purchase, use, and charging infrastructure deployment are fundamental to the uptake of EVs.

Some incentives, such as rebates and tax credits for vehicle purchases, already have a proven track record of increasing EV sales among individual consumers. Research has shown, in fact, that purchase incentives are among the most powerful policies that states can use to accelerate EV deployment (Morrison et al. 2018; Lutsey 2015). Many states have tax credits and rebates in place to supplement the federal plug-in electric drive vehicle tax incentive, which provides a credit of up to $7,500 for qualifying vehicles[18]. Likewise, nonfinancial incentives, such as high-occupancy vehicle (HOV) lane access and priority parking, can make EVs more appealing to individual consumers.

Additionally, as EV availability increases and EVs become a critical part of states' strategies for addressing transportation GHG emissions, states can help create comprehensive charging networks by providing financial incentives both for home charging and for public charging infrastructure. Several recent reports identify charging availability as directly correlated with electric vehicle deployment (Morrison, Veilleux, and Powers 2018; Hall and Lutsey 2017; Satterfield and Schefter 2022). The IIJA dedicated $7.5 billion toward building out a network of 500,000 EV chargers, with $2.5 billion of that going toward rural and marginalized communities (Skibell 2021). More recently, the IRA extended the 30C tax credit until 2032 to require EV charging infrastructure in low-income census tracts and non-urban areas (117th Congress 2022).

[18] Vehicles qualify for the credit based on whether the final assembly happens in North America and on the source of the battery materials.

The policies earning points in this chapter were selected because of their impact on spurring EV adoption. The scoring for each reflects the magnitude of change required to move the market toward broader EV sales and EVSE installation. These policies apply to a diverse group of stakeholders including individual consumers, businesses, and municipalities, helping to encourage EV integration across both the public and private sectors. In this chapter, we review and score states on the following policies:

- Light-duty EV purchase incentives (4 points)
- Heavy-duty EV purchase incentives (4 points)
- Used LD EV purchase incentive (1 point)
- Statewide EV investment and programs prioritizing low-income, economically distressed, or environmental justice communities (6 points)
- State incentives for L2 chargers (2 points)
- State incentives for DCFC chargers (2 points)
- EV fees (-2 to 2 points)
- Utility incentive offerings for L2 chargers (1 point)
- Utility incentive offerings for DCFC chargers (1 point)
- Utility incentive offerings for commercial fleet charging (1 point)
- Utility spending on EV charging infrastructure incentives (5 points)
- Utility EV programs prioritizing low-income, economically distressed, or environmental justice communities (2 points)
- EV charger exemption from public utility definition (1 point)
- Volkswagen settlement fund allocation for electrification (2 points)
- Nonfinancial incentives (1 point)
- Direct sales regulations (1 point)

RESULTS AND KEY TAKEAWAYS

The scores that each state and the District of Columbia in the top 33 earned in this chapter are captured below in table 7, which has been split in two for readability.

Table 7. Scores for incentives for deployment

Rank	State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)
1	California	4	3	0	4.5	1	2	1	30.5
2	New York	3	4	0	2	2	0	2	25
3	Massachusetts	3	4	0	1.5	1	0	2	21.5
	Pennsylvania	4	4	1	0	1	1	2	21.5
	New Jersey	3	4	0	1	2	1	2	21.5
6	Connecticut	3	0	1	0	2	1	2	17
	Colorado	1.5	1.5	0	1	1	1	1	17

Rank	State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)
8	District of Columbia	0	0	0	2	1	1	2	16.5
9	Maine	4	3	1	2	1	0	2	16
10	Nevada	0	3	0	0	0	0	2	14.5
11	Vermont	4	3	0	0	0	0	2	14
	Maryland	1.5	0	0	0	1	1	2	14
13	Washington	1.5	0	0	2	1	1	1	13
14	Oregon	4	0	1	0	0	0	1	12
	Delaware	3	0	0	0	1	0	2	12
16	Rhode Island	4	0	1	0	0	0	2	11.5
	Florida	0	0	0	0	0	0	2	11.5
18	Minnesota	0	0	0	0	0	0	1	11

Rank	State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)
19	Illinois	3	0	0	0	2	2	0	10.5
	New Mexico	0	0	0	0	1	0	2	10.5
21	Hawaii	0	0	0	1	0	0	1	10
22	North Carolina	0	0	0	0	1	1	1	9.5
23	Utah	0	1.5	0	0	1	1	1	9
	Virginia	0	0	0	0	0	0	1	9
25	Michigan	0	0	0	0	0	1	1	7.5
	Tennessee	0	0	0	0	1	1	1	7.5
27	Arizona	0	0	0	0	0	0	2	7
	Montana	0	3	0	0	0	0	2	7
29	Idaho	0	3	0	0	0	0	0	6
30	Kansas	0	0	0	0	0	0	0	5.5

Rank	State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)
31	Oklahoma	0	0	0	0	1	1	2	5
32	Iowa	0	0	0	0	0	0	2	4
33	Georgia	0	0	0	0	1	1	-2	3

Rank	State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure incentives (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total points (36 pts.)
1	California	1	1	1	5	2	1	2	1	1	30.5
2	New York	1	1	1	4	2	1	1	1	0	25
3	Massachusetts	1	1	0	1.5	2	1	2	0.5	1	21.5
	Pennsylvania	1	1	0.5	1.5	2	1	1.5	0	0	21.5
	New Jersey	1	1	0.5	3	0	1	1	1	0	21.5

Rank	State		LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)		EV fees (–2 to 2 pts.)	Total points (36 pts.)
6	Connecticut	1	1	0.5	3	0	1	0.5	1	0	17
	Colorado	1	1	1	3	0	1	1	1	1	17
8	District of Columbia	1	0.5	0.5	2	2	1	1.5	1	1	16.5
9	Maine	0.5	0	0	0.5	0	1	0	0	1	16
10	Nevada	1	1	0.5	3	1	1	1	1	0	14.5
11	Vermont	1	0.5	0.5	0	0	1	1	0	1	14
	Maryland	1	0.5	0.5	2.5	1	1	1.5	0.5	0	14
13	Washington	1	0.5	1	1	1	1	0.5	0.5	0	13
14	Oregon	0.5	0.5	0.5	1	1	1	0	0.5	1	12
	Delaware	0.5	0.5	0	0.5	1	1	1	0.5	1	12
16	Rhode Island	0	0	0	0	0	1	2	0.5	1	11.5

Rank	State		LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)		L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)
	Florida	1	1	1	2.5	1	1	1	0	1	11.5
18	Minnesota	1	1	0.5	3	2	1	1.5	0	0	11
19	Illinois	0	0	0	0	0	1	1	0.5	1	10.5
	New Mexico	1	1	0.5	3	1	1	0	0	0	10.5
21	Hawaii	0	0.5	0.5	3	0	1	2	0	1	10
22	North Carolina	0.5	0.5	1	1.5	1	1	0.5	0.5	0	9.5
23	Utah	0.5	0	0.5	0.5	0	1	0.5	0.5	1	9
	Virginia	1	1	1	2	0	1	1	1	0	9
25	Michigan	1	1	0.5	2.5	0	0	0	0.5	0	7.5
	Tennessee	0.5	0.5	0	1.5	0	0	1	0	1	7.5
27	Arizona	1	0	0.5	0.5	0	1	0	1	1	7

Rank	State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV fees (–2 to 2 pts.)	Total points (36 pts.)		
	Montana	0	0	0	0	0	1	1	0	0	7
29	Idaho	0	0	0	0	0	1	0.5	0.5	1	6
30	Kansas	1	0	0.5	2.5	0	1	0.5	0	0	5.5
31	Oklahoma	0	0	0	0	0	1	0	0	0	5
32	Iowa	0	0	0	0	0	1	1	0	0	4
33	Georgia	0.5	0.5	0.5	1.5	0	0	0	0	0	3

Util. = utility
Disadvantaged communities = Low- and moderate-income communities, environmental justice communities, and underserved communities

California and New York lead the way in the incentives section. Both states have comprehensive and substantial EV tax credits and rebates. California scores full points for utility spending on EV charging infrastructure. In fact, both California and New York score full points in several metrics in this chapter, earning total scores of 30.5 and 25 out of 36, respectively.

After these two leaders, regional frontrunners include Massachusetts and Pennsylvania in the Northeast, Florida in the Southeast, Oregon in the Northwest, Illinois in the Midwest, and Colorado in the Southwest. Like California and New York, these states provide consumer-friendly financial incentives for EVs and EV charging equipment and notable utility incentives and utility spending to support the adoption of EVs statewide.

Although North Dakota did not make the cutoff for the top 33, it earned a perfect score for its heavy-duty EV financial incentives. The state's Department of Environmental Quality (NDDEQ) offers grants that cover up to 38% or up to 50% of upfront costs (for non-government and government projects, respectively) for initiatives that replace or repower medium- and heavy-duty vehicles with new all-electric or hybrid vehicles. Heavy-duty EVs can be a significant financial expense for many potential buyers, and grant programs like North Dakota's can go a long way toward facilitating early heavy-duty EV adoption. Only five states scored more than half of the available points in the incentives chapter, meaning that most states have opportunities to grow their programs and progress in this space.

Establishing consistent and recurring incentive offerings as the EV market gains momentum will be important for all states. Many incentives are currently tied to more ephemeral sources of funding such as the Volkswagen settlement fund. While incentives that draw funding from temporary sources are impactful in the short term, finding ways to establish more permanent and reliable funding sources in the future, for example by tying funding to state cap-and-trade programs, general funds, or other state programs, is imperative to the success of EV adoption moving forward nationwide.

Light-Duty and Heavy-Duty EV Purchase Incentives

Light-duty EVs will likely reach upfront cost parity with gasoline vehicles by 2025 for smaller range EVs and by 2030 at the latest for almost all LD EVs (Eisenstein 2019; Chakraborty, Buch, and Tal 2021; Slowik et al. 2022). And the total cost of ownership is significantly lower for electric vehicles than for internal combustion engines. However, the high upfront purchase cost still acts as a key barrier to uptake. For instance, a 2023 Nissan Leaf starts at $27,800, while a 2023 Toyota Corolla starts at just $21,550 (U.S. News 2022). This is especially true for heavy-duty EVs, which can cost up to $300,000, in some cases totaling twice as much in upfront costs as a functionally comparable diesel counterpart (ACT News 2020). To encourage consumers to purchase both new and used EVs, states may offer a number of financial incentives, including tax credits, rebates, and sales tax exemptions (Tal and Brown 2017). *Cash on the hood* rebates, which are immediately redeemable upon purchase of a vehicle, and tax credits are two especially appealing forms of incentive that states should consider. Rebates that are instantly redeemable are given greater weight in our scoring, as they directly offset the higher upfront cost of EVs and make them more accessible to lower-income buyers. Tax credits may be effective at attracting high-income buyers but are far less impactful for low-income purchasers who often do not carry a sufficient annual tax burden to qualify for the full tax credit. It is important that incentives be accessible to all communities within any state, and that the benefits that EVs provide (less air pollution, improved respiratory health outcomes, lower upkeep costs) be equitably distributed. This means that providing additional incentives like rebates, vouchers, or grants for low- and moderate-income earners will be a necessary step toward achieving a state's goals for comprehensive EV integration.

In the *Scorecard*, state light-duty and heavy-duty incentives are worth 4 points each. Tables 8 and 9, below, outline our methodology for assigning points for these metrics.

Table 8. Scoring for light-duty EV purchase incentives

Point category	Criteria	Points (4)
Purchase incentives (credit given for only one or the other)	State has a "cash on hood" rebate program for EV purchases	3
	State has a tax credit for EV purchases	1.5
Additional incentive for low-income, economically distressed, and environmental justice communities	State provides some form of additional incentive for purchasers from low-income, economically distressed, and environmental justice communities	1

Table 9. Scoring for heavy-duty EV purchase incentives

Point category	Criteria	Points (4)
Purchase incentives (credit given for only one or the other)	State has a "cash on hood" rebate program for HD EV purchases	3
	State has a tax credit for HD EV purchases	1.5

Point category	Criteria	Points (4)
Upfront costs covered	The state-supported grant, rebate, or tax credit program covers at least 25% or $25,000 of total vehicle costs	1

Used LD EV Purchase Incentives

Even after federal and state incentives, new EVs may be too expensive for many, especially low-income families. However, as the new EV market grows, so does the used EV market. Used vehicles are often the only option for lower-income families, especially given that the price of new EVs (similar to all new vehicles) reached a new high in 2022, due to supply chain disruptions and inflation, averaging about $48,000 (Cox Automotive 2022). Yet even used EVs can commonly cost upward of $38,000, the result of an increase in newer model year vehicles entering the used vehicle market (Najman 2023). The cost keeps EVs out of reach for those individuals and communities that would benefit the most from vehicle electrification. Fortunately, the IRA now offers a used clean vehicle tax credit, worth up to $4,000 or 30% of the vehicle's sale price (117th Congress 2022).

States received 1 point if they have a tax credit or rebate for used EVs. If a state's only low-income incentive was its used EV incentive, we counted it in the previous metric on LD EV purchase incentives for low-income, economically distressed, or EJ communities—to avoid double counting. Five states had used EV purchase incentives.

Statewide EV Investment and Programs Prioritizing Low-income, Economically Distressed, or Environmental Justice Communities[19]

The communities that have historically been exposed to higher levels of pollution and other environmental harms are the same ones that are underserved by accessible, reliable, and safe transportation options. Yet the current upfront investment required for EVs and their charging equipment can be cost prohibitive for people living in these communities. To make

[19] This metric is comprised of two separate metrics from the 2021 *Scorecard*: Statewide EV investment for low-income, economically distressed, or EJ communities and State EV programs for low-income, economically distressed, or EJ communities. The point allocation remains the same.

EVs accessible to all, states should include goals, funding streams, and targeted programs designed specifically to increase EV access and adoption within those communities. For example, New York's EV Make-Ready Initiative, which aims to deploy more than 50,000 EV charging stations by 2025, includes $206 million set aside to benefit low-income and economically distressed communities (New York State 2020).

States received 2 points if their EV policy includes explicit funding streams that benefit low-income, economically distressed, or environmental justice communities. States without explicit funding streams could earn 1 point if their EV policy or plan includes language that prioritizes these communities or includes related goals.

California, Maine, New York, Washington, and the District of Columbia are the only jurisdictions recognized to have explicit funding streams aimed at increasing the adoption of EVs in low-income, economically distressed, and EJ communities. Maine's program, the Clean Transportation and Sustainability Accelerator, provides loans for qualified alternative fuel vehicle (AFV) projects, including the purchase of electric vehicles. Recipients must use 40% of the awarded funds in low-income communities or communities of color (DOE 2023c). Consistent investment and attention to the needs of these communities is crucial to ensure the benefits of EV adoption are accessible and equitable.

For the second part of this metric, states received 0.5 points for each qualified program specifically intended to increase access to EVs in low-income, economically distressed, or EJ communities, and 0.5 points for each program to increase access to the necessary charging infrastructure. States could receive a maximum of 2 points for each of the two program types, or a total of 4 points for this portion of the metric. California scored highest in this portion of the metric—2.5 points for five of their state programs. For example, Clean Cars 4 All is a program offered to lower-income California drivers to replace an older, high-polluting car with a zero- or near-zero-emission vehicle. We did not award points to programs still in the planning phase.

State Incentives for L2 and DCFC Chargers

As the market for EVs continues to grow, states will need to ensure that charging infrastructure keeps up with demand. Recent research highlights that 88 of the 100 most populous cities in the United States will need to double their charging infrastructure over the next five years to meet demand (Nicholas, Hall, and Lutsey 2019). Another report, by Atlas Public Policy and the Alliance for Transportation Electrification, finds that publicly accessible charging infrastructure will need to increase up to 16-fold by 2025 to meet ambitious EV deployment targets (Smith 2020).

States have a pivotal role to play in establishing reliable charging infrastructure to support vehicle adoption, and state-backed financial incentives are a reliable approach. Encouraging the proliferation of both L2 and DCFC charging for public and private use is important as each system serves specific needs for EV owners. L2 chargers are commonly used in homes and in public retail locations, while DCFC chargers are useful for drivers on interstate highways who may need to charge quickly at a rest stop. A comparison of chargers is provided in figure 4, below. For both the L2 and the DCFC metrics, 1 point was awarded to states that provide a rebate or tax credit toward the installation of a charging unit, and an additional point was awarded if there are additional incentives available for installation of charging in low-income, EJ, or economically distressed communities.

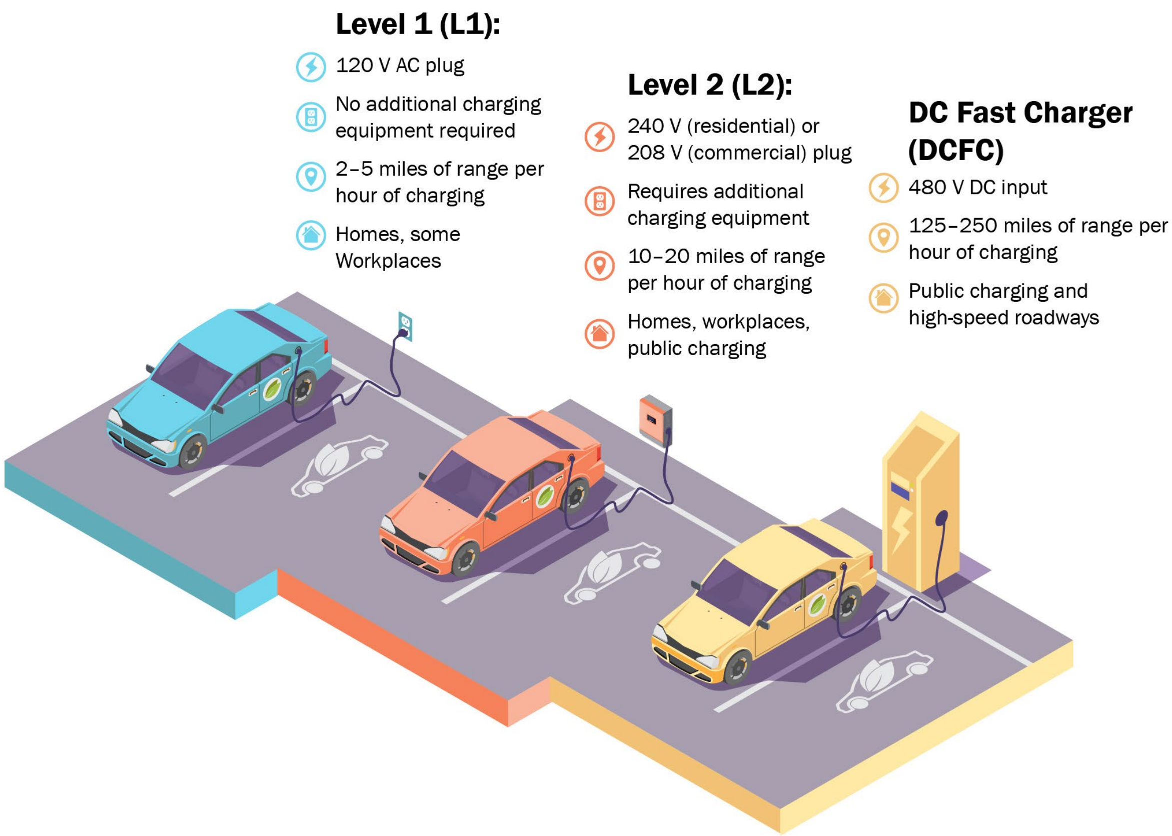


Figure 4. EV charging equipment types

EV Fees

As electric vehicle sales ramp up across the country—and a steep increase in the rate of EV penetration is projected—some states have applied additional registration fees to these vehicles. Judging from a review of a small sample of state bills, the primary motivation for these fees is to replace lost future gasoline tax revenues that fund road maintenance and related projects. To date, 28 states have imposed such fees, including Arkansas, Connecticut, Maine, North Dakota, and Rhode Island. A few states intend to use the funds to build out EV charging infrastructure to support increased deployment.

While all vehicle owners should contribute to the maintenance of the roads they drive on, these surcharges have the potential to create obstacles to transportation electrification. First, EV fees can be at odds with state targets for EV deployment. Numerous states have tax credits in place to encourage EV sales (see Appendix C) yet also have high additional registration costs for EV drivers, policies that work against each other (Tomich 2019).

Moreover, these fees in some cases exceed what the driver of an average gasoline-fueled car pays in gas taxes. A notable example is Alabama, which charges an annual fee of $200 for battery EVs and $100 for plug-in hybrid vehicles. The battery EV fee is already greater than the estimated $116 gas tax revenue per passenger vehicle, and the state plans to increase the EV fee further starting July 2023 (DOE 2023a). Finally, EV fees in many states do not take into consideration that EV owners pay other taxes that owners of gasoline-powered vehicles do not.

States were evaluated by comparing their EV fees with the amount of gasoline tax revenue collected for the average internal combustion vehicle. Many states earned full points for this metric by having no EV fee at all. Of the states that do have an EV fee, only Iowa received full credit in our scoring for how the fee compares with revenue collected from internal combustion vehicles. States could earn up to 2 points or lose up to 2 points for this metric according to the methodology outlined in table 10. States that direct their collected EV fee revenue toward EV charging infrastructure did not get any additional consideration in our methodology; given the still relatively low market penetration of EVs, any sort of significant additional fee can undermine purchases.

Table 10. Scoring for EV fees

Ratio of EV fee to gas tax revenue	Points
0–50%	2
51–100%	1
101–150%	0
151–170%	–1
> 170%	–2

Utility Programs and Incentives for EV Charging

Deploying EV charging infrastructure affordably, at scale, and in a reasonable time frame requires investment from multiple sources. The utilities that provide power for homes and businesses in the United States are well situated to incentivize and finance electric vehicle infrastructure in their service areas. Certain types of equipment, especially DCFC and fleet charging stations, can cost up to 30 times as much as private L1 or L2 chargers (Nicholas 2019). Utilities have access to funding through their rate base and may benefit from the load growth and infrastructure needs associated with EV deployment. Before ratepayer-funded utility spending plans can go into effect, they must undergo review by state regulators to ensure that the associated costs are reasonable, prudent, and aligned with the public interest. For this reason, regulated utility EV charging infrastructure programs are an extension of the state's actions encouraging transportation electrification.

In our scoring under these metrics, we considered only infrastructure programs offered by regulated utilities, generally only investor-owned utilities.[20] Many municipal utilities or cooperatives provide EV-specific programs and incentives, but they are not subject to regulatory approval and therefore do not represent state-level activity. However, smaller utilities play an important role in driving access to EV chargers on a local level, particularly in more rural areas, and this supports states' efforts to reach their transportation electrification goals. The benefits of investing in EV programs flow not just to utility customers but to the utilities themselves: Both large and small utilities can benefit from EV load growth leading to more kWh sales, increasing customer engagement with targeted programs, strategic load management through smart charging, and a cleaner environment (Susser 2019). These are compelling reasons for utilities of all sizes to promote EVs and EV charging infrastructure among their customers.

Utility EV charging infrastructure metrics are divided into two categories: availability of approved programs, worth 5 points total, and spending, worth 5 points. For program availability, we considered three major EVSE categories: L2, DCFC, and commercial fleet charging programs. Each requires a unique approach to adequately serve that sector's needs and each was worth 1 point. We also scored utility EV programs of all types that were aimed at low-income, economically distressed, or environmental justice communities, worth 2 points. We counted programs that dedicated investment toward these communities as well

[20] One exception is TVA, a federally owned entity that is not regulated at the state level. Because it sets rates for the local distribution companies, TVA is considered alongside other state-regulated utilities for the purpose of recognizing its achievement in this report. Although it serves parts of seven states in the region, we award TVA's points to Tennessee, because it serves most of the load in Tennessee but only some parts of other states.

as programs specifically targeted to these populations. However, only 1 point was given to states with utilities that only had low-income programs or prioritization. The full two points were awarded to states with utility EV programs prioritizing or dedicating investment toward EJ or economically distressed communities. The historical and current impacts of our transportation system on EJ and economically distressed communities are considerable; alleviating those burdens deserves more points (Creger, Espino, and Sanchez 2018; Valentine 2020).

Utility Incentive Offerings (Program Availability)

We considered the following program offerings, shown in figure 5 below:

- **Utility service equipment:** Incentives for equipment upgrades on the utility-owned side of the meter for the purpose of serving electric vehicle charging loads
- **Site-specific equipment:** Incentives to prepare a site for EV chargers through conduit installation, panel upgrades, or other necessary hardware improvements
- **EV service equipment:** Incentives for hardware, network services, or other aspects of charging equipment installation in the form of rebates, grants, loans, and so on.
- **Utility-owned infrastructure:**[21] EV service equipment built and operated by the utilities themselves, can include any or all parts of the charging infrastructure described above

For each of these EV service infrastructure categories, states earned 0.5 points for a regulated utility offering one of the four program types in an approved program, and a full point for offering two or more types. Such programs include make-ready investments, where utilities fund upgrades to utility- and customer-side electrical equipment as well as EV charger incentives, such as rebates.[22] Other options are equipment leasing approaches, which are often combined with a special rate design or subscription; utility-owned-and-operated programs; and hybrid program models. Utility-owned infrastructure often encompasses several of the above incentive categories, including make-ready on both the utility and the customer side and installing EV chargers; however, finding consistent data for the types of offerings associated with utility-owned infrastructure was not always feasible.

[21] Although utility-owned infrastructure is not a direct "incentive" like a rebate or financing offering, increasing availability of EV service equipment to end users is a key enabler of transportation electrification. This metric is represented as its own category due to an overall lack of more specific data on which parts of the utility system were being upgraded in utility owned infrastructure programs.

[22] On-bill financing is another type of incentive that helps customers effectively manage the costs of installing specialized EV service equipment. We did not include it in the data set due to a lack of program examples.

For this reason, we considered utility-owned infrastructure its own category of investment alongside consumer-focused incentives such as rebates.

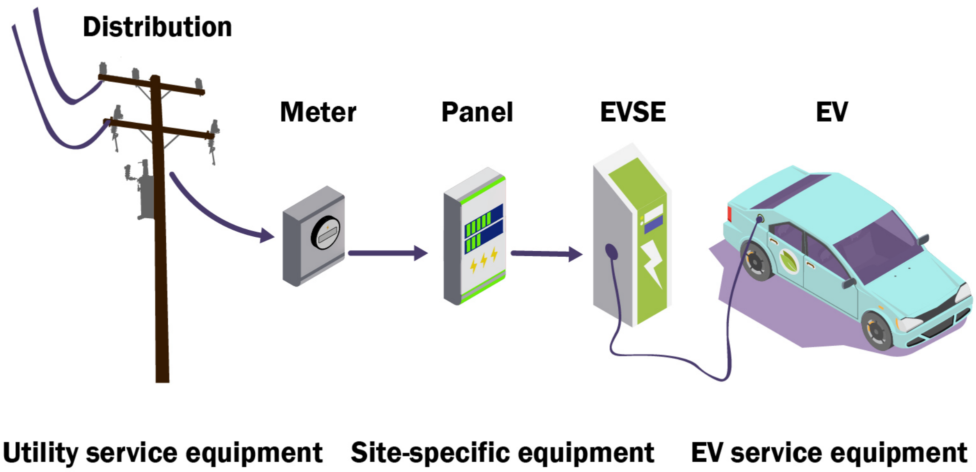


Figure 5. EV charging infrastructure

Whether utilities themselves should own and operate EV service equipment is an evolving issue without consensus in the literature. While such ownership may accelerate deployment and create ratepayer benefits, it may also limit competition for independent EVSE suppliers[23] (Khan and Vaidyanathan 2018). Some states allow such ownership, most frequently in underserved markets such as MUDs and rural areas, which may struggle to attract private investment. Beyond underserved markets, some commissions are approving broader sets of utility-owned investments to support more rapid market transformation, leveraging utilities' low cost of capital, ease of access to grid infrastructure, and established relationship with consumers. For example, although the California Public Utilities Commission (CPUC) initially focused only on underserved markets in reviewing such applications, in 2014 it updated guidance to consider such utility requests on a case-specific basis by using a test that balances multiple factors (CPUC 2014). Since then, utilities have proposed, and commissioners across the country have adopted, several approaches and models for EV market development, including utility ownership. Given this diversity of approaches, and

[23] In prior reports, such as the *Utility Energy Efficiency Scorecard*, ACEEE has not awarded points for utility ownership of EVSE due to competitiveness concerns. The approach in this *Scorecard* is different, in recognition of evolving perspectives on utility ownership in state regulatory decisions. As such, we award points for a variety of market development models, including utility-owned EVSE incentives.

recognizing the careful PUC reviews in advance of such investments, we include ratepayer investments in utility-owned EV chargers in this EVSE investment category.

Utility Spending on EV Charging Infrastructure Incentives

The EV charging infrastructure spending category, worth up to 5 points, considers total utility spending on plans approved since January 1, 2019, with partial credit given for spending plans that are awaiting approval, as discussed below.[24] All types of programs across L1/L2, DCFC, and fleets are included. With programs often spanning multiple years, the spending included is only for the portions of programs committed to infrastructure; we do not count other costs such as marketing and education or administration. The percentage of program spending aimed at improving equity is also assessed, with 2 of the 5 points dedicated to utility equity spending. The reason for consolidating program spending into one metric is that many utility spending plans do not specify the ratio of spending on, for example, L2 versus DCFC, but provide a flexible pool of funds from which the utility can draw to meet its EV charging targets. Points were assigned on a sliding scale based on spending per eligible customer in the utility's service territory, as shown in table 11 for non-equity spending. For equity spending, points were assigned on a sliding scale based on percentage of total spending dedicated to low-income, economically distressed, or environmental justice communities, as shown in table 12.

Some utilities have proposed investments that have not yet been approved by the state regulatory commission. We sought to recognize the contributions these utilities can make to state action by awarding partial points for spending plans that were filed in 2021 and the first 10 months of 2022. Utilities received 0.5 points for proposed spending on utility service equipment, site-specific equipment, EV service equipment, and utility-owned infrastructure. This resulted in higher scores in certain states like Massachusetts and Hawaii that have utilities with large proposed spending packages. If approved, these plans are likely to have a far-reaching impact on EV deployment statewide.

More detailed utility program examples can be found in Appendix C.

[24] This time period was chosen to reflect the limited time frame and budget under which most incentive programs operate. While this excludes utility spending from 2016 and earlier, the results from past programs are recognized in the "Transportation Electrification Outcomes" section of this report.

Table 11. Scoring for utility EV charging infrastructure spending

Spending per customer	Points (approved spending)	Points (proposed spending)
$0.01–1.00	0.5	0.5
$1.00–2.99	1	0.5
$3.00–4.99	1.5	0.5
$5.00–9.99	2	0.5
$10.00–24.99	2.5	1.0
$25+	3	1.5

Table 12. Scoring for utility EV charging infrastructure spending for low-income, economically distressed, or environmental justice communities

Percentage of total approved spending	Points
5.0–9.9%	0.5
10.0–19.9%	1
20.0–29.9%	1.5
30% +	2

Utility EV Programs Prioritizing Low-Income, Economically Distressed, or Environmental Justice Communities

Utilities also play an important role in funding and deploying EV incentives and infrastructure for low- and moderate-income (LMI) and disadvantaged communities. Equitable utility programs can entail setting funds aside specifically for low-income, economically distressed, or EJ communities or programs that give greater subsidies to communities or customers meeting certain income criteria. Equity in utility-funded programs is particularly important due to the ways in which utilities recover the costs of investment through their rate base. There is a risk with utility-funded programs that the costs associated with financing EV charger incentives will lead to higher rates for those who cannot afford EV ownership. However, ample evidence suggests that well-managed and grid-optimized EV programs actually reduce costs and improve utility revenues (Frost et al. 2019). Regardless of the effects on consumer rates, however, it is essential that utilities, like states, endeavor to include all customers in their incentive plans.

We scored states on whether a state-regulated utility offers an equity-oriented program or has a low- or low/moderate-income spending requirement within a larger EV budget. States could receive up to 2 points in this category: 1 point for having an income-qualified program, and the full 2 points if the same program, or a different one in the same portfolio, specifically targets environmental justice communities. This metric was evaluated in this way because of the unique and important role utilities have in administering and delivering programs to marginalized groups. California's latest statewide transportation electrification plan details how utilities such as San Diego Gas & Electric (SDG&E) and Pacific Gas & Electric (PG&E) should include equity in their transportation electrification programs. In November 2022 the California Public Utility Commission adopted a unified funding structure for its utilities for 2025–2029 that focuses on HD EV charging and MUD charging, with at least 65% of the funding going to low-income and disadvantaged communities, or DACs (California's terminology for the communities that most suffer from economic, health, and environmental burdens) (CPUC 2022).

EV Charger Exemption from Public Utility Definition

Just as gas stations charge their customers per gallon of gas, public EV charging stations often provide their services on a per-kilowatt-hour (kWh) basis. Gasoline is an unregulated fuel, and the owners of gas stations may freely set the prices they charge per gallon. However, the price of electricity is traditionally set through the regulatory process. Because of this, state legislatures and commissions have questioned whether public EV service providers should count as a regulated utility.[25] Classifying all EV service providers as such means that private businesses providing charging services are unable to set their own charging prices. This has a noncompetitive effect, which can make the EV service market prohibitively burdensome to all nonutility providers of EV charging (Walton 2022). For this reason, many state legislators and regulators have exempted privately owned EV service providers from being defined as public utilities. In the interest of promoting fairness and competition in the charging market, we awarded 1 point to states that have enacted a regulatory or legal decision that exempts providers of EV charging from these requirements

[25] When utilities themselves operate charging stations and sell electricity to the public, they are still required to receive approval for EV charging rates. This exemption applies only to third-party owners of EV chargers who are providing services in the public EV charging market.

on a statewide basis.[26] Forty-three states and the District of Columbia have done so, and several others are considering it, including Michigan and Wisconsin.

Volkswagen Fund Allocation for Electrification

The Volkswagen (VW) Environmental Mitigation Trust was established on October 2, 2017 to mitigate diesel-related nitrogen oxide (NO_x) emissions resulting from VW's use of defeat devices to overcome stringent NO_x standards. The trust, stemming from a settlement between VW and the states, consists of $2.9 billion allocated to all 50 states (plus the District of Columbia and Puerto Rico) to fund eligible actions that replace mobile sources of NOx emissions with cleaner technologies. The allocation structure is based primarily on the number of registered affected VW vehicles within the boundaries of each state (EPA 2020c). Beneficiaries can choose the eligible mitigation actions that are best for their states and decide how much of the funding will go to electric transportation. Each state was required to develop a plan on how to use its share of funds from the VW Environmental Mitigation Trust.

For this metric, states were evaluated and scored based on two factors: funds awarded for electrification projects to date (up to 1 point), and the mitigation plan's commitment to low-income, economically distressed, or EJ communities (1 point).

We recognize that the goal of the VW Environmental Mitigation Trust is to reduce NO_x emissions broadly in the transportation sector using various technologies, including electrification. Given that this *Scorecard* focuses on maximizing reductions in energy use, GHG emissions, and criteria pollution through EVs, this metric focuses exclusively on activities that direct VW funds toward light- and heavy-duty vehicle electrification. Although states have limited control over the proportion of funding requests that are focused on electrification, they entirely determine which of those projects to prioritize for VW funding. Lastly, as most of this funding has already been allocated, this metric has become less relevant than in the previous iteration of the *Scorecard* and now receives 1 point, down from 4 in our 2021 edition. Nevertheless, we believe that this metric is still a useful benchmark of a state's commitment to transportation electrification more broadly.

To date, states have been awarded a total of $1.7 billion via the VW Environmental Mitigation Trust to fund various transportation projects (Atlas Public Policy 2022b). Table 13

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[26] It is possible in future for charging providers to behave like utilities to such an extent that they should no longer receive this exemption. Procuring energy on the wholesale electricity market would be one such behavior. In those cases, exemption policies would need to shift.

shows the methodology used to award states a maximum of 1 point based on the percentage of VW trust funds awarded to date that have supported electrification projects.

Table 13. Scoring for Volkswagen Environmental Mitigation Fund awards

VW funds awarded to date to support electrification projects	Points
≥ 80%	1.0
≥ 40%	0.5

States received 1 additional point if their mitigation plan includes explicit language directing funds to projects that benefit low-income, economically distressed, or EJ communities, or if such projects are given higher priority in the selection process.

California, Hawaii, Massachusetts, and Rhode Island were the only states to receive a perfect score of 2 points for this metric. Hawaii's plan leverages most of its funds to procure electric school, transit, or shuttle buses and the maximum amount of eligible funding, 15%, for projects that facilitate the deployment of light-duty EV chargers. To date, Hawaii has awarded funds to procure electric transit buses and build out EV charging infrastructure. Massachusetts likewise allocated all of its initial phase of funding toward the electrification of regional transit buses, development of charging infrastructure, and replacement of affected diesel vehicles or equipment with electric versions. The draft of their plan's second amendment proposes using the remainder of the funds for further electrification of their transit buses (Ahlberg 2023).

Similarly, Rhode Island's plan allocates 75% of its VW funds to replace 20 diesel-powered transit buses with zero-emission buses (ZEBs), with the remaining funds allocated for EV chargers and administration fees. Rhode Island's plan launched in 2018 with the lease of three all-electric buses, giving the Rhode Island Public Transit Authority (RIPTA) the opportunity to pilot the new technology, train staff, and test the performance of the new buses on a variety of routes. The final phase of Rhode Island's plan began in 2021 and called for RIPTA to purchase 16–20 electric buses as permanent additions to its fleet. To date, RIPTA has received and been operating 14 of these electric buses on a key corridor where many low-income communities and communities of color have been affected by air pollution (RIPTA 2022).

Nonfinancial Incentives

Making EV ownership more appealing and removing barriers to installing EV chargers are important steps to increase EV adoption. Rebates and tax credits are pivotal in steering consumers toward purchasing an EV, but nonfinancial incentives—including HOV lane access, licensing incentives, streamlined permitting for EV chargers, and preferred parking—can help make EV driving and ownership more compelling.

Nine states earned full credit for this metric, and another 13 states got half credit. Each nonfinancial incentive a state has in place was worth 0.5 in our scoring; states could earn up to 1 point in total for this metric. The Alternative Fuel Data Center (DOE 2023c) was the primary source of information.

Direct Sales Regulations

Making EV purchases as easy as possible will help expedite adoption across the country. Many traditional dealerships do not sell or stock a large number of EVs, likely in part because of profit considerations. The lifetime maintenance costs associated with an EV can be as much as 50% less than those of their internal combustion counterparts (Hanley 2020). Since dealerships make up to half their profit from servicing vehicles (Edmunds 2019), the lower maintenance costs of EVs threaten many dealerships' business model and may discourage dealerships from proactively marketing and selling EVs. Some evidence also suggests that traditional dealers are less effective at selling EVs because they are generally unfamiliar with this technology (Gerdes 2017). States can take an important step in facilitating increased EV sales by allowing EV-only manufacturers to sell directly to consumers.

We awarded 1 point to states that do not have legislation barring direct sales of vehicles to customers by manufacturers. We reviewed and vetted data for scoring from a Tesla enthusiasts' website, which tracks the states in which Tesla would be able to sell directly to customers given their unique sales model. Twenty-two states earned credit for this metric, meaning there is significant opportunity for further change.

UNSCORED METRICS

Education

In this section, we chose not to score education-focused programs led by state agencies and utilities. Although such programs deliver an important benefit in informing consumers and businesses about how best to navigate EV ownership and charging, we decided against scoring such programs due to a lack of consistent, available data.

Consumer Protection

As the transportation sector continues to electrify, states must safeguard against certain groups bearing an unequal burden of the costs associated with moving toward electric vehicles. While we do not score states on their activities around consumer protection, since we consider this outside the scope of a *Scorecard* that is focused on EV uptake and GHG emissions, we recognize that enacting consumer protection programs and regulations will be critical to extending the benefits of EVs to all. State regulatory commissions, and consumer advocates in particular, have a role to play in maintaining regulated rates and creating other charging-related and vehicle purchase protection rules for customers as EVs become mainstream in the transportation system (CUB 2017). While the large number of successful EV programs show that these policies can be implemented cost effectively and promote public welfare, they must undergo careful oversight and monitoring after approval.

Chapter 4. Transportation System Efficiency

INTRODUCTION

The transportation sector is the largest source of GHG emissions in the United States, accounting for 28% of the nation's economywide GHG emissions (EPA 2020b). While transportation electrification will significantly reduce GHGs, a true systems approach is needed to ensure that we maximize emissions reductions while also improving lives with accessible, cost-effective, equitable, and clean mobility options for all. Most past public transportation investments and policies were made to support a system built upon the internal combustion engine. Moving forward, public policy and investment should support the creation of a zero-emission, multimodal transportation system alongside a transition to EV technologies.

State policy actors can influence the transition to a more efficient transportation system by setting policies that address the whole system while also encouraging electrified vehicle options. The policies discussed in this chapter are important steps states can take to promote this transition, and the scoring reflects the impact of each policy. We chose policy areas to focus on in this chapter, with input and feedback from our advisory committee, because of the clear role states play in those areas.

In this chapter we review and score states on the following policies:

- Transportation sector GHG reduction targets (3 points)
- GHG pricing policies (3 points)
- Transit agency bus goals and procurement (4 points)
- State investment for electric transit bus deployment (2 points)
- State requirements for electric school bus (ESB) deployment (2 points)
- State investment for electric school bus (ESB) deployment (2 points)
- Policies to encourage shared EV fleets (1 points)

RESULTS

Table 14 outlines scores for the top states on transportation system efficiency.

Table 14. Scores for transportation system efficiency

Rank	State	GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit goals and procurement (4 pts.)	Investment for transit bus deployment (2 pts.)	Requirements for ESB deployment (2 pts.)	Investment for ESB deployment (2 pts.)	Shared fleet policies (1 pt.)	Total (17 pts.)
1	California	3	3	4	2	0	1.5	1	14.5
2	Colorado	2	0	4	2	0.5	1	0	9.5
	District of Columbia	3	0	4	1	0	0.5	1	9.5
4	Maryland	2	0	4	2	1	0	0	9
5	Massachusetts	3	0	2	2	0	0.5	1	8.5
6	Connecticut	0	0	4	1	2	1	0	8
	Washington	3	3	0	2	0	0	0	8
8	New York	0	0	2	2	2	1	0	7
9	New Jersey	0	0	4	1	0	1	0	6
	Oregon	2	3	0	1	0	0	0	6
11	Vermont	0	0	4	1	0	0.5	0	5.5
12	Michigan	0	0	4	1	0	0	0	5
13	Illinois	0	0	2	1	0	1	0	4
	Maine	1	0	0	1	1	1	0	4
	Minnesota	2	0	0	1	0	1	0	4
	Tennessee	0	0	2	1	0	1	0	4
17	Arizona	0	0	2	1	0	0.5	0	3.5
18	Oklahoma	0	0	0	1	0	2	0	3
	Virginia	0	0	0	2	0	1	0	3
20	Nevada	0	0	0	1	0	1	0	2
	New Mexico	1	0	0	1	0	0	0	2
22	Georgia	0	0	0	1	0	0.5	0	1.5
	Rhode Island	0	0	0	1	0	0.5	0	1.5

Rank	State	GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit goals and procurement (4 pts.)	Investment for transit bus deployment (2 pts.)	Requirements for ESB deployment (2 pts.)	Investment for ESB deploymen t (2 pts.)	Shared fleet policies (1 pt.)	Total (17 pts.)
24	Delaware	0	0	0	1	0	0	0	1
	Florida	0	0	0	1	0	0	0	1
	Hawaii	0	0	0	1	0	0	0	1
	Idaho	0	0	0	1	0	0	0	1
	Iowa	0	0	0	1	0	0	0	1
	Kansas	0	0	0	1	0	0	0	1
	Montana	0	0	0	1	0	0	0	1
	North Carolina	0	0	0	1	0	0	0	1
	Pennsylvania	0	0	0	1	0	0	0	1
	Utah	0	0	0	1	0	0	0	1

Once again, California is the highest-scoring state in this policy area. Along with Oregon and Washington State, California has a comprehensive carbon pricing policy in place, which puts it ahead of most states in this category. While other states such as Maryland have made progress in setting goals for transit agency EV procurement and investing in ZEV buses, California is the only state to earn full points for these metrics and the shared EV metric. By encouraging electrification of both transit buses and shared EV fleets, California has demonstrated the strongest commitment to decarbonizing its transportation system. Maryland earned the second highest total, 10 points out of 17. A 2022 law directed the Maryland Transit Administration to only purchase zero-emission transit buses starting in 2023; this helped the state receive full points for the transit agency goals and procurement metric. Due to the dissolution of the Transportation Climate Initiative,[27] Maryland and several northeastern states no longer earn points for the GHG pricing policy metric.

All the top states received points for their investment in electric transit buses through the Federal Transit Administration's Low or No Emission (Low-No) grant program. State entities should continue to prioritize the Low-No program as an existing funding stream to further the transition to electric transit buses.

The District of Columbia ranked third place, earning 9.5 out of 17 points. It scored high in the transit agency goals and procurement metric thanks to the Clean Energy DC Act, which requires public transit vehicles and some private fleets to be zero-emission by 2045. The District also earned full points for the sector-wide GHG goals metric due to a goal of 60% reduction in transportation-related emissions by 2032.

Overall, states underperformed in this category compared to others. Out of the top 33 states, the average score was 5 out of 17 points. A potential explanation behind these low scores is the scarcity of transportation-sector-wide GHG reduction goals and transportation-specific carbon pricing policies. Unless states set intentional goals and provide economic incentives to reduce emissions, it will be difficult to decarbonize the transportation sector even with an uptake in EVs.

Setting a GHG emissions reduction goal and commitment for the transportation sector is an important first step states can take to guide their transportation systems to be more efficient and EV friendly. Currently, seven states and the District of Columbia have set such a goal. The remaining six metrics in this chapter can act as tools to complement a state's GHG emissions reduction goal.

Transportation Sector GHG Reduction Targets

Increased transportation electrification will be critical to reducing energy use and GHG emissions in the transportation sector in the long term. As just one essential part of transportation electrification, EV deployment must be complemented by a suite of other transportation policies to ensure that states are maximizing GHG emissions reductions from the transportation sector.

[27] The Transportation Climate Initiative (TCI) was a multistate agreement to collectively reduce GHG emissions from the transportation sector. Several northeastern states earned points for their involvement with the TCI in the 2021 scorecard, as the TCI was still active at the time of publication.

Transportation-specific GHG reduction targets are a useful way for states to prioritize transportation system efficiency and develop strategies to reduce GHG emissions. Setting meaningful targets is an important step when creating a road map of policies and establishing specific benchmarks against which to measure progress.

A 2022 proposed rule by the Federal Highway Administration requires state transportation departments and metropolitan planning organizations to set declining GHG emissions targets and to report their progress. Reduction targets would be from a baseline of on-road mobile source emissions from calendar year 2021. Although the rule does not establish specific reduction levels that states must achieve, it does assert that state targets must align with federal net-zero goals (FHWA 2022). However, this alignment may be difficult to achieve since no national goal currently exists for on-road transportation emissions reduction to help the United States achieve net-zero emissions by 2050 (Vaidyanathan and Langer 2022).

In the absence of federal requirements, we continued to score states in this area. States earned 2 points in the *Scorecard* if they have adopted transportation-specific GHG reduction goals. Just eight jurisdictions have such targets in place: California, Colorado, the District of Columbia, Maryland, Oregon, Massachusetts, Minnesota, and Washington State. The District of Columbia has the most stringent reduction target; it aspires to reduce greenhouse gas emissions from transportation by 60%, using 2006 emissions as a baseline, by 2032.

States could earn an additional point by setting a goal to reduce vehicle miles traveled (VMT). VMT measures the number of miles that people drive, often measured in a specific timeframe. VMT can serve as an additional benchmark for reducing transportation-related GHG emissions. Only seven states had goals to reduce VMT. California, the District of Columbia, Massachusetts, and Washington State had set VMT goals in addition to broader GHG reduction goals. Louisiana, Maine, and New Mexico have VMT goals but not broader GHG reduction goals.

GHG Pricing Policies

The emissions that result from burning fossil fuels are not just the leading factor contributing to climate change; they also represent a market failure because there is no financial cost for emitting GHGs. Carbon pricing policies put a price on carbon emissions, with the goal of incentivizing producers to lower their emissions and their costs (Morris 2022). The main types of carbon pricing structures generally used for transportation emissions are cap-and-trade or cap-and-invest.[28] The revenue generated from carbon pricing policies can be an effective tool to advance transportation electrification and create funding streams for EVs.

States that have a carbon pricing policy for the transportation sector received 2 points; states that are currently in the process of developing such a policy received 1 point; and states that have a carbon pricing policy received an additional 1 point if a portion of revenue generated by the policy is directed to programs prioritizing low-income, economically distressed, and environmental justice communities. California's Cap-and-Trade Program, Oregon's Clean Fuels Program, and Washington State's Carbon Emissions Reduction Account are the only adopted state GHG pricing policies that impact the transportation sector. All three programs have specific carve-outs to benefit disadvantaged and environmental justice communities.

California's program reduces GHG emissions from major sources, including the transportation sector, by setting a cap on statewide GHG emissions while employing market mechanisms to cost effectively help achieve the state's emission reduction goal. Revenues from the program are deposited in the state's Greenhouse Gas Reduction Fund and then appropriated to state agencies to implement programs that further reduce greenhouse gas emissions; 35% of the revenues are required by law to be directed to disadvantaged and low-income communities.[29]

Transit Agency Bus Goals and Procurement

Transit agencies (or districts) are government agencies, or in some cases public-benefit corporations, that provide public transportation within a specific region. Although states rely on local transportation programs for planning within a region, they can establish overall policy and funding allocation for transit agencies. Buses are the backbone of most public

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[28] A cap-and-trade system sets a limit, or cap, on the total amount of CO_2 that can be emitted and divides this total into emissions allowances that decline over time. It then distributes these allowances among GHG-emitting companies, creating a market in which allowances can be bought and sold. Cap-and-invest policies are designed to specifically direct revenues generated by the policy to complementary programs, policies, and technologies that reduce emissions.

[29] California uses the term *disadvantaged* to refer to communities that bear the greatest economic, health, and environmental burdens.

transit systems across the country. They move people far more efficiently than personal vehicles and provide a service that many members of low-income communities and communities of color rely on to get to work, school, and essential services.

Although transit buses can produce considerable economic and social benefits, the fuels that power them can lead to negative environmental impacts. In 2019 (the most recent year for which data are available), about 42% of transit buses in the United States were powered by diesel, a fuel that emits harmful pollutants (DOE 2021). Diesel emissions can lead to ground-level ozone formation and acid rain, in addition to respiratory problems for people who breathe exhaust from diesel-powered vehicles (EPA 2023). Electrifying transit represents an opportunity to provide marginalized groups with adequate transportation while protecting their health. Vehicle electrification in general can improve public health on a national scale, especially for people living in urban areas. A study by Pan et al. (2023) investigated potential health benefits from vehicle electrification in 30 major metropolitan areas. The authors proposed a scenario in which the United States achieved a 95% reduction in carbon emissions due to EV uptake. The Greater Los Angeles Area would experience the greatest health and economic benefits from this scenario. By 2050, the region would save $12.61 billion in annual health costs by preventing 1,163 premature deaths.

Procurement decisions made by transit agencies have long-lasting effects, as a public bus generally has a useful life of around 14 years (FTA 2021). CARB estimates that an electric bus purchased in 2016 can save $458,000 in fuel and maintenance costs compared with a diesel bus over the lifetime of the asset (CARB 2017). In addition to subsidies offered by the state, procurement guidelines and practices may also help transit agencies address upfront costs and other barriers associated with EV adoption. Transit agencies may make up for higher acquisition costs through lower operation and maintenance costs over the useful life of electric buses. Although transit procurement policies are typically determined by transit agencies and cities, states still have a role to play in helping transit providers achieve their goals and dictating how quickly the transition to EVs occurs.

New Jersey has the most ambitious statewide goal for decarbonizing its transit fleet. Senate Bill 2252 of 2018 mandates that zero-emission vehicles make up 10% of new bus purchases made by the New Jersey Transit Corporation by the end of 2024, 50% by the end of 2026, and 100% by 2032 (New Jersey Legislature 2020). Connecticut has the second-most ambitious goal, with Executive Order no. 21-3 calling for an all-electric transit bus fleet by 2035 (Connecticut Office of the Governor 2021).

States that have a mandated zero-emission transit bus procurement target for transit agencies, established via legislation or executive order, received 4 points. Only eight jurisdictions earned full points for this metric: California, Colorado, Connecticut, the District of Columbia, Maryland, Michigan, New Jersey, and Vermont.

States that have a nonbinding goal or commitment to electrify transit fleets received 2 points, as did states where a joint purchase agreement is in place among multiple transit agencies to purchase EVs. For states to earn points, their goals or purchase agreements must require electrification of at least 50% of transit buses in the state. Data on total transit buses per state came from the FTA's 2021 National Transit Database.

State Investment for Electric Transit Bus Deployment

Currently there are few funding streams available to states to support municipal, state, and transit agency investment in EV bus deployment. Aside from the Volkswagen Environmental Mitigation Trust, discussed in the previous chapter, such funding comes predominantly from the Federal Transit Administration (FTA) through the Low-No grant program. The proportion of these funds that states allocate to EVs gives some indication of the state's commitment to ramping up transportation electrification within their transit bus fleets. Unfortunately, transit ridership and fare revenue had drastically dropped due to COVID-19. While state investment in zero-emission buses may currently be a challenge for transit agencies with limited state resources, sustained investment in ZEBs by states will lead to a more efficient and equitable transportation system in the long term.

States were awarded 1 point if funding received through the FTA's Low-No grant program has been allocated toward the purchase of electric transit buses. States could receive an additional point if a state-administered and -funded program exists for the purchase of electric transit buses. All but three (North Dakota, South Dakota, and West Virginia) of the 50 states have utilized Low-No funds to fund ZEBs.

CARB's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) directly invests in zero-emission transit buses by working with dealers to apply a voucher incentive at the time of purchase for eligible zero-emission vehicles. Washington's Green Transportation Capital Grant provides transit agencies in the state with funds for projects that reduce the carbon intensity of the Washington transportation system, such as the purchase of electric transit buses. The New York Truck Voucher Incentive Program (NYTVIP) provides vouchers, or discounts, to fleets across the state to purchase or lease electric transit buses; voucher incentive amounts differ by vehicle technology, vehicle weight class, and location where the vehicle is domiciled.

State Requirements for Electric School Bus Deployment

There are tangible health benefits to eliminating exhaust from heavy-duty internal combustion vehicles in public spaces (EPA 2020a). School buses commonly idle in place for hours at a time, and youth exposure to engine particulates can have especially negative impacts on respiratory health and development (Austin, Heutel, and Kreisman 2019). Some policies, such as idling restrictions and guidelines, are already in place to mitigate these adverse health impacts as much as possible, but replacing gasoline-powered vehicles with

EV models will have direct health benefits, including for low-income and communities of color, particularly in the absence of other EV programs. Electric school buses (ESBs) are already being used by school districts across the country and are delivering considerable operational savings and emissions reductions. As a result, states are increasingly requiring districts to procure ESBs, putting bus fleets on a path to full electrification.

States were awarded 1 point for a binding target for school districts or 0.5 points for a non-binding target. States were also awarded 1 point for prioritizing equity in their binding target. Two states, Connecticut and New York, prioritized equity and received full points, with Connecticut setting an earlier target for electrification of school buses in EJ communities, 2030 versus 2040 for other communities. A metric with this name was included in our 2021 edition; however, that metric assessed state funding for ESB purchases, which is now included in the next metric on state investment.

State Investment for Electric School Bus Deployment

Electric school buses can have considerably higher upfront costs than traditional diesel buses; reducing this price difference will be key to their uptake. Several states are already making efforts to incorporate ESBs into their current fleets by providing additional funding to defray higher upfront costs. For instance, the Texas Commission on Environmental Quality will award both school districts and charter schools in Texas with grant money to incrementally cover the costs of school bus fleets with cleaner, alternative-fuel vehicles (AFVs), including ESBs. The federal government has also recognized the benefits of school bus electrification and created the Clean School Bus Program as part of the 2021 Bipartisan Infrastructure Law. This program includes $5 billion in funding over five years for school districts to purchase cleaner buses, including electric school buses. The first round of funding has been awarded, with almost $913 million being given out to 390 districts out of around 2,000 original applications requesting $4 billion (EPA 2022).

We awarded 1 point to states that have programs or have contributed money toward the purchase of ESBs. Only 14 states scored points for this portion of the metric, leaving a lot of room for improvement moving forward. We also awarded 1 point to states based on applications to the Clean School Bus Program for ESBs. We included both awarded and waitlisted applications from the first round of funding to indicate the demand by school districts in each state. States were awarded based on the number of total ESBs applied for divided by the state's total school bus fleet. States received 1 point if their districts applied for ESBs totaling greater than 5% of the state fleet and received 0.5 points if greater than 2.5%. Only three states, Maine, Oklahoma, and South Carolina, received a full point for this portion of the metric.

Policies to Encourage Shared EV Fleets

The influx of car-sharing and ride-sharing platforms in the marketplace in recent years has reduced the need for car ownership and increased mobility options for urban residents. As car-sharing companies and transportation network companies (TNCs),[30] such as Uber and Lyft, continue to grow in fleet size, usage, and inherent impact on transportation energy use and emissions, states have the opportunity to influence them to adopt policies that prioritize EVs. Since TNC vehicles typically accumulate more VMT than personal vehicles, electrifying these fleets can produce greater emissions savings. A study by Jenn (2019) estimated that electrifying a TNC vehicle could produce three times the emissions savings compared to electrifying an average California driver's personal car.

Although the COVID-19 pandemic increased ambivalence toward shared transportation for many individuals, such policies will, in the long run, be crucial to limiting emissions from ride-hailing services while helping the economy recover. Despite the shift to remote and hybrid work that occurred during the pandemic, many people, especially low-income workers, still need reliable transportation to their workplaces (Barrero, Bloom, and Davis 2021). Broadening access to innovative transportation technologies can also be a valuable tool to address poverty and enable socioeconomic mobility by connecting communities to key job centers (Bouchard 2015).

States could receive 1 point for a policy that requires or encourages EV deployment in private shared fleets. Only California, the District of Columbia, and Massachusetts earned points for this metric. California's Clean Miles Standard and Incentive Program will implement new requirements for TNCs to curb GHG emissions and will push these companies to consider solutions such as goals for increasing the share of miles traveled using zero-emission vehicles. Per DC Law 22-257, or the Clean Energy DC Omnibus Amendment Act of 2018, by January 1, 2022 and every two years after, private vehicle-for-hire companies, including TNCs, must develop a GHG reduction plan. The plan must include proposals on how to meet goals for reducing emissions by increasing the proportion of participating drivers using zero-emission vehicles and increasing the proportion of miles completed by zero-emission vehicles relative to all miles (Council of the District of Columbia 2018). In Massachusetts, the governor signed House Bill 5060 into law, which directs the Department of Public Utilities TNC Division to create vehicle electrification and GHG emissions reduction requirements for TNCs (Massachusetts General Court 2022).

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[30] A transportation network company provides on-demand ride-hailing services to customers through online platforms.

UNSCORED METRICS

Electric Micromobility Solutions

We recognize the importance of electrified micromobility solutions (e.g., electric scooters, e-bikes) in the efficiency of a robust electrified transportation system. The proliferation of such programs can add to the travel options people have in urban environments and can be used as last-mile solutions to bridge the gap in transit service. If designed correctly, these programs can also increase access to mobility options for marginalized communities. We chose not to include metrics on electric bikes and scooters because micromobility efforts and funding typically fall under local jurisdictions; what role states could play to further those programs is unclear.

Chapter 5. Electricity Grid Optimization

INTRODUCTION

In the modernized electric grid system, utilities are charged with delivering clean, reliable, and affordable power to all customers within their service territory. If managed effectively, electric vehicles can create a less polluting energy and transportation system. The average EV produces no tailpipe emissions, and across the country the emissions from charging electric vehicles are lower than the emissions produced by a comparable traditional internal combustion engine (Reichmuth 2023). The carbon footprint of EVs will only improve with increasing penetration of a low-carbon electricity supply (Reichmuth 2020). Further, because EVs lead to increased energy sales, their proliferation may in turn lead to reduced electricity rates for all utility customers—even those who do not own an EV (Frost et al. 2019; Cutter et al. 2021).

Utilities are essential players in this transition. With targeted rates and managed charging, utilities can influence when EVs are plugged in, helping to make more efficient use of the grid, including times when it is most economical to utilize variable renewable resources. However, if unmanaged, a major influx of EVs could create strain on the electric distribution system and drive an increase in peak demand. This could lead to costly and avoidable investments in generation and distribution infrastructure upgrades, as well as potentially more air pollution from the combustion of fossil fuels to meet peak demand. These negative consequences can be avoided or mitigated through smart rate design and optimization of the electric vehicle load.

We evaluated state-regulated utilities that offer targeted rates and services to incentivize and manage smart EV charging in order to alleviate impact on the grid. At the same time, utilities need to balance grid impacts with consumer-focused rates to keep EVs attractive for residential and business customers. Several metrics are included in this category. States earned points for offering targeted pricing for L2 charging, such as time-varying (time-of-use) rates or dedicated EV rates. For DCFC charging, we recognized states offering electricity rates that balance grid needs with better economics under low utilization to encourage development of a widespread DCFC network. The managed charging metric recognizes programs or pilots that deploy EV charging on demand as a grid resource; an additional, bonus point was awarded to states that are piloting vehicle-to-grid technologies. We also evaluated the carbon footprint of states' power generation and policies that lead to improvements in power sector emissions. Total scores for the top 33 states and DC are listed in table 15.

In this chapter, we review and score states on the following policies:

- Time-varying charging rates for L2 chargers (2 points)

- DCFC-specific charging rates (2 points)
- Managed charging programs (1 point)
- Electric power sector emissions goals (4 points)
- Vehicle-to-grid programs (1 bonus point)

RESULTS

Table 15. Scores for electricity grid optimization

Rank	State	L2 time-varying rates (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
1	California	2	2	1	4	1	10
2	Colorado	2	2	1	3	1	9
	New York	1	2	1	4	1	9
4	Hawaii	2	2	0.5	3	1	8.5
5	Tennessee	1	2	0	4	1	8
6	Maine	1	2	0	4	0	7
	Maryland	2	2	0	3	0	7
	Nevada	2	2	0	3	0	7
	New Jersey	2	2	0	3	0	7
	Oregon	2	0	1	4	0	7
	Vermont	2	0	1	4	0	7
12	Minnesota	2	2	0.5	2	0	6.5
13	District of Columbia	2	0	0	4	0	6
	Massachusetts	2	0	1	2	1	6
	North Carolina	1	0	0	4	1	6
	Virginia	2	0	0	3	1	6

Rank	State	L2 time-varying rates (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
17	Washington	0	2	0.5	3	0	5.5
18	Connecticut	1	0	0	4	0	5
	Delaware	2	0	0	3	0	5
	Florida	1	2	1	0	1	5
	Michigan	2	2	1	0	0	5
22	Arizona	2	0	0	2	0	4
	Illinois	1	0	0	3	0	4
	New Mexico	2	0	0	2	0	4
	Pennsylvania	0	2	0	2	0	4
26	Georgia	2	0	0	1	0	3
	Kansas	2	0	0	1	0	3
	Utah	2	0	1	0	0	3
29	Idaho	1	0	0	1	0	2
	Iowa	1	0	0	1	0	2
	Oklahoma	1	0	0	1	0	2
	Rhode Island	0	0	0	2	0	2
33	Montana	1	0	0	0	0	1

Clear leaders emerge among states in terms of efforts to plan for and optimize EVs on the electric grid system. California, New York, and Colorado were the only states to earn a perfect score of 9 points or higher. Other leading states included Hawaii and Colorado. Of all 50 states and DC, the largest number of states (38) earned points in the time-varying charging rates category, which indicates utilities are largely aware of the opportunity to reduce costs on the system by managing overall peak demand. Far fewer states earned points in the DCFC rates category, with only 14 total states receiving the 2 possible points for including these types of technology-specific rates. Eleven states are offering managed charging programs and pilots, with some utilities, like Duke Energy Florida, making participation in managed charging a prerequisite to receiving other EV incentives. Since DCFC deployment and managed charging efforts are comparatively less developed, these low numbers are unsurprising: They indicate the strong potential for utilities to build out more options for customers to participate in EV demand management. In terms of electric power sector emissions, 36 states included some type of goal for reducing emissions over the next 15 years. This means that EVs in those states will have decreasing life-cycle carbon emissions over time.

States, regulators, and utilities can leverage some straightforward and relatively inexpensive ways to better optimize EV charging for the grid. Time-varying EV rates for L2 charging are a recognized and effective way to deliver both lower prices to EV customers and better outcomes for the electricity system (Frost et al. 2019). For customers who would prefer to cede control of charging to a utility or program administrator in exchange for a rebate or other incentive, residential and public managed charging programs provide another option for load control. States should also consider policies that support economic development of DCFC, which otherwise can become prohibitively expensive to build and operate due to high demand charges. Lastly, as carbon-free energy sources like wind, solar, and energy efficiency become increasingly cost competitive with fossil fuels, states can further encourage decarbonization by establishing targets for the electric industry, thereby reducing the life-cycle emissions of every EV on the road.

Time-Varying Rates for L2 Chargers

Well-designed pricing and electric rates that vary according to the time of use can incentivize customers to shift their EV charging to off-peak hours (Khan and Vaidyanathan 2018). Currently most residential electric rates are very simply structured, with a flat per-kWh charge that does not vary by time of day. This does not represent actual costs to generate electricity, which fluctuate based on time of day and weather conditions. The higher the total net demand on the electricity system, the more expensive it becomes to deliver power to everyone. Time-of-use (TOU) rates seek to address this by offering power more cheaply during off-peak times, such as at night, with the goal of incentivizing consumers to spread out the times when they use electricity (Chitkara et al. 2016). Because EVs can more easily shift their charging to off-peak hours, they are considered “flexible” load and are well situated to take advantage of time-varying rates. A stronger price signal is correlated with more responsive customer behavior, particularly by charging during “super-off-peak” times (Cook, Churchwell, and George 2014). Whether by offering a specific rate exclusively to EV owners or by marketing a general whole-home TOU rate to households that own a plug-in vehicle, the price of charging at home or in the workplace can be altered to more accurately represent system costs. As a result, EV owners who charge during high-demand times will pay their fair share for contributing to electric system peak demand, while those who take advantage of times when electricity—particularly clean electricity—is abundant and cheap will save on charging costs.

For our analysis of utility time-varying rate design offerings such as TOU, we included only rates that

- Were approved by a state's regulatory commission
- Contain at least two rate periods: a lower, off-peak value and a higher, on-peak value (some rate structures have additional periods, such as "super-peak" or "super-off-peak")
- Target the residential or commercial sector for L1 or L2 charging (not DCFC)

This metric earned states 1 points for a general time-of-use rate and a full 2 points for an EV-specific time-varying rate. Details on the rates and managed charging programs offered by investor-owned utilities for private charging are available in Appendix E.

DCFC-Specific Rates

DCFC, which can consume a large volume of power over a very short time, can be costly to operate in some rate designs that include demand-based charges.[31] In some cases of low utilization, these account for more than 90% of a charging station's electricity costs (Nelder 2017). Because of this, some utilities are offering DCFC-specific rates or providing incentives to reduce or avoid a high demand charge in order to make the market for DCFC investment more viable.

A *DCFC business rate* should balance the need to encourage grid integration through price signals with the charger profitability and customer economics needed for market viability (Nelder 2017). Such a rate may take a variety of forms, including a sliding-scale volumetric rate, with per-kWh charges decreasing and demand charges increasing based on utilization; demand charge *holidays* that offer relief from high demand charges on specific off-peak days; or *subscription* rates for commercial charging.[32] Some other designs preserve the price

[31] The cost to operate DCFC will depend on usage patterns and the particular design of the demand charge. Costs are highest (1) where DCFC station utilization is low, resulting in a power consumption profile with low average consumption and high peaks, (2) when those peaks coincide with times of high grid system demand, and (3) where rate designs include demand-based charges to discourage consumption during such peaks.

[32] A *subscription* rate model involves a fixed monthly payment for EV charging services. It may or may not also include a demand charge or restrict charging to off-peak hours. As an example of such a rate, in 2020 Green

signals from time-varying rates or demand changes but offer an incentive outside the rate design that aims to cover demand charges and provide support for operating expenses.

In our scoring, a state-regulated utility that offers an approved DCFC-oriented rate received 2 points. Although there may be differences among these rates and their effectiveness in driving adoption of DCFC, we gave them equal weight in this *Scorecard* due to the relative rarity of such rates and the importance of stimulating the emerging DCFC market in this critical stage of the industry's development.

Managed Charging Programs

Another approach to grid optimization is using EV batteries themselves as a flexible grid resource. Since the average personal vehicle spends 95% of its lifetime parked, that idle battery capacity could potentially be used to provide flexibility to the grid. This can be accomplished by aggregating large numbers of vehicle batteries with managed (sometimes called controlled) charging technology (V1G) or through vehicle-to-grid (V2G) discharging (Khan and Vaidyanathan 2018). While most EV battery warranties currently prohibit discharging for purposes other than operating the vehicle, there is an opportunity for utilities or third parties to aggregate charging and adjust or curtail loads as necessary to provide a V1G demand-response resource. Although such demand response has not been widely adopted in private home, workplace, or public charging environments, some utilities are offering pilots or programs to allow aggregated control of EV charging demand.

We awarded 1 point for an approved program and 0.5 points for a pilot offering. Only 10 states earned the full point for having an approved managed charging program. Vehicle-to-grid (V2G) programs, where they exist, merited a bonus point but were not included in the overall total due to their relative scarcity. Only eight states featured V2G offerings, all pilots: California, Florida, Massachusetts, North Carolina, New York, Hawaii, Virginia, and Tennessee.

Electric Power Sector Emissions Goals

EVs that run exclusively on electricity do not produce tailpipe emissions. Reducing tailpipe emissions has important health benefits to communities in addition to reducing the GHG impact of the broader transportation sector. That said, the power source that charges

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Mountain Power offered an eCharger Pilot program that allowed participants to charge their EVs an unlimited amount during off-peak hours for $29.99 per month, while at the same time participating in load management by agreeing to let GMP interrupt their charging during peak events (GMP 2020).

vehicles, and its associated emissions profile, have implications for the overall GHG reduction benefit and other related health benefits of EVs.

States have acted to reduce power sector emissions through strategies such as an energy efficiency resource standard, a clean energy standard, a renewable portfolio standard, or some combination of the three. Through legislation and executive orders, a growing number of states are building on these existing commitments and adopting ambitious clean energy goals, aiming to zero out emissions in the power sector and, in some cases, the statewide economy. As the grid mix in states continues to decarbonize the life cycle of EVs, their GHG benefits will continue to improve.

States could earn 1 point for having a utility grid carbon dioxide equivalent (CO_2e) output rate that is below the national average.[33] This average is determined by the U.S. Environmental Protection Agency (EPA) Emissions & Generation Resource Integrated Database (eGRID) 2020 summary tables. States could earn up to another 3 points for the level of planned emissions reductions over a 15-year period, which is the life expectancy of a vehicle. We collected the expected proportion of the electricity grid mix from renewable energy in 2035 in states with clean electricity standards or renewable portfolio standards. We assumed that all such standards include only zero-carbon resources. For states without a 2035 target, we interpolated between the 2018 penetration of renewables from EIA State Electricity Profiles and the goal for a later year.[34]

Table 16 provides a breakdown of how states were scored.

Table 16. Scoring for GHG reduction plan over a 15-year period

GHG reduction plan over a 15-year period	Points
≥ 67% reduction	3
≥ 33% reduction	2

[33] CO_2e represents an amount of a GHG whose atmospheric impact has been standardized to that of one-unit mass of carbon dioxide (CO_2), based on the global warming potential (GWP).

[34] Data from the Natural Resources Defense Council were used to support our analysis (S. Ptacek, program assistant, pers. comm., August 27, 2020).

≥ 12.5% reduction	1
≤ 12.4% reduction	0

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As with other sections of this *Scorecard*, some policies that were identified by stakeholders as best practices for grid optimization were not assigned scores in this chapter. This was due to either a lack of data availability or limited state experience with such practices. A summary of such policies is below.

Electric Vehicles in Integrated Resource Planning/Distribution Planning

Electric vehicles are already having an impact on power demand and load shapes. Planning well in advance for the infrastructure needs, investments, and grid impacts of increased transportation electrification is essential so that utilities can continue to deliver reliable, affordable power. This applies on both the resource side (transmission) and the delivery side (distribution), where large numbers of charging vehicles may require additional infrastructure such as transformer and substation upgrades. Clear and streamlined interconnection procedures and channels for communication are also an important part of planning and enabling infrastructure deployment. Planning and interconnection metrics were not scored due to difficulties in obtaining and comparing planning data across multiple time frames, in overlapping utility territories, and under various transmission authorities. Utilities within a regional transmission organization or independent system operator may not participate in the same type of resource planning as those outside a centralized planning region. For these reasons, it was difficult to accurately quantify the role of EVs in resource planning across states; however, we believe rigorous consideration of the impacts of EVs to be an important practice for utilities.

Interoperability and Open Standards

For grid system optimization, all EV charging technologies and data-sharing tools must be secure and accessible to the relevant parties and able to connect with one another. Interoperability—making sure all stations have compatible software—and open standards for data sharing among EV chargers are needed to deliver a seamless user experience, to enable communication of price signals for managed charging, and to support robust grid planning. For customers, allowing different types of chargers to communicate across networks reduces friction, helping to expand the network of available chargers. Open standards with good data access policies can allow utilities and state and local governments to use network data for system planning. Open standards also support a more flexible, sustainable network by allowing different manufacturers to connect, letting charging station owners introduce new technologies over time.

In policy statements, the PUCs of both Washington and Minnesota have noted the importance of interoperability; Minnesota specifically encouraged the use of Open Charge Point Protocol and Open Automated Demand Response (Minnesota PUC 2019). Washington regulators found that greater interoperability serves the public interest by making data available for system planning purposes and by improving customer experience by ensuring that all utility-owned public chargers can accept payment from credit cards (Washington UTC 2017). We did not find a data source that covered all states' adoption of interoperability standards, so were not able to include it in the *Scorecard*.

Chapter 6. Transportation Electrification Outcomes

INTRODUCTION

This final, outcomes-based chapter scores states on the progress they have already made on vehicle electrification. It highlights the importance of collecting outcome-related data to measure progress and set a baseline for future research. States must be able to demonstrate that current policies lead to the desired outcome of increasing EVs and EV charging locations while also reducing GHG emissions.

In this chapter, we review and score states on the following outcomes:

- Light-duty EV registrations per 100,000 people (4 points)
- Heavy-duty EV registrations per 100,000 people (4 points)
- Public L2 charging facilities per 100,000 people (4 points)
- Public DCFC charging facilities per 100,000 people (4 points)
- Electric transit buses per 100,000 people (2 points)
- Total electric school buses committed or ordered (1 points)
- Percentage change in transportation GHG emissions over a five-year period (4 points)

RESULTS AND KEY TAKEAWAYS

The scores that each state and DC in the top 33 earned in this chapter are captured below in table 17.

Table 17. Scores for transportation electrification outcomes

Rank	State	LD EVs (4 pts.)	HD EVs (4 pts.)	L2 stations and ports (4 pts.)	DCFC stations and ports (4 pts.)	Electric transit buses (2 pts.)	ESB fleet commitment (1 pt.)	GHG emissions (4 pts.)	Total (23 pts.)
1	Vermont	3	3	4	3	2	0.5	3	18.5
2	California	4	4	4	3	2	1	0	18
3	Washington	3	4	3	3	2	0	0	15

Rank	State	LD EVs (4 pts.)	HD EVs (4 pts.)	L2 stations and ports (4 pts.)	DCFC stations and ports (4 pts.)	Electric transit buses (2 pts.)	ESB fleet commitment (1 pt.)	GHG emissions (4 pts.)	Total (23 pts.)
4	Colorado	3	2	4	3	2	0.5	0	14.5
5	Maryland	3	2	3	3	1.5	1	0	13.5
6	District of Columbia	3	3	4	1	2	0	0	13
	Hawaii	3	3	3	2	2	0	0	13
8	Utah	3	2	3	2	1.5	0	0	11.5
	Oregon	3	1	3	3	1.5	0	0	11.5
	Massachusetts	3	1	4	1	2	0.5	0	11.5
	Maine	2	0	3	2	0	0.5	4	11.5
12	Rhode Island	2	0	4	2	2	0.5	0	10.5
13	Delaware	2	3	2	1	2	0	0	10
14	Nevada	3	1	2	2	1.5	0	0	9.5
	New Jersey	3	1	1	1	0.5	0	3	9.5
16	New York	2	1	3	1	2	0	0	9
17	Virginia	2	1	2	2	0	0.5	1	8.5
	Florida	3	0	2	1	2	0.5	0	8.5
19	New Mexico	2	2	1	1	2	0	0	8
	Georgia	2	1	2	2	1	0	0	8
21	Montana	1	2	1	1	1.5	0.5	0	7
	Idaho	2	1	1	1	2	0	0	7
	Oklahoma	2	0	0	4	0	0	1	7
24	Iowa	1	1	1	2	0.5	0	1	6.5
	Arizona	3	0	2	1	0.5	0	0	6.5

Rank	State	LD EVs (4 pts.)	HD EVs (4 pts.)	L2 stations and ports (4 pts.)	DCFC stations and ports (4 pts.)	Electric transit buses (2 pts.)	ESB fleet commitment (1 pt.)	GHG emissions (4 pts.)	Total (23 pts.)
	Kansas	1	0	2	0	0.5	0	3	6.5
27	North Carolina	2	1	2	0	1	0	0	6
	Connecticut	2	0	2	1	0.5	0.5	0	6
29	Michigan	2	0	2	1	0	0	0	5
30	Minnesota	2	0	2	0	0.5	0	0	4.5
31	Illinois	2	0	1	0	1	0	0	4
	Tennessee	2	0	1	0	1	0	0	4
33	Pennsylvania	2	0	1	0	0	0	0	3

Vermont leads the outcomes chapter with 18.5 points, showcasing the effectiveness of its policies and programs that reduce GHG emissions and promote transportation electrification. Vermont also leads in L2 ports and electric transit buses per 100,000 residents.

California's wide variety of programs and incentives, such as the California Capital Access Program's Electric Vehicle Charging Station Financing Program, have led to increased adoption of EV charging infrastructure in the state. California has by far the largest network of EV charging infrastructure in the country.

Regionally, California and Washington lead in the West, Vermont tops these rankings in the Northeast, and Colorado leads in the Southwest.

As this chapter scores states on progress, or outcomes, they can expect their scores in this chapter to improve as they implement the many policies, programs, and incentives that they have been scored on throughout this report.

Light-Duty and Heavy-Duty Registrations per 100,000 People

Tracking the number of EVs registered per state is indicative of how effectively state policies outlined in earlier chapters have encouraged the proliferation of passenger, freight, and transit electric vehicles. In 2017 close to 200,000 plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) were sold nationwide. This accounted for just 1.15% of total vehicle sales for the year but was a sharp, 26% increase in total EV sales compared with EV sales from 2016 (Bellan 2018). This trend in rising EV sales and ownership continued until 2019, when sales decreased by 7– 9% from the previous year, but that may simply reflect that 2018 was an outlier in terms of total sales (EVAdoption 2020). Overall, sales increased nationally from 2017 to 2019, with no indication of stagnation in the EV market. EV sales reached record highs in 2021 at the national and global level, a strong sign that state policies outlined in earlier chapters are working well (Cui and Hall 2022). In 2021 667,731 EV's were sold in the United States, totaling 4.4% of the market (Cui and Hall 2022).

California is the only state to have scored all available points for the light-duty metric, and California and Washington were the only states to score full marks for the heavy-duty metric. California had over five times more registrations than the next closest state, which speaks to its dominance over the light-duty metric. Several states recorded their highest scores for the chapter by virtue of their performance in these metrics. Points were awarded on the basis of how many light-duty or heavy-duty vehicles per 100,000 people are registered in each state. All data were collected between October and November 2022. As the heavy-duty EV market continues to expand, a better method for evaluating heavy-duty EV penetration may be to look at such registrations as a proportion of total heavy-duty registrations per state rather than the state's population. However, due to data quality and availability limitations, we did not use this method for this edition of the *Scorecard*.

States could earn up to 4 points each for their light-duty and heavy-duty registrations. The scoring thresholds are shown in tables 18 and 19.

Table 18. Scoring for light-duty EV registrations per 100,000 residents

Number of LD EV registrations per 100,000 residents	Points (4)
800+	4
300–799.99	3
150–299.99	2
90–149.99	1

Table 19. Scoring for heavy-duty EV registrations per 100,000 residents

Number of HD EV registrations per 100,000 residents	Points (4)
3+	4
1.50–2.99	3
1–1.49	2
0.50–0.99	1

Public L2 and DCFC Charging Facilities per 100,000 People

Maintaining and growing a reliable network of public EV chargers will be critical to the continued expansion of the EV market. The number of publicly available charging stations per capita in a given state is indicative of the success of the state's policies to increase the uptake of electric vehicles. As a way of gauging states' efforts to support the expansion of their EV charging networks, points were awarded on the basis of how many L2 and DCFC charging ports per 100,000 people are currently available in each state. The difference in scoring thresholds for these two metrics reflects the number of chargers of a particular type that are currently available for use in each state. One reason we chose to score these metrics separately rather than together relates to their potential charge rates. DCFC chargers work far more quickly than L2 chargers because of their superior kWh output. We wanted to give states credit for the variety of public chargers they have available; scoring L2 and DCFC chargers separately can help illuminate which states are best providing EV owners with powerful and convenient options for refueling.

California, Vermont, Colorado, Rhode Island, Massachusetts, and the District of Columbia scored full points for L2 chargers per capita, but Oklahoma stands alone in scoring full points for DCFC availability. Just 11 states scored more than 50% of the available points for these metrics, so there is much room for improvement in the domain of publicly accessible chargers. These metrics were worth up to 4 points each, and the scoring criteria are shown in tables 20 and 21. Proprietary chargers such as Tesla's superchargers were not included in our count although may in the future if they are open to all drivers.

Table 20. Scoring for public L2 charging facilities per 100,000 residents

Number of charging ports per 100,000 residents	Points (4)
50+	4
35–49.99	3

18–34.99	2
10–17.99	1

Table 21. Scoring for public DCFC charging facilities per 100,000 residents[35]

Number of charging ports per 100,000 residents	Points (4)
10+	4
5–9.99	3
3–4.99	2
2–2.99	1

Electric Transit Buses per 100,000 People

Transitioning transit bus fleets to EVs has numerous environmental, mobility, and community benefits. Points were awarded on the basis of the number of zero-emission buses either operating today, on order, or funded for purchase by transit agencies within the state, as identified by CALSTART as of February 2023 (Chard et al. 2023). The 5,269 total ZEBs recognized by CALSTART nationwide represent just 4.2% of the 56,000 active transit buses across the country, as tracked in the FTA's National Transit Database (FTA 2020).

California and New York lead the way with 1,988 and 489 identified zero-emission buses, respectively. The New York Truck Voucher Incentive Program administered by New York State Energy Research & Development Authority (NYSERDA) provides an example of how states can promote ZEBs moving forward (NYSERDA 2023). States have improved on this metric: 26 states earned at least half credit.

Table 22 gives a breakdown of how states were scored for this metric.

[35] An error in the 2021 edition of the *Scorecard* resulted in overestimates in the number of DCFC chargers and the cutoffs for point allocation, which have been updated.

Table 22. Scoring for electric transit buses per 100,000 people

Electric transit buses per 100,00 people	Points
≥ 2.0	2.0
≥ 1.5	1.5
≥ 1.0	1.0
≥ 0.5	0.5

Total Electric School Buses Committed or Delivered

As noted in previous chapters, transitioning transit bus fleets such as school buses to EVs has numerous environmental, mobility, and community benefits. For this metric, we evaluate the proportion of a state's school bus fleet that is zero-emission, either operating today, on order, or funded for purchase by school districts, as identified by the World Resources Institute (WRI 2023). No states earned full points for this metric. Only California and Maryland earned 1 point for this metric. The remaining states earned either 0.5 points or no points, representing major room for improvement moving forward.

Table 23 gives a breakdown of how states were scored for this metric.

Table 23. Electric school bus fleet commitment percentages

EV school bus fleet commitment percentages	Points
≥ 2.0 %	1.0
≥ 0.5 %	0.5

Percentage Change in Transportation GHG over a Five-Year Period

As noted earlier in this report, in 2018 GHG emissions from transportation accounted for around 28% of the U.S. total, making it the leading source of GHG emissions in the nation. More than 90% of the fuel used for transportation, which includes gasoline and diesel, is petroleum based (EPA 2020b). Increased adoption of EVs, combined with a growing influx of electricity sourced from cleaner technologies, has potential to slash GHG emissions from the transportation sector.

For this metric, states were scored based on the percentage change in per capita GHG emissions from the transportation sector over a five-year period (2014–2018). While many factors contribute to the transportation sector's total GHG emissions, including progress on GHG emission reductions is important as that is a key purpose of EV deployment. Table 24 offers a breakdown of how the states were scored.

Table 24. Scoring for transportation GHG emissions

Percentage change in GHGs, 2014–2018	Points
7.50% reduction or greater	4.0
5.00–7.49% reduction	3.0
2.50–4.99% reduction	2.0
0–2.49% reduction	1.0

UNSCORED METRICS

Access to Electrified Transportation

To the extent possible with the data available, this chapter tracks the impacts of the policies outlined in this report. However, data limitations made it impossible to measure all outcomes. In particular, we were unable to evaluate whether state policies are supporting equitable access to EVs and EV charging equipment in this edition. Understanding such factors as whether residents of marginalized communities have access to and are using charging facilities in their neighborhoods will be important to measuring the success of equitable state and local EV infrastructure investments and policies. Several states are starting to study these trends, including New Jersey and Maine (Warner et al. 2020; Efficiency Maine Trust 2020). States will continue to play an important role in collecting the relevant geographic and socioeconomic data to conduct such assessments.

Chapter 7. Conclusions

ACEEE's assessment of state transportation electrification efforts demonstrates that, with the exception of a few leaders, states are still in relatively early stages of creating a supportive policy environment for transportation electrification. However, recently established and expanded federal programs will likely drive states to do more to ramp up EV deployment, and these improved outcomes will be captured in future editions of the *Scorecard*. In the 2023 report, scores for the top 33 among states and the District of Columbia range from 15 to 88 points out of 100. California is far and away the top performer, placing at the top of four out of five scoring categories included in the *Scorecard*. New York and Colorado have also demonstrated leadership on electric vehicles, although they trail California in our rankings by 26 and 27 points, respectively. New York scores well among utility-related metrics while Colorado is a leader in transportation electrification outcomes.

This review of EV policies also identifies clear regional pacesetters. States like Washington in the Northwest, Nevada in the Southwest, Virginia in the Southeast, and Minnesota in the Midwest continue to lead in their geographical regions.

States have made varying levels of progress on transportation electrification. However, more must be done to meet state EV deployment and climate targets while complementing economic development. **States that are not included in the top 33 have the most work to do to plan for and accelerate transportation electrification. For these states we continue to recommend the following policy actions as important foundational steps to move transportation electrification ahead:**

- Engage in comprehensive planning that defines a coordinated strategy to build out electrified transportation, include specific goals for EVs and deployment of EV charging infrastructure, and benchmark progress on transportation electrification. Comprehensive planning can and should go beyond EVs to incorporate sector-wide greenhouse gas goals, improve system efficiency, and address the planning needs of different modes of transportation.
- Collect data on key metrics to establish a baseline and track progress on EV adoption and integration, and EV charging infrastructure deployment. These data could include EV registration information for light- and heavy-duty vehicles, location and count of EV charging facilities, and demographic information on EV use by race and income. Data should be made publicly available, with the status of milestones shared through regular public reporting.
- When investing in vehicle and infrastructure deployment, begin with equity in mind. Incorporate spending carve-outs or funding adders for low-income, economically distressed, and EJ communities in state and utility EV planning to ensure that the benefits of transportation electrification are distributed equitably. Track spending and impacts of programs to ensure benefits for those most in need.

- Leverage existing funding sources such as the recently passed IIJA and the federal Low or No Emission Program to support EVs and EV charging infrastructure deployment while evaluating other opportunities to create sustained funding for programs.
- Establish clear policy direction to encourage utility and third-party investment in EV charging infrastructure, such as exempting third-party EV charging providers from being defined as a public utility and approving utility electric vehicle charging programs and demonstration projects such as electric school buses.
- Engage with communities early and throughout the planning process to incorporate their viewpoints and build trust. Invest in internal engagement capacity and knowledge and support the capacity of the communities. Prioritize community participation in mobility needs assessments and use these assessments to guide investment.

While all of the states and DC in our top 33 are making progress, there are varying approaches and plenty of room for improvement. **For states that are represented in our top 33 but are earlier in the process of developing a robust environment for transportation electrification, we recommend the following next steps to help accelerate their market and GHG reductions:**

- Codify targets for the deployment of EVs and EV chargers and prioritize the adoption of ACC II and ACT rules for vehicles.
- Offer on-the-hood incentives for the purchase of light- and heavy-duty EVs to offset the additional upfront cost of these vehicles.
- Encourage utilities to make fair and reasonable investments in EV charging infrastructure that are supported by local communities and provide appropriate safeguards for low-income ratepayers. Encourage utilities to also implement EV rates or managed charging programs that encourage integration of EVs into the grid and benefit ratepayers, EV drivers, and grid stability while reducing emissions.
- Encourage grid-scale decarbonization by establishing clean energy and energy efficiency targets for the electric industry, thereby reducing the life-cycle emissions of every EV on the road.
- Set a GHG emissions reduction goal and commitment for the transportation sector to ensure that EV deployment complements other efforts to reduce transportation GHG emissions.
- Increase the amount and percentage of state and utility funding going toward low-income, economically distressed, and environmental justice communities. Consider setting a funding goal in line with the Justice40 initiative's objective of directing 40% of benefits to underserved communities (The White House 2023). This can help ensure no communities are left behind in the transition to electrified transportation.

- Engage with communities early and throughout the planning process to incorporate their viewpoints and build trust. Invest in internal engagement capacity and knowledge and support the capacity of the communities. Prioritize community participation in mobility needs assessments and use these assessments to guide investment.

Transportation electrification is still maturing. The policy landscape and best practices will keep evolving as states continue to adopt and experiment with policy approaches to advance the use of EVs and EV charging infrastructure.

Nevertheless, states can apply the strategies outlined above and others in the *Scorecard* as they seek to electrify transportation and combat climate change in an equitable fashion. Abundant opportunities exist to learn from current state strategies and build on policy successes to leverage positive outcomes.

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Appendix A. Full State Scores

Table A1. Full scores by scoring category for all 50 states and the District of Columbia

State	Planning and goals (15 pts.)	Incentives (36 pts.)	Transportation system efficiency (17 pts.)	Electricity grid optimization (9 pts.)	Outcomes (23 pts.)	Total (100 pts.)
California	15	30.5	14.5	10	18	88
New York	12	25	7	9	9	62
Colorado	11	17	9.5	9	14.5	61
Massachusetts	10	21.5	8.5	6	11.5	57.5
Vermont	12	14	5.5	7	18.5	57
Washington	14.5	13	8	5.5	15	56
New Jersey	9.5	21.5	6	7	9.5	53.5
District of Columbia	6.5	16.5	9.5	6	13	51.5
Oregon	15	12	6	7	11.5	51.5
Maryland	5.5	14	9	7	13.5	49
Maine	5	16	4	7	11.5	43.5
Connecticut	6.5	17	8	5	6	42.5
Nevada	5.5	14.5	2	7	9.5	38.5
Hawaii	5.5	10	1	8.5	13	38
Virginia	9.5	9	3	6	8.5	36
Pennsylvania	3.5	21.5	1	4	3	33
Delaware	2.5	12	1	5	10	30.5
Minnesota	4.5	11	4	6.5	4.5	30.5
Rhode Island	4	11.5	1.5	2	10.5	29.5
Florida	2	11.5	1	5	8.5	28
New Mexico	3	10.5	2	4	8	27.5

State	Planning and goals (15 pts.)	Incentives (36 pts.)	Transportation system efficiency (17 pts.)	Electricity grid optimization (9 pts.)	Outcomes (23 pts.)	Total (100 pts.)
Illinois	5	10.5	4	4	4	27.5
Tennessee	3.5	7.5	4	8	4	27
Utah	2	9	1	3	11.5	26.5
North Carolina	4	9.5	1	6	6	26.5
Arizona	2.5	7	3.5	4	6.5	23.5
Michigan	1	7.5	5	5	5	23.5
Oklahoma	0	5	3	2	7	17
Idaho	0.5	6	1	2	7	16.5
Montana	0.5	7	1	1	7	16.5
Kansas	0	5.5	1	3	6.5	16
Georgia	0	3	1.5	3	8	15.5
Iowa	1.5	4	1	2	6.5	15
Indiana	0.5	6	1	2	5	14.5
South Carolina	0	4	2	2.5	5.5	14
Ohio	0	5	2	1	5.5	13.5
New Hampshire	0.5	4	1.5	2	5	13
North Dakota	0	5.5	0	1	6	12.5
Alaska	0	5	1	3	3.5	12.5
Missouri	0	8	1	0	3.5	12.5
Texas	0	6	2	0	4	12
Wisconsin	0.5	3.5	1	4	3	12
Wyoming	0.5	0	1	0	8	9.5
Nebraska	0	1	1	3	3.5	8.5
Alabama	0	4	1	3	0	8

State	Planning and goals (15 pts.)	Incentives (36 pts.)	Transportation system efficiency (17 pts.)	Electricity grid optimization (9 pts.)	Outcomes (23 pts.)	Total (100 pts.)
Louisiana	0	2	2.5	1	0.5	6
Kentucky	0	3	1	1	0.5	5.5
South Dakota	0	3	0	1	1	5
West Virginia	0	1	1.5	0	1	3.5
Arkansas	0	–1	1.5	1	1	2.5
Mississippi	0	–1	1.5	0	0	0.5

Table A2. Scores for metrics or portions of metrics that prioritize low-income, economically distressed, or EJ communities

State	EV Plans (0.5 pts.)	New EV incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 Incentives (1 pt.)	DCFC Incentives (1 pt.)	Statewide EV investment and programs for disadvantaged communities (6 pts.)	Utility Spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
California	0.5	1	0	0	1	4.5	2	2	1	1	0	13.0
New York	0.0	0	0	1	0	2	1	2	0	0	1	7.0
District of Columbia	0.5	0	0	0	0	2	0	2	1	0	0	5.5
Pennsylvania	0.0	1	1	0	0	0	0.5	2	1	0	0	5.5
Maine	0.5	1	1	0	0	2	0	0	0	0	0	4.5
Massachusetts	0.0	0	0	0	0	1.5	0	2	1	0	0	4.5
Oregon	0.5	1	1	0	0	0	0	1	0	1	0	4.5
Washington	0.0	0	0	0	0	2	0	1	0	1	0	4.0
Connecticut	0.5	0	1	1	0	0	0	0	0	0	1	3.5
Minnesota	0.5	0	0	0	0	0	0	2	1	0	0	3.5

State	EV Plans (0.5 pts.)	New EV incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 Incentives (1 pt.)	DCFC Incentives (1 pt.)	Statewide EV investment and programs for disadvantaged communities (6 pts.)	Utility Spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
Rhode Island	0.0	1	1	0	0	0	0	0	1	0	0	3.0
New Jersey	0.5	0	0	1	0	1	0	0	0	0	0	2.5
Delaware	0.0	0	0	0	0	0	0	1	1	0	0	2.0
Hawaii	0.0	0	0	0	0	1	0	0	1	0	0	2.0
Illinois	0.0	0	0	1	1	0	0	0	0	0	0	2.0
Maryland	0.0	0	0	0	0	0	0	1	1	0	0	2.0
New Mexico	0.0	0	0	0	0	0	1	1	0	0	0	2.0
Colorado	0.5	0	0	0	0	1	0	0	0	0	0	1.5
Florida	0.5	0	0	0	0	0	0	1	0	0	0	1.5
Iowa	0.0	0	0	0	0	0	0	0	1	0	0	1.0
Missouri	0.0	0	0	0	0	0	0	1	0	0	0	1.0
Nevada	0.0	0	0	0	0	0	0	1	0	0	0	1.0
North Carolina	0.0	0	0	0	0	0	0	1	0	0	0	1.0

State	EV Plans (0.5 pts.)	New EV incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 Incentives (1 pt.)	DCFC Incentives (1 pt.)	Statewide EV investment and programs for disadvantaged communities (6 pts.)	Utility Spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
Ohio	0.0	0	0	0	0	0	0	1	0	0	0	1.0
Tennessee	0.0	0	0	0	0	0	0	0	1	0	0	1.0
Vermont	0.0	1	0	0	0	0	0	0	0	0	0	1.0
Alabama	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Alaska	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Arizona	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Arkansas	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Georgia	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Idaho	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Indiana	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Kansas	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Kentucky	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Louisiana	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Michigan	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Mississippi	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Montana	0.0	0	0	0	0	0	0	0	0	0	0	0.0

State	EV Plans (0.5 pts.)	New EV incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 Incentives (1 pt.)	DCFC Incentives (1 pt.)	Statewide EV investment and programs for disadvantaged communities (6 pts.)	Utility Spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deployment goals (1 pt.)	Total (17.5 pts.)
Nebraska	0.0	0	0	0	0	0	0	0	0	0	0	0.0
New Hampshire	0.0	0	0	0	0	0	0	0	0	0	0	0.0
North Dakota	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Oklahoma	0.0	0	0	0	0	0	0	0	0	0	0	0.0
South Carolina	0.0	0	0	0	0	0	0	0	0	0	0	0.0
South Dakota	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Texas	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Utah	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Virginia	0.0	0	0	0	0	0	0	0	0	0	0	0.0
West Virginia	0.0	0	0	0	0	0	0	0	0	0	0	0.0
Wisconsin	0.0	0	0	0	0	0	0	0	0	0	0	0.0

State	EV Plans (0.5 pts.)	New EV incentives (1 pt.)	Used EV Incentives (1 pt.)	L2 Incentives (1 pt.)	DCFC Incent ives (1 pt.)	Statewide EV investment and programs for disadvantaged communities (6 pts.)	Utility Spending on EV charging incentives (2 pts.)	Utility EV programs for disadvantaged communities (2 pts.)	VW funds (1 pt.)	GHG pricing policies (1 pt.)	Electric school bus deploym ent goals (1 pt.)	Total (17.5 pts.)
Wyoming	0.0	0	0	0	0	0	0	0	0	0	0	0.0

Table A3. Scores for heavy-duty metrics

State	Heavy-duty EV adoption goals and ZEV mandates (4 pts.)	HD EV tax credits and rebates (4 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State ESB deployment requirements (2 pts.)	State investment for ESB deployment (2 pts.)	HD EV registrations (4 pts.)	Electric transit bus fleets (2 pts.)	Electric School bus fleets (2 pts.)	Electric school bus subtotal (5 pts.)	Total (23 pts.)
California	4	3	4	2	0	1.5	2	2	1	2.5	19.5
New York	4	4	2	2	2	1	2	2	0	3	19
Colorado	4	1.5	4	2	0.5	1	2	2	0.5	2	17.5
Massachusetts	4	4	2	2	0	0.5	2	2	0.5	1	17
Vermont	4	3	4	1	0	0.5	2	2	0.5	1	17
New Jersey	4	4	4	1	0	1	0.5	0.5	0	1	15
Maryland	2	0	4	2	1	0	1.5	1.5	1	2	13
Connecticut	2	0	4	1	2	1	0.5	0.5	0.5	3.5	11.5
District of Columbia	2	0	4	1	0	0.5	2	2	0	0.5	11.5
Nevada	2	3	0	1	0	1	1.5	1.5	0	1	10
Washington	4	0	0	2	0	0	2	2	0	0	10
Maine	2	3	0	1	1	1	0	0	0.5	2.5	8.5
Idaho	0	3	0	1	0	0	2	2	0	0	8

State	Heavy-duty EV adoption goals and ZEV mandates (4 pts.)	HD EV tax credits and rebates (4 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State ESB deployment requirements (2 pts.)	State investment for ESB deployment (2 pts.)	HD EV registrations (4 pts.)	Electric transit bus fleets (2 pts.)	Electric School bus fleets (2 pts.)	Electric school bus subtotal (5 pts.)	Total (23 pts.)
Oregon	4	0	0	1	0	0	1.5	1.5	0	0	8
Rhode Island	2	0	0	1	0	0.5	2	2	0.5	1	8
Montana	0	3	0	1	0	0	1.5	1.5	0.5	0.5	7.5
Hawaii	2	0	0	1	0	0	2	2	0	0	7
Pennsylvania	2	4	0	1	0	0	0	0	0	0	7
Illinois	0	0	2	1	0	1	1	1	0	1	6
Indiana	0	3	0	1	0	0	1	1	0	0	6
Ohio	0	3	0	2	0	0	0.5	0.5	0	0	6
Tennessee	0	0	2	1	0	1	1	1	0	1	6
Florida	0	0	0	1	0	0	2	2	0.5	0.5	5.5
Utah	0	1.5	0	1	0	0	1.5	1.5	0	0	5.5
Virginia	2	0	0	2	0	1	0	0	0.5	1.5	5.5
Delaware	0	0	0	1	0	0	2	2	0	0	5
Michigan	0	0	4	1	0	0	0	0	0	0	5
New Mexico	0	0	0	1	0	0	2	2	0	0	5

State	Heavy-duty EV adoption goals and ZEV mandates (4 pts.)	HD EV tax credits and rebates (4 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State ESB deployment requirements (2 pts.)	State investment for ESB deployment (2 pts.)	HD EV registrations (4 pts.)	Electric transit bus fleets (2 pts.)	Electric School bus fleets (2 pts.)	Electric school bus subtotal (5 pts.)	Total (23 pts.)
North Carolina	2	0	0	1	0	0	1	1	0	0	5
Wyoming	0	0	0	1	0	0	2	2	0	0	5
Arizona	0	0	2	1	0	0.5	0.5	0.5	0	0.5	4.5
Wisconsin	0	1.5	0	1	0	0	1	1	0	0	4.5
Alabama	0	3	0	1	0	0	0	0	0	0	4
North Dakota	0	4	0	0	0	0	0	0	0	0	4
Texas	0	0	0	1	0	1	1	1	0	1	4
Georgia	0	0	0	1	0	0.5	1	1	0	0.5	3.5
Minnesota	0	0	0	1	0	1	0.5	0.5	0	1	3
Oklahoma	0	0	0	1	0	2	0	0	0	2	3
South Carolina	0	0	0	1	0	1	0.5	0.5	0	1	3
Louisiana	0	0	0	1	0	0.5	0.5	0.5	0	0.5	2.5
Alaska	0	0	0	1	0	0	0.5	0.5	0	0	2
Iowa	0	0	0	1	0	0	0.5	0.5	0	0	2
Kansas	0	0	0	1	0	0	0.5	0.5	0	0	2

State	Heavy-duty EV adoption goals and ZEV mandates (4 pts.)	HD EV tax credits and rebates (4 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State ESB deployment requirements (2 pts.)	State investment for ESB deployment (2 pts.)	HD EV registrations (4 pts.)	Electric transit bus fleets (2 pts.)	Electric School bus fleets (2 pts.)	Electric school bus subtotal (5 pts.)	Total (23 pts.)
Kentucky	0	0	0	1	0	0	0.5	0.5	0	0	2
Missouri	0	0	0	1	0	0	0.5	0.5	0	0	2
Nebraska	0	0	0	1	0	0	0.5	0.5	0	0	2
Arkansas	0	0	0	1	0	0.5	0	0	0	0.5	1.5
Mississippi	0	0	0	1	0	0.5	0	0	0	0.5	1.5
New Hampshire	0	0	0	1	0	0.5	0	0	0	0.5	1.5
West Virginia	0	0	0	0	0	1.5	0	0	0	1.5	1.5
South Dakota	0	0	0	0	0	0	0	0	0	0	0

Table A4. Scores for planning and goal setting for all 50 states and the District of Columbia

State	EV and EV charging infrastructure plans (2 pts.)	LD EV adoption goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
California	2	4	4	2	2	1	15
Oregon	2	4	4	2	2	1	15
Washington	1.5	4	4	2	2	1	14.5
Vermont	1.5	4	4	1	1.5	0	12
New York	1.5	4	4	1	1	0.5	12
Colorado	2	1	4	2	2	0	11
Massachusetts	1.5	4	4	0	0.5	0	10
New Jersey	2	2	4	0	1.5	0	9.5
Virginia	1.5	4	2	2	0	0	9.5
Connecticut	2	1	2	0	1.5	0	6.5
District of Columbia	2	1	2	0	1.5	0	6.5
Maryland	1.5	2	2	0	0	0	5.5
Nevada	1.5	0	2	2	0	0	5.5
Hawaii	1.5	0	2	0	2	0	5.5

State	EV and EV charging infrastructure plans (2 pts.)	LD EV adoption goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
Maine	2	1	2	0	0	0	5
Illinois	1	0	0	2	1.5	0.5	5
Minnesota	2	1	0	1	0	0.5	4.5
North Carolina	1	1	2	0	0	0	4
Rhode Island	1	1	2	0	0	0	4
Tennessee	1.5	1	0	1	0	0	3.5
Pennsylvania	1.5	0	2	0	0	0	3.5
New Mexico	0.5	0	0	2	0	0.5	3
Arizona	0.5	0	0	2	0	0	2.5
Delaware	0.5	2	0	0	0	0	2.5
Florida	2	0	0	0	0	0	2
Utah	1	0	0	1	0	0	2
Iowa	1.5	0	0	0	0	0	1.5
Michigan	0.5	0	0	0	0	0.5	1
Idaho	0.5	0	0	0	0	0	0.5
Montana	0.5	0	0	0	0	0	0.5

State	EV and EV charging infrastructure plans (2 pts.)	LD EV adoption goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
New Hampshire	0.5	0	0	0	0	0	0.5
Wyoming	0.5	0	0	0	0	0	0.5
Indiana	0.5	0	0	0	0	0	0.5
Wisconsin	0.5	0	0	0	0	0	0.5
Alabama	0	0	0	0	0	0	0
Alaska	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0
Missouri	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0
Ohio	0	0	0	0	0	0	0

State	EV and EV charging infrastructure plans (2 pts.)	LD EV adoption goals and ZEV mandates (4 pts.)	HD EV goals and ZEV mandates (4 pts.)	Utility EV charging infrastructure goals (2 pts.)	EV-supportive building codes (2 pts.)	Low-carbon fuel standard (1 pt.)	Total (15 pts.)
Oklahoma	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0	0

Table A5. Scores for incentives for deployment for all 50 states and the District of Columbia

State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV Fees (–2 to 2 pts.)	Total Points (36 pts.)
California	4	3	0	4.5	1	2	1	30.5
New York	3	4	0	2	2	0	2	25
Massachusetts	3	4	0	1.5	1	0	2	21.5
Pennsylvania	4	4	1	0	1	1	2	21.5
New Jersey	3	4	0	1	2	1	2	21.5
Connecticut	3	0	1	0	2	1	2	17
Colorado	1.5	1.5	0	1	1	1	1	17
District of Columbia	0	0	0	2	1	1	2	16.5
Maine	4	3	1	2	1	0	2	16
Nevada	0	3	0	0	0	0	2	14.5
Vermont	4	3	0	0	0	0	2	14
Maryland	1.5	0	0	0	1	1	2	14
Washington	1.5	0	0	2	1	1	1	13

State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV Fees (–2 to 2 pts.)	Total Points (36 pts.)
Oregon	4	0	1	0	0	0	1	12
Delaware	3	0	0	0	1	0	2	12
Rhode Island	4	0	1	0	0	0	2	11.5
Florida	0	0	0	0	0	0	2	11.5
Minnesota	0	0	0	0	0	0	1	11
Illinois	3	0	0	0	2	2	0	10.5
New Mexico	0	0	0	0	1	0	2	10.5
Hawaii	0	0	0	1	0	0	1	10
North Carolina	0	0	0	0	1	1	1	9.5
Utah	0	1.5	0	0	1	1	1	9
Virginia	0	0	0	0	0	0	1	9
Missouri	0	0	0	0	0	0	0	8
Michigan	0	0	0	0	0	1	1	7.5
Tennessee	0	0	0	0	1	1	1	7.5
Arizona	0	0	0	0	0	0	2	7

State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV Fees (–2 to 2 pts.)	Total Points (36 pts.)
Montana	0	3	0	0	0	0	2	7
Idaho	0	3	0	0	0	0	0	6
Texas	3	0	0	0	0	0	2	6
Indiana	0	3	0	0	0	0	0	6
Kansas	0	0	0	0	0	0	0	5.5
North Dakota	0	4	0	0	0	0	0	5.5
Ohio	0	3	0	0	0	0	-1	5
Alaska	0	0	0	0	0	0	2	5
Oklahoma	0	0	0	0	1	1	2	5
Alabama	0	3	0	0	1	1	-2	4
Iowa	0	0	0	0	0	0	2	4
New Hampshire	0	0	0	0	0	0	2	4
South Carolina	0	0	0	0	0	0	1	4
Wisconsin	0	1.5	0	0	0	0	1	3.5

State	LD new EV incentives (4 pts.)	HD EV incentives (4 pts.)	Used LD EV Incentives (1 pt.)	Statewide programs and investment for disadvantaged communities (6 pts.)	L2 incentives (2 pts.)	DCFC incentives (2 pts.)	EV Fees (–2 to 2 pts.)	Total Points (36 pts.)
Georgia	0	0	0	0	1	1	-2	3
Kentucky	0	0	0	0	0	0	2	3
South Dakota	0	0	0	0	0	0	2	3
Louisiana	0	0	0	0	0	0	2	2
Nebraska	0	0	0	0	0	0	1	1
West Virginia	0	0	0	0	0	0	0	1
Wyoming	0	0	0	0	0	0	-2	0
Arkansas	0	0	0	0	0	0	-2	-1
Mississippi	0	0	0	0	0	0	-2	-1

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
California	1	1	1	5	2	1	2	1	1	30.5

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
New York	1	1	1	4	2	1	1	1	0	25
Massachusetts	1	1	0	1.5	2	1	2	0.5	1	21.5
Pennsylvania	1	1	0.5	1.5	2	1	1.5	0	0	21.5
New Jersey	1	1	0.5	3	0	1	1	1	0	21.5
Connecticut	1	1	0.5	3	0	1	0.5	1	0	17
Colorado	1	1	1	3	0	1	1	1	1	17
District of Columbia	1	0.5	0.5	2	2	1	1.5	1	1	16.5
Maine	0.5	0	0	0.5	0	1	0	0	1	16
Nevada	1	1	0.5	3	1	1	1	1	0	14.5

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
Vermont	1	0.5	0.5	0	0	1	1	0	1	14
Maryland	1	0.5	0.5	2.5	1	1	1.5	0.5	0	14
Washington	1	0.5	1	1	1	1	0.5	0.5	0	13
Oregon	0.5	0.5	0.5	1	1	1	0	0.5	1	12
Delaware	0.5	0.5	0	0.5	1	1	1	0.5	1	12
Rhode Island	0	0	0	0	0	1	2	0.5	1	11.5
Florida	1	1	1	2.5	1	1	1	0	1	11.5
Minnesota	1	1	0.5	3	2	1	1.5	0	0	11
Illinois	0	0	0	0	0	1	1	0.5	1	10.5
New Mexico	1	1	0.5	3	1	1	0	0	0	10.5

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
Hawaii	0	0.5	0.5	3	0	1	2	0	1	10
North Carolina	0.5	0.5	1	1.5	1	1	0.5	0.5	0	9.5
Utah	0.5	0	0.5	0.5	0	1	0.5	0.5	1	9
Virginia	1	1	1	2	0	1	1	1	0	9
Missouri	1	1	0.5	2	1	1	0	0.5	1	8
Michigan	1	1	0.5	2.5	0	0	0	0.5	0	7.5
Tennessee	0.5	0.5	0	1.5	0	0	1	0	1	7.5
Arizona	1	0	0.5	0.5	0	1	0	1	1	7
Montana	0	0	0	0	0	1	1	0	0	7
Idaho	0	0	0	0	0	1	0.5	0.5	1	6
Texas	0	0	0	0	0	1	0	0	0	6

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
Indiana	0.5	0	0	0	0	1	0.5	0	1	6
Kansas	1	0	0.5	2.5	0	1	0.5	0	0	5.5
North Dakota	0	0	0	0	0	1	0	0.5	0	5.5
Ohio	0.5	0.5	0	0	1	1	0	0	0	5
Alaska	1	0	0	0	0	1	0	0	1	5
Oklahoma	0	0	0	0	0	1	0	0	0	5
Alabama	0	0	0	0	0	1	0	0	0	4
Iowa	0	0	0	0	0	1	1	0	0	4
New Hampshire	0	0	0	0	0	1	0	0	1	4
South Carolina	0.5	0.5	0	1	0	1	0	0	0	4

State	L2 utility incentives (1 pt.)	DCFC utility incentives (1 pt.)	Commercial utility incentives (1 pt.)	Utility spending on EV charging infrastructure inc. (5 pts.)	Util. programs for disadvantaged communities (2 pts.)	EVSE definition exemption (1 pt.)	VW Funds (2 pts.)	Non-financial incentives (1 pt.)	Direct sales (1 pt.)	Total Points (36 pts.)
Wisconsin	0.5	0	0	0.5	0	0	0	0	0	3.5
Georgia	0.5	0.5	0.5	1.5	0	0	0	0	0	3
Kentucky	0	0	0	0	0	1	0	0	0	3
South Dakota	0	0	0	0	0	1	0	0	0	3
Louisiana	0	0	0	0	0	0	0	0	0	2
Nebraska	0	0	0	0	0	0	0	0	0	1
West Virginia	0	0	0	0	0	1	0	0	0	1
Wyoming	0	0	0	0	0	1	0	0	1	0
Arkansas	0	0	0	0	0	1	0	0	0	-1
Mississippi	0	0	0	0	0	0	0	0	1	-1

Util. = utility
Disadvantaged communities = Low- and moderate-income communities, environmental justice communities, and underserved communities

Table A6. Scores for transportation system efficiency for all 50 states and the District of Columbia

State	Sector-wide GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit agencies goals and procureme nt (4 pts.)	State investment for electric transit bus deploymen t (2 pts.)	State require ments for ESB deploym ent (2 pts.)	State investment for ESB deploymen t (2 pts.)	Policies to encourage shared EV fleets (1 pt.)	Total (17 pts.)
California	3	3	4	2	0	1.5	1	14.5
District of Columbia	3	0	4	1	0	0.5	1	9.5
Colorado	2	0	4	2	0.5	1	0	9.5
Maryland	2	0	4	2	1	0	0	9
Massachuse tts	3	0	2	2	0	0.5	1	8.5
Connecticut	0	0	4	1	2	1	0	8
Washington	3	3	0	2	0	0	0	8
New York	0	0	2	2	2	1	0	7
New Jersey	0	0	4	1	0	1	0	6

State	Sector-wide GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State requirements for ESB deployment (2 pts.)	State investment for ESB deployment (2 pts.)	Policies to encourage shared EV fleets (1 pt.)	Total (17 pts.)
Oregon	2	3	0	1	0	0	0	6
Vermont	0	0	4	1	0	0.5	0	5.5
Michigan	0	0	4	1	0	0	0	5
Illinois	0	0	2	1	0	1	0	4
Maine	1	0	0	1	1	1	0	4
Minnesota	2	0	0	1	0	1	0	4
Tennessee	0	0	2	1	0	1	0	4
Arizona	0	0	2	1	0	0.5	0	3.5
Oklahoma	0	0	0	1	0	2	0	3
Virginia	0	0	0	2	0	1	0	3
Louisiana	1	0	0	1	0	0.5	0	2.5
Nevada	0	0	0	1	0	1	0	2

State	Sector-wide GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State requirements for ESB deployment (2 pts.)	State investment for ESB deployment (2 pts.)	Policies to encourage shared EV fleets (1 pt.)	Total (17 pts.)
New Mexico	1	0	0	1	0	0	0	2
Ohio	0	0	0	2	0	0	0	2
South Carolina	0	0	0	1	0	1	0	2
Texas	0	0	0	1	0	1	0	2
Arkansas	0	0	0	1	0	0.5	0	1.5
Georgia	0	0	0	1	0	0.5	0	1.5
Mississippi	0	0	0	1	0	0.5	0	1.5
New Hampshire	0	0	0	1	0	0.5	0	1.5
Rhode Island	0	0	0	1	0	0.5	0	1.5

State	Sector-wide GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State requirements for ESB deployment (2 pts.)	State investment for ESB deployment (2 pts.)	Policies to encourage shared EV fleets (1 pt.)	Total (17 pts.)
West Virginia	0		0	0	0	1.5	0	1.5
Alabama	0	0	0	1	0	0	0	1
Alaska	0	0	0	1	0	0	0	1
Delaware	0	0	0	1	0	0	0	1
Florida	0	0	0	1	0	0	0	1
Hawaii	0	0	0	1	0	0	0	1
Idaho	0	0	0	1	0	0	0	1
Indiana	0	0	0	1	0	0	0	1
Iowa	0	0	0	1	0	0	0	1
Kansas	0	0	0	1	0	0	0	1
Kentucky	0	0	0	1	0	0	0	1
Missouri	0	0	0	1	0	0	0	1

State	Sector-wide GHG goals (3 pts.)	GHG pricing policies (3 pts.)	Transit agencies goals and procurement (4 pts.)	State investment for electric transit bus deployment (2 pts.)	State requirements for ESB deployment (2 pts.)	State investment for ESB deployment (2 pts.)	Policies to encourage shared EV fleets (1 pt.)	Total (17 pts.)
Montana	0	0	0	1	0	0	0	1
Nebraska	0	0	0	1	0	0	0	1
North Carolina	0	0	0	1	0	0	0	1
Pennsylvania	0	0	0	1	0	0	0	1
Utah	0	0	0	1	0	0	0	1
Wisconsin	0	0	0	1	0	0	0	1
Wyoming	0	0	0	1	0	0	0	1
North Dakota	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0

Table A7. Scores for electricity system optimization for all 50 states and the District of Columbia

State	Time-varying rates for L2 chargers (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
California	2	2	1	4	1	10
New York	1	2	1	4	1	9
Colorado	2	2	1	3	1	9
Hawaii	2	2	0.5	3	1	8.5
Tennessee	1	2	0	4	1	8
Vermont	2	0	1	4	0	7
Oregon	2	0	1	4	0	7
Maine	1	2	0	4	0	7
Maryland	2	2	0	3	0	7
Nevada	2	2	0	3	0	7
New Jersey	2	2	0	3	0	7
Minnesota	2	2	0.5	2	0	6.5
Massachusetts	2	0	1	2	1	6
North Carolina	1	0	0	4	1	6
Virginia	2	0	0	3	1	6

State	Time-varying rates for L2 chargers (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
District of Columbia	2	0	0	4	0	6
Washington	0	2	0.5	3	0	5.5
Florida	1	2	1	0	1	5
Connecticut	1	0	0	4	0	5
Delaware	2	0	0	3	0	5
Michigan	2	2	1	0	0	5
Arizona	2	0	0	2	0	4
Illinois	1	0	0	3	0	4
New Mexico	2	0	0	2	0	4
Pennsylvania	0	2	0	2	0	4
Wisconsin	2	2	0	0	0	4
Utah	2	0	1	0	0	3
Alabama	2	0	0	1	0	3
Alaska	2	0	0	1	0	3
Georgia	2	0	0	1	0	3
Kansas	2	0	0	1	0	3

State	Time-varying rates for L2 chargers (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
Nebraska	0	0	0	3	0	3
South Carolina	1	0	0.5	1	0	2.5
Idaho	1	0	0	1	0	2
Indiana	2	0	0	0	0	2
Iowa	1	0	0	1	0	2
New Hampshire	0	0	0	2	0	2
Oklahoma	1	0	0	1	0	2
Rhode Island	0	0	0	2	0	2
Ohio	0	0	1	0	0	1
Arkansas	1	0	0	0	0	1
Kentucky	1	0	0	0	0	1
Louisiana	0	0	0	1	0	1
Montana	1	0	0	0	0	1
North Dakota	1	0	0	0	0	1
South Dakota	0	0	0	1	0	1
Mississippi	0	0	0	0	0	0

State	Time-varying rates for L2 chargers (2 pts.)	DCFC-specific rates (2 pts.)	Managed charging programs (1 pt.)	Electric power sector emissions targets (4 pts.)	Vehicle-to-grid pilot (+1 bonus)	Total (9 pts.)
Missouri	0	0	0	0	0	0
Texas	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0

Table A8. Scores for transportation electrification outcomes for all 50 states and the District of Columbia

State	LD EVs per 100,000 people (4 pts.)	HD EVs per 100,000 people (3 pts.)	L2 stations and L2 ports per 100,000 people (4 pts.)	DCFC stations and DCFC ports per 100,000 people (4 pts.)	EVs in transit bus fleets (2 pts.)	% change in GHG over a 5-year period (4 pts.)	Electric school bus fleets (2 pts.)	Total (23 pts.)
Vermont	3	3	4	3	2	0.5	3	18.5
California	4	4	4	3	2	1	0	18
Washington	3	4	3	3	2	0	0	15
Colorado	3	2	4	3	2	0.5	0	14.5
Maryland	3	2	3	3	1.5	1	0	13.5
District of Columbia	3	3	4	1	2	0	0	13
Hawaii	3	3	3	2	2	0	0	13
Maine	2	0	3	2	0	0.5	4	11.5
Massachusetts	3	1	4	1	2	0.5	0	11.5
Oregon	3	1	3	3	1.5	0	0	11.5
Utah	3	2	3	2	1.5	0	0	11.5
Rhode Island	2	0	4	2	2	0.5	0	10.5
Delaware	2	3	2	1	2	0	0	10
Nevada	3	1	2	2	1.5	0	0	9.5

State	LD EVs per 100,000 people (4 pts.)	HD EVs per 100,000 people (3 pts.)	L2 stations and L2 ports per 100,000 people (4 pts.)	DCFC stations and DCFC ports per 100,000 people (4 pts.)	EVs in transit bus fleets (2 pts.)	% change in GHG over a 5-year period (4 pts.)	Electric school bus fleets (2 pts.)	Total (23 pts.)
New Jersey	3	1	1	1	0.5	0	3	9.5
New York	2	1	3	1	2	0	0	9
Florida	3	0	2	1	2	0.5	0	8.5
Virginia	2	1	2	2	0	0.5	1	8.5
Georgia	2	1	2	2	1	0	0	8
New Mexico	2	2	1	1	2	0	0	8
Wyoming	0	2	1	2	2	0	1	8
Idaho	2	1	1	1	2	0	0	7
Montana	1	2	1	1	1.5	0.5	0	7
Oklahoma	2	0	0	4	0	0	1	7
Arizona	3	0	2	1	0.5	0	0	6.5
Iowa	1	1	1	2	0.5	0	1	6.5
Kansas	1	0	2	0	0.5	0	3	6.5
Connecticut	2	0	2	1	0.5	0.5	0	6

State	LD EVs per 100,000 people (4 pts.)	HD EVs per 100,000 people (3 pts.)	L2 stations and L2 ports per 100,000 people (4 pts.)	DCFC stations and DCFC ports per 100,000 people (4 pts.)	EVs in transit bus fleets (2 pts.)	% change in GHG over a 5-year period (4 pts.)	Electric school bus fleets (2 pts.)	Total (23 pts.)
North Carolina	2	1	2	0	1	0	0	6
North Dakota	0	0	1	1	0	0	4	6
Ohio	2	0	1	1	0.5	0	1	5.5
South Carolina	1	3	1	0	0.5	0	0	5.5
Indiana	1	1	0	0	1	0	2	5
Michigan	2	0	2	1	0	0	0	5
New Hampshire	2	0	2	1	0	0	0	5
Minnesota	2	0	2	0	0.5	0	0	4.5
Illinois	2	0	1	0	1	0	0	4
Tennessee	2	0	1	0	1	0	0	4
Texas	2	0	1	0	1	0	0	4
Alaska	1	0	1	1	0.5	0	0	3.5

State	LD EVs per 100,000 people (4 pts.)	HD EVs per 100,000 people (3 pts.)	L2 stations and L2 ports per 100,000 people (4 pts.)	DCFC stations and DCFC ports per 100,000 people (4 pts.)	EVs in transit bus fleets (2 pts.)	% change in GHG over a 5-year period (4 pts.)	Electric school bus fleets (2 pts.)	Total (23 pts.)
Missouri	1	0	2	0	0.5	0	0	3.5
Nebraska	1	0	1	1	0.5	0	0	3.5
Pennsylvania	2	0	1	0	0	0	0	3
Wisconsin	1	0	1	0	1	0	0	3
Arkansas	0	0	1	0	0	0	0	1
South Dakota	0	0	0	1	0	0	0	1
West Virginia	0	0	1	0	0	0	0	1
Kentucky	0	0	0	0	0.5	0	0	0.5
Louisiana	0	0	0	0	0.5	0	0	0.5
Alabama	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0	0

Appendix B. Planning and Goal-Setting Metrics

Table B1. State EV and EV charging infrastructure plans

State	State EV action plan or multistate memorandum of understanding
Arizona	REV West
California	2016 ZEV Action Plan: An updated roadmap toward 1.5 million zero-emission vehicles on California roadways by 2025 2018 ZEV Action Plan Priorities Update Multi-State ZEV Action Plan
Colorado	Colorado Electric Vehicle Plan 2020 REV West
Connecticut	Electric Vehicle Roadmap for Connecticut Multi-State ZEV Action Plan

State	State EV action plan or multistate memorandum of understanding
Delaware	Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018–2021
District of Columbia	Clean Energy DC DC Transportation Electrification Roadmap
Florida	Florida Electric Vehicle Roadmap Interim Reports
Hawaii	Hawaii Clean Energy Initiative Transportation Energy Analysis Multi-State ZEV Action Plan
Idaho	REV West
Illinois	Illinois Electric Vehicle Advisory Council Final Report Climate and Equitable Jobs Act
Iowa	Charging Forward: Iowa's Opportunities for Electric Vehicle Infrastructure Support

State	State EV action plan or multistate memorandum of understanding
Maine	Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018–2021 EV Roadmap 2021
Maryland	Multi-State ZEV Action Plan
Massachusetts	Massachusetts Zero Emission Vehicle Action Plan Multi-State ZEV Action Plan
Michigan	Optimized EV Charger Placement Plan Michigan Healthy Climate Plan
Minnesota	Accelerating Electric Vehicle Adoption: A Vision for Minnesota 2021 EV Assessment
Montana	REV West

State	State EV action plan or multistate memorandum of understanding
Nevada	Electrifying Nevada's 21st-Century Transportation System: Actions, Opportunities, Aspirations REV West
New Hampshire	Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018–2021
New Jersey	2019 Energy Master Plan Strategies and Goals Multi-State ZEV Action Plan
New Mexico	REV West
New York	Multi-State ZEV Action Plan
North Carolina	North Carolina ZEV Plan: A Strategic Plan for Accelerating Electric Vehicle Adoption in North Carolina North Caroline ZEV Plan: 2022 Progress Update

State	State EV action plan or multistate memorandum of understanding
Oregon	Multi-State ZEV Action Plan Every Mile Counts 2021 Oregon ZEV Action Plan
Pennsylvania	Pennsylvania Electric Vehicle Roadmap Electric Vehicle Roadmap 2021 Update
Rhode Island	State of Rhode Island Zero Emission Vehicle Action Plan Multi-State ZEV Action Plan Electrifying Transportation: A Strategic Policy Guide 2022 Climate Update
Tennessee	A Roadmap for Electric Vehicles in Tennessee
Utah	State of Utah Electric Vehicle Master Plan

State	State EV action plan or multistate memorandum of understanding
	State of Utah Electric Vehicle Master Plan Second Edition REV West
Vermont	Vermont Zero Emission Vehicle Action Plan Multi-State ZEV Action Plan
Virginia	The Commonwealth of Virginia's 2018 Energy Plan
Washington	Washington State Electric Vehicle Action Plan 2015–2020
Wisconsin	REV Midwest
Wyoming	REV West

Sources: ACEEE review of state energy and EV plans, legislative, regulatory and executive actions

Table B2. LD EV adoption goals and ZEV mandates

State	Description
California	Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Adopted Advanced Clean Cars II (ACCII)
Colorado	Colorado Electric Vehicle Plan 2020 includes a LD EV goal of 940,000 by 2030 Updated Comprehensive EV Plan
Connecticut	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle (LEV) Standards Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Multistate ZEV Action Plan
Delaware	In the process of adopting ACCII

State	Description
District of Columbia	The Clean Energy DC Omnibus Amendment Act of 2018 mandates a plan including recommendations for polices to achieve at least 25% ZEV registrations by 2030
Maine	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle (LEV) Standards Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025
Maryland	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle (LEV) Standards Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 In the process of adopting ACCII
Massachusetts	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle (LEV) Standards Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective

State	Description
	target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Adopted ACCII
Minnesota	Rulemaking: Clean Cars Minnesota Accelerating Electric Vehicle Adoption: A Vision for Minnesota includes a goal of powering 20% of the light-duty cars in the state with electricity by 2030
Nevada	Clean Cars Nevada
New Jersey	New Jersey State Department of Environmental Protection New Jersey Air Pollution Control Act Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Multistate ZEV Action Plan

State	Description
	In the process of adopting ACCII
New York	218-4.1 ZEV percentages Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Adopted ACCII
North Carolina	Executive Order Number 80 issues a North Carolina ZEV Plan to increase the number of registered ZEVs in the state to at least 80,000 by 2025
Oregon	Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Adopts ACCII
Rhode Island	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle Standards

State	Description
	Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Multistate ZEV Action Plan
Tennessee	A Roadmap for Electric Vehicles in Tennessee sets a goal to increase LD EVs to at least 200,000 by 2028
Vermont	Zero Emission Vehicle (ZEV) Sales Requirements and Low Emission Vehicle Standards Signatory to the State Zero-Emission Vehicle Programs MOU, which agrees to a collective target of at least 3.3 million zero-emission vehicles on the road in states by 2025 Adopted ACCII

State	Description
Washington	Washington clean car standards Washington State Electric Vehicle Action Plan 2015–2020 contains a goal of 50,000 plug-in electric vehicles by 2020 Adopted ACCII

Sources: ACEEE review of state energy and EV plans, legislative, regulatory and executive actions

Table B3. Utility EV charging infrastructure goals

State	Description
Arizona	Arizona Corporation Commission Decision No. 77289 ordered state utilities to develop long-term, comprehensive statewide TE plan.
California	California Public Utility Commission adopted five-year, statewide TE program for all its utilities.
Colorado	Senate Bill 19-077 requires state regulated electric utilities to develop TE plans.

State	Description
Illinois	SB 2940 requires state regulated electric utilities to submit beneficial electrification plans.
Minnesota	Minnesota Public Utility Commission opened TE workshop and found utility investments to be in the public interest.
Nevada	SB 21-448 requires electric utilities to submit plans to accelerate transportation electrification.
New Mexico	SB 489 requires electric utilities to submit plans to expand transportation electrification every two years.
New York	New York Department of Public Service ordered state-wide TE program for all its utilities.
Oregon	SB 1547 requires electric utilities to submit TE program plans to utility commission.
Tennessee	Tennessee Valley Authority launches EV initiative.
Utah	Utah Public Service Commission required to consider utility TE programs.

State	Description
Vermont	Vermont Public Utility Commission publishes report on role of utilities in TE.
Virginia	Virginia State Corporation Commission Case No. PUR-2020-00051 requires the filing of TE plans by utilities.
Washington	State legislation requires regulated investor-owned utilities to submit TE plans.

Table B4. EV-ready building codes

State	Description
California	California Green Building Standards Code: Residential Mandatory Measures California Green Building Standards Code: Nonresidential Mandatory Measures

State	Description
Colorado	The 2020 City of Boulder Energy Conservation Code
	Boulder County Building Code Amendments
	The Summit Sustainable Building Code
	The Denver Green Code
	Fort Collins 2019 Changes and Revisions to the Amended 2018 International Residential Code
	City of Golden Sustainability Menu
	Lakewood Zoning Ordinance
	City of Aspen Buildings and Building Regulation

State	Description
Connecticut	House Bill No. 5002 of 2019
District of Columbia	Code of the District of Columbia Green Building Requirements.
Hawaii	City and County of Honolulu, Relating to the Adoption of the State Energy Conservation Code
Illinois	Substitute Ordinance by the City Council of the City of Chicago
Massachusetts	Board of Building Regulation and Standards Meeting
New Jersey	Public Law 2021, c. 171
New York	Local Law 130 of 2013
Oregon	Oregon Rule 918-020-0380 Electric Vehicle Ready Parking
Vermont	2019 Vermont Residential Building Energy Standards Commercial Energy Efficiency

State	Description
Washington	WAC 51-50-0427 Section 427—Electric Vehicle Charging Infrastructure

Sources: SWEEP 2020, original research

Appendix C. Incentives for EV Deployment Metrics

Table C1. Purchase incentives for light-duty, heavy-duty, and used EVs

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
Alabama	N/A	N/A	Grant	Varies	N/A	N/A
California	The Clean Vehicle Rebate Project offers as much as $4,500 for a fuel cell electric vehicle, $2,000 toward the purchase of a plug-in electric vehicle (PEV), and	Statewide programs such as the Clean Vehicle Assistance Program, as well as more localized programs such as the Bay Area and Sacramento's Driving Clean	Rebate	$9,000	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	$1,000 toward a PHEV.	Assistance Program, help to make both used and new EVs and home chargers more accessible to low-income purchasers.				
Colorado	The state's PEV Tax Credit provided as much as $4,000 toward the purchase or conversion of a light-duty EV or PHEV, or $2,000 toward the lease of	N/A	Tax credit	$8,000 for purchase; $5,000 for lease	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	a light-duty EV or PHEV in 2020. The credit also provided as much as $5,500 toward the purchase or conversion of LD electric trucks, or $2,750 for lease of LD electric trucks in 2020. The rates decrease over the next several years.					
Connecticut	The state's CHEAPR program provides $500 toward any PHEV,	N/A	N/A	N/A	Rebate	Between $1,125 and $7,500

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	$1,500 toward an EV with a maximum range equal to or exceeding 200 miles, $500 for an EV with a range under 200 miles, and $5,000 for any fuel cell electric vehicle (FCEV).					
Delaware	The state offers a $2,500 rebate for purchasing a new electric vehicle.	N/A	N/A	N/A	N/A	N/A
Idaho	N/A	N/A	Rebate	Varies, with special consideration given	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
				to air quality priority areas		
Illinois	Customers who purchase or lease an EV between July 1, 2022, and June 30, 2026, can earn a rebate of $4,000.	N/A	N/A	N/A	N/A	N/A
Indiana	N/A	N/A	Grant	Not specified	N/A	N/A
Maine	Maine's PEV rebate program provides anywhere from $2,000 to $7,500, depending on the purchaser's	The state's PEV rebate program provides the highest available rebate to purchases made by tribal government	Rebate	Up to $8,000	Rebate	$2,500

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	qualifications and needs.	entities within Maine.				
Maryland	Starting July 1, 2023, EV purchasers who meet eligibility requirements can apply for a tax credit of $3,000.	N/A	N/A	N/A	N/A	N/A
Massachusetts	The Massachusetts Offers Rebates for Electric Vehicles program offers as much as $2,500 toward the purchase of an EV	N/A	Rebate	Up to $90,000	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	for qualifying buyers.					
Montana	N/A	N/A	Grant	Not specified	N/A	N/A
Nevada	N/A	N/A	Grant	Funding amounts vary based on vehicle, applicant, and fuel type.	N/A	N/A
New Jersey	Rebates up to $2,000 or $4,000 are available based on purchase price.	N/A	Voucher	Between $20,000 and $175,000 based on vehicle weight	N/A	N/A
New York	The state's Drive Clean Rebate offers up to $2,000 for purchasing a new EV.	N/A	Voucher	Anywhere between 90–100% of the incremental cost, or up to $140,000 to $385,000	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
				depending on the vehicle type		
North Dakota	N/A	N/A	Grant	38% of non-government project costs and up to 50% of government project costs	N/A	N/A
Ohio	N/A	N/A	Grant	Not specified	N/A	N/A
Oregon	The Clean Vehicle Rebate Program offers rebates of $1,500 or $2,500 depending on the vehicle's battery capacity.	The Charge Ahead Rebate Program offers a $5,000 rebate for residents who live 400% or below of the poverty line.	N/A	N/A	Rebate	$5,000 (Charge Ahead Rebate Program)

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
Pennsylvania	The state offers a $1,500 rebate for purchase of a plug-in hybrid EV, and a $2,000 rebate for an all-electric vehicle.	Eligible low-income customers can receive an additional rebate of $1,000.	Rebate	Between 75–100% of purchase cost, depending on the applicant type	Rebate	$1,500 for a plug-in hybrid EV or $2,000 for an all-electric vehicle
Rhode Island	The state offers a $1,500 rebate for purchasing a new plug-in hybrid EV or $2,500 for a ZEV.	Individuals who participate in a state or federal income-qualified program can earn an additional $2,000 rebate.	N/A	N/A	Rebate	$750 for a used plug-in hybrid EV or $1,500 for a used ZEV
Texas	The state offers rebates up to $2,500 for	N/A	N/A	N/A	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	purchase of EVs and select PHEVs.					
Utah	N/A	N/A	Tax credit	$12,000 in 2023	N/A	N/A
Vermont	The state offers rebates of either $2,500 or $4,000 based on EV purchasers' income level.	Individuals who make $50,000 or less of annual income are eligible for the larger $4,000 rebate.	Grant	Varies based on project	Rebate	25% of the upfront cost, up to $5,000
Washington	The state offers exemptions from the retail sales and use tax when customers purchase an	N/A	N/A	N/A	N/A	N/A

State	State purchase incentive for LD EVs	Additional incentives for low-income, environmental justice, and disadvantaged communities	State purchase incentive for HD EVs	How much of the upfront cost does it offset for purchase of these vehicles?	State purchase incentive for used EVs	How much of the upfront cost does it offset for purchase of these vehicles?
	alternative fuel vehicle.					
Wisconsin	N/A	N/A	Rebate	Varies, only applicable to transit buses	N/A	N/A

Source: Alternative Fuels Data Center 2023

Table C2. Statewide investment and programs prioritizing low-income, economically distressed, or environmental justice communities

State	Program	Description
California	California Climate Investments	At least 35% of California Climate Investments must benefit disadvantaged communities, low-income communities, and low-income households, also known as priority populations.
	Our Community CarShare Sacramento	Our Community CarShare is a community pilot program of the Sacramento Metropolitan Air Quality Management District, funded by California Climate Investments, a statewide initiative that puts billions of cap-and-trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment, particularly in disadvantaged communities. The program currently operates in seven lower-income communities in the Sacramento region.
	BlueLA CarSharing from Blink Mobility	BlueLA CarSharing is an electric vehicle sharing program run by Blink Mobility that serves low-

State	Program	Description
		income communities of Los Angeles. It began as a pilot funded by a grant awarded from CARB through California Climate Investments.
	[Lift Line]	The Lift Line Paratransit Dial-a-Ride Electric Vehicle Transition Project is part of California Climate Investments. Community Bridges operates the program, which provides 60,000 door-to-door rides a year to seniors and people with disabilities. Two existing gas-powered shuttles will be replaced with two 16-seat EV shuttles equipped with wheelchair lifts, making Lift Line the first public transportation entity to utilize EVs across Santa Cruz County.
	[Clean Vehicle Assistance Program]	The Clean Vehicle Assistance Program provides grants and affordable financing to help income-qualified Californians purchase or lease a new or used hybrid or electric vehicle. Its goal is to make clean vehicles accessible and affordable to all who qualify. The program is funded by California Climate Investments.
	[Clean Cars 4 All]	The Clean Cars 4 All program helps get lower-income consumers into cleaner-technology

State	Program	Description
		vehicles by retiring their older, higher-polluting vehicles and upgrading to a cleaner one.
	Clean Mobility Options Voucher Pilot Program	The Clean Mobility Options Voucher Pilot Program provides voucher-based funding for zero-emission car-sharing, carpooling/vanpooling, bike-sharing/scooter-sharing, innovative transit services, and ride-on-demand services in California's historically underserved communities. The program is funded by California Climate Investments.
Colorado	Colorado EV Plan 2020	As outlined in Colorado's EV Plan 2020, state agencies will work to ensure that all Coloradans have access to the benefits of transportation electrification.
	Colorado Clean Transit Enterprise: 10 Year Plan	This plan describes how Colorado's Clean Transit Enterprise will reduce and mitigate the adverse environmental and health impacts of air pollution and greenhouse gas emissions produced by retail deliveries through enabling the widespread adoption of zero-emission transit vehicles, including charging/fueling infrastructure, facility modifications, and planning studies. The plan uses advancing equity in disproportionately impacted

State	Program	Description
		communities as a prioritization factor for limited project funds.
	Colorado Community Access Enterprise: 10 Year Plan	The Community Access Enterprise is created to serve the primary business purpose of equitably reducing and mitigating the adverse environmental and health impacts of air pollution and greenhouse gas emissions produced by motor vehicles used to make retail deliveries to consumers within local communities. This 10-year plan outlines equity considerations for program development and equity-focused key performance indicators to measure its progress.
District of Columbia	Clean Energy DC Act	The Clean Energy DC Act calls for the vehicle excise tax formula to be revised to incentivize electric and fuel-efficient vehicles over less efficient vehicles, with certain provisions to protect low- and middle-income residents.
Hawaii	EV Charging Station Rebate Program Authorization	The Hawaii Public Utility Commission (PUC) is authorized to establish an EV charging station rebate program. The PUC must prioritize rebate awards for certain EV charging stations, including

State	Program	Description
		those that serve low- or moderate-income or environmental justice communities.
	EV Charging Station Rebates	Hawaii Energy offers bonus incentives of up to $5,000 to existing or new affordable housing facilities for AC Level 2 multiport EV charging stations.
Massachusetts	Zero Emission Transit Bus Deployment Plans	The Massachusetts Bay Transportation Authority capital investment program for mass transportation must include a five-year rolling plan to prioritize the deployment of zero-emission buses on routes that service underserved and low-income communities.
	E4TheFuture EV Car Sharing Program	Funded via the Massachusetts Clean Energy Center as part of its Accelerating Clean Transportation Now initiative, this pilot program deploys an income-tiered and equity-focused electric vehicle carshare program in Boston, Massachusetts.
Maine	Clean Energy and Sustainability Accelerator (Legislative Document 1659)	Efficiency Maine administers the Maine Clean Energy and Sustainability Accelerator to provide loans for qualified alternative fuel vehicle projects, including the purchase of electric vehicles.

State	Program	Description
		Recipients must direct 40% of funds toward low-income communities and communities of color.
New Jersey	New Jersey Energy Master Plan	Goal 6.3 of the New Jersey Energy Master Plan: prioritize clean transportation options in low- and moderate-income and environmental justice communities.
New York	EV Make Ready	New York's EV Make-Ready initiative includes $206 million set aside to benefit low-income and disadvantaged communities.
Washington	Washington House Bill 2042: Advancing Green Transportation Adoption	Washington HB2042 includes funds to develop a grant pilot program to support clean alternative fuel car sharing in underserved communities and for low- to moderate-income members of the workforce not readily served by transit or located in transportation corridors with emissions that exceed federal or state emissions standards.

Source: ACEEE review of state offered EV programs

Table C3. State incentives for L2 chargers*

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
Alabama	The Electric Transportation Infrastructure Grant Program offered by the state's Department of Transportation may cover any amount of potential costs associated with purchase and installation of EV charging infrastructure.	N/A
California	The California Electric Vehicle Infrastructure Project helps property owners fund incentive programs for installing ENERGY-STAR-certified L2 chargers.	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
Colorado	The Colorado Energy Office and Regional Air Quality Council administer grants for EV charging infrastructure throughout the state. Maximum amounts differ based on type of charging station.	N/A
Connecticut	The state's Department of Energy and Environmental Protection offers grants to both public and private entities for purchasing, installing, and maintaining EV charging stations.	Projects located in environmental justice communities will receive priority attention.
Delaware	L2 charger rebates of up to $3,500 are	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	available through the Delaware Clean Transportation Incentive Program.	
District of Columbia	The AFV Conversion and Infrastructure Tax Credit covers up to 50% of the equipment and labor costs for the purchase and installation of AFV infrastructure. Maximum credits of $1,000 and $10,000 are available for each residential or public charging station project, respectively.	N/A
Georgia	The state offers a tax credit for 10% of the	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	cost of the EV charging station, up to $2,500.	
Illinois	The state EPA offers rebates that may cover up to 80% of the eligible project cost for installing and maintaining Level 2 chargers.	There are additional rebates for EV charging stations installed in underserved or environmental justice communities.
Maine	Purchase and installation of strategically located L2 chargers may be funded through the Efficiency Maine Trust.	N/A
Maryland	A rebate covering up to 40% of EV charging infrastructure purchase and installation with variable maximum	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	funding cutoffs is available through the Maryland Energy Administration.	
Massachusetts	The state's MassEVIP program helps fund public EV charger and EV charging infrastructure projects.	N/A
New Jersey	Reimbursement grants, available on a first come, first served basis, cover the cost and installation of qualifying EV charging infrastructure projects.	For multi-unit dwellings located in overburdened municipalities, a grant of $6,000 is available for installing an L2 charger (compared to $4,000 for a standard grant).
New Mexico	The New Mexico Environmental Department may fund up to 100% of the cost	NA

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	of purchase, installation, and maintenance.	
New York	The New York State Energy Research and Development Authority's (NYSERDA) offers $4,000 rebates per installation of L2 charging stations.	An additional $500 rebate is available for charging stations installed in disadvantaged communities.
North Carolina	The North Carolina Department of Environmental Quality offers grants for installing L2 charging stations.	N/A
Oklahoma	Competitive grants worth up to 80% of project costs for eligible public EV charging	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	infrastructure projects may be available.	
Pennsylvania	The state offers a rebate program for L2 EV charging infrastructure projects.	N/A
Tennessee	EV charging infrastructure funding is available through the state's Department of Environment and Conservation.	N/A
Utah	Rebates covering 50% of total project costs at a maximum total value of $75,000 are available for EV charging infrastructure projects through the state's	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	Department of Environmental Quality.	
Washington	EV charging infrastructure projects with potential to bolster the West Coast Electric Highway network are eligible for competitive grant funding through the state's Department of Transportation.	N/A

*** Any program that was in operation at the time of data collection for this Scorecard was given consideration in our scoring and in this appendix, regardless of funding sources. Source: Alternative Fuel Data Center 2023.**

Table C4. State incentives for DCFC chargers*

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
Alabama	The state DOT has grant money available for EV charging infrastructure through its Electric Transportation Infrastructure Grant Program.	N/A
California	The California Electric Vehicle Infrastructure Project provides funding for property owners to develop	Additional rebates are available for chargers installed in disadvantaged communities.

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	incentives for installing DCFC chargers.	
Colorado	The Colorado Energy Office administers the Charge Ahead Colorado program, which provides grants for EV charging infrastructure throughout the state.	N/A
Connecticut	The Connecticut Department of Energy and Environmental	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	Protection can fund 60–65% of the cost of purchasing, installing, and maintaining a DCFC charging station. Funding varies by applicant type.	
District of Columbia	The District's AFV Conversion and Infrastructure Tax Credit covers up to 50% of the equipment and labor costs for the purchase and installation of AFV infrastructure.	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
Georgia	The state offers a 10% tax credit (up to $2,500) for installing a qualified EV charging station.	N/A
Illinois	The state EPA offers rebates for the installation of DCFC EV charging infrastructure.	Additional rebates are available for chargers installed in disadvantaged or environmental justice neighborhoods.
Maryland	A rebate covering up to 40% of EV charger and infrastructure purchase and installation costs with variable	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	maximum funding cutoffs is available through the Maryland Energy Administration.	
Michigan	Grants available for the installation of DCFC chargers. Grant amounts would be the lesser of 33.3% of the total cost or a direct match of the amount the electric utility is paying, up to $70,000	N/A
New Jersey	Grants of up to $50,000 are	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	available for installation of a DCFC charger.	
North Carolina	The state's Department of Environmental Quality provides funding for DCFC charger projects through its Zero-Emission Vehicle Direct Current Fast Charge Infrastructure Program.	N/A
Oklahoma	Competitive grants worth up to 80% of eligible project costs	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	for DCFC public charging projects are available.	
Pennsylvania	The state offers a grant of up to $250,000 for DCFC charging infrastructure projects.	N/A
Tennessee	The state offered $5.2 million in total grant funding, split between twelve different recipients, to install DCFC charging units.	N/A
Utah	Rebates covering 50% of total project	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	costs at a maximum total value of $75,000 are available for EV charging infrastructure projects through the state's Department of Environmental Quality.	
Washington	EV charging infrastructure projects with potential to bolster the West Coast Electric Highway network are eligible for competitive	N/A

State	State purchase incentive	Does the state offer additional incentives for low income, environmental justice, and disadvantaged communities?
	grant funding through the state's DOT.	

*** Any program that was in operation at the time of data collection for this Scorecard effort was given consideration in our scoring and in this appendix regardless of funding sources. Source: Alternative Fuels Data Center 2023.**

Table C5. EV fees

State	Annual EV fee amount	Average gasoline tax revenue for a passenger vehicle	Ratio of EV fee to gas tax revenue
Alabama	$200.00	$80.03	250%
Alaska		$27.81	0%
Arizona		$75.09	0%
Arkansas	$200.00	$87.16	229%
California	$100.00	$181.33	55%
Colorado	$50.00	$89.30	56%
Connecticut		$103.95	0%
Delaware		$113.50	0%
District of Columbia		$101.99	0%
Florida		$79.03	0%
Georgia	$213.00	$124.17	172%

State	Annual EV fee amount	Average gasoline tax revenue for a passenger vehicle	Ratio of EV fee to gas tax revenue
Hawaii	$50.00	$72.70	69%
Idaho	$140.00	$132.31	106%
Illinois	$100.00	$81.25	123%
Indiana	$150.00	$122.98	122%
Iowa	$65.00	$133.20	49%
Kansas	$100.00	$99.29	101%
Kentucky		$122.77	0%
Louisiana		$92.08	0%
Maine		$136.76	0%
Maryland		$154.75	0%
Massachusetts		$105.05	0%
Michigan	$100.00	$122.75	81%
Minnesota	$75.00	$137.04	55%

State	Annual EV fee amount	Average gasoline tax revenue for a passenger vehicle	Ratio of EV fee to gas tax revenue
Mississippi	$150.00	$83.57	179%
Missouri	$75.00	$74.50	101%
Montana		$113.00	0%
Nebraska	$75.00	$137.91	54%
Nevada		$103.83	0%
New Hampshire		$110.18	0%
New Jersey		$166.78	0%
New Mexico		$71.77	0%
New York		$106.44	0%
North Carolina	$130.00	$159.46	82%
North Dakota	$120.00	$96.54	124%

State	Annual EV fee amount	Average gasoline tax revenue for a passenger vehicle	Ratio of EV fee to gas tax revenue
Ohio	$200.00	$124.03	161%
Oklahoma		$85.44	0%
Oregon	$110.00	$115.59	95%
Pennsylvania		$249.58	0%
Rhode Island		$152.38	0%
South Carolina	$60.00	$81.60	74%
South Dakota		$125.11	0%
Tennessee	$100.00	$111.02	90%
Texas		$96.13	0%
Utah	$90.00	$111.64	81%
Vermont		$134.98	0%
Virginia	$64.00	$70.75	90%

State	Annual EV fee amount	Average gasoline tax revenue for a passenger vehicle	Ratio of EV fee to gas tax revenue
Washington	$150.00	$190.66	79%
West Virginia	$200.00	$169.78	118%
Wisconsin	$100.00	$142.37	70%
Wyoming	$200.00	$101.06	198%

Source: Atlas Public Policy 2022a

Table C6. Utility incentive offerings for L2 chargers—approved programs

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
Alaska	Alaska Electric Light & Power		•	•		AEL&P provides incentives for privately owned L2 and offers on-bill financing and rebates of up to $1,000.
Arizona	Arizona Public Service Co., Tucson Electric Power		•	•		Both utilities offer incentives for prewiring homes to be EV ready, as well as a discount of up to $750 per charging station.
California	Bear Valley, Pacific Gas & Electric, Southern California Edison (SCE), San Diego Gas & Electric, Liberty Utilities	•	•	•	•	A wide range of incentives include PG&E's point-of-sale incentive for residential L2, SCE make-ready rebates for qualifying customer-side infrastructure, Bear Valley public L2 make-ready projects.
Colorado	Black Hills Energy, Xcel Colorado	•	•	•	•	Both utilities offer customer-side incentives and Xcel CO offers a wide range including a focus on multi-unit dwellings.

[36] Utilities were considered eligible if they were state regulated (i.e., investor owned) and sold more than 100,000 MWh in 2019. One exception is the Tennessee Valley Authority, which is federally regulated.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
Connecticut	Eversource CT, United Illuminating Co.		•	•		Both offer make-ready investments as well as upfront incentives for chargers, including $500 for single-family residences.
Delaware	Delmarva Power				•	In 2019 Delmarva was approved to install utility-owned smart L2 chargers within select neighborhoods in Delmarva's Delaware service territory.
District of Columbia	Potomac Electric (PEPCO)	•			•	In 2019 PEPCO agreed to install make-ready public smart L2 charging stations, at least 20% of them in disadvantaged communities.
Florida	Duke Energy Florida, Florida Power & Light, Tampa Electric		•		•	Duke Energy Florida's utility-owned EVSE pilot will install 500 L2 chargers in MUDs, at workplaces, and in public settings. Tampa Electric will pay up $5,000 per port for workplace, retail, and multi-unit dwelling charging.
Georgia	Georgia Power Co.			•		Georgia Power offers a $250 incentive to customers who install L2 charging in their homes and provides a $100 incentive for prewiring garages for L2 outlets.
Indiana	Duke Energy Indiana, Indianapolis Power &	•				In 2015 Indianapolis Power & Light was approved to invest $3.7 million in equipment upgrades and line extensions to support EV car-sharing programs.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
	Light, Indiana Michigan Power					
Kansas	Evergy		•	•	•	The KCPL Clean Charge Network Project was launched in 2018 to install 264 utility-owned L2 chargers in the service territory. In 2021 Evergy (formerly KCPL) was approved to offer commercial EV charger rebates of up to $500 per outlet.
Maine	Emera Maine, Central Maine Power	•				In 2020 the Maine PUC approved $240,000 in make-ready investment for L2 charging by CMP.
Maryland	Baltimore Gas & Electric, Delmarva Power, Potomac Electric Co.	•	•	•	•	As part of a statewide transportation electrification initiative, BGE, Delmarva, and PEPCO were approved in 2019 to invest in L2 charging rebates and infrastructure for residential customers, including MUDs.
Massachusetts	Eversource, National Grid	•	•	•		In 2017 Eversource was approved to invest $45 million in charging infrastructure expansion projects to support public, workplace, and MUD L2 charging. National Grid's $20 million program, approved in 2018, offers rebates, line extensions, and make-ready investment.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
Michigan	Consumers Energy, DTE Energy	•	•	•	•	In 2019 Consumers Energy was approved to offer rebates of up to $5,000 per charger for public, workplace, and MUD L2 projects, with a limit of 200 chargers total. DTE offered $500 residential rebates for "smart" EV chargers, conditioned on adoption of a TOU rate. DTE also provided a make-ready program for public-facing L2 charging.
Minnesota	Xcel Energy, Otter Tail Power			•	•	Otter Tail Power offers a $400 rebate to customers who install L2 chargers in qualified service locations. Xcel Energy was approved in 2018 for a $9 million public charging program that saw installation of L2 and DCFC service equipment in public transportation hubs.
Missouri	Ameren, Evergy, Kansas City Power & Light		•	•	•	In October 2019 Ameren's $6 million investment plan was approved. It includes public, MUD, and workplace charging infrastructure and rebates.
Nevada	Nevada Power		•	•	•	A demonstration program was approved in 2018 with a total budget of $380,000. Nevada Power offers rebates of $3,000 for L2 chargers that support more than one vehicle.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
New Jersey	Atlantic City Electric Co, Jersey Central Power and Light, PSE&G	•	•			Atlantic City Electric will offer make-ready rebates of up to $1,000 on smart L2 chargers or up to $5,000 per smart port in multi-unit dwellings.
New Mexico	Public Service Co. of NM, Xcel Energy NM		•		•	Xcel Energy NM offers up to $500 for home charging upgrades.
New York	Con Ed, National Grid, New York State Electric & Gas, Rochester Gas & Electric, Orange & Rockland, Central Hudson Gas & Electric	•	•	•		As part of a statewide program, in 2020 New York utilities offered to cover up to 90% of the make-ready costs for L2 units that meet certain access or eligibility requirements, and 100% of costs for MUDs and LMI or EJ communities.
North Carolina	Duke Energy Carolinas, Duke Energy Progress				•	In December 2020 the Duke utilities were approved for statewide investment in utility-owned EVSE, including 50 L2 chargers at MUDs in their service territories.
Ohio	Ohio Power, Duke Energy Ohio, Ohio Edison, Toledo Edison			•		In 2018 the state PUC approved Ohio Power's $5 million rebate program focused on public EV charging, workplace charging, and MUDs.
Oregon	Portland General Electric, Pacific Power				•	The Oregon utilities were approved in 2018 to undertake several public charging pilots with utility-owned infrastructure, outreach, and education.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
Pennsylvania	PECO Energy, West Penn Power, Duquesne Light	•	•	•	•	In 2018 Duquesne Light's $1.65 million EV investment plan was approved. It covers 65 make-ready public L2 chargers per year until 2022 and a $60 one-time bill credit for EV owners who register with Duquesne Light.
South Carolina	Duke Energy Carolinas			•		In 2020 Duke Carolinas was approved to run a pilot for up to 400 residential customers, offering a rebate for L2 charging equipment in exchange for participating in load management programs.
Tennessee	Knoxville Utilities Board	•				KUB offers residential customers a rebate of up to $400 for the purchase and installation of a L2 charger.
Utah	Pacificorp, Rocky Mountain Power			•		In 2019 RMP was approved to offer residential L2 charger rebates from $200 up to 75% of total charger/installation cost.
Vermont	Green Mountain Power			•	•	GMP provides an L2 charger at no cost ($600 value) with proof of purchase of a new or used EV. The utility is building out a statewide network of utility-owned chargers.
Virginia	Dominion, Appalachian Power		•	•		In 2019 Dominion was approved for $5.9 million of investment in rebates for make-ready infrastructure and EV charging infrastructure for MUD L2 stations.

State	Eligible utilities[36]	Utility side	Customer side	EVSE	Utility owned	Program description
Washington	Puget Sound Energy, Pacificorp, Avista		•	•		Puget Sound Energy offers several approved programs and financial incentives, including a $500 incentive for new EVs, a residential charging and off-peak pilot program that covers the cost of L2 chargers and up to $2,000 of installation cost for "smart" grid-integrated EV charging equipment, and a MUD /public charging pilot program. Avista offers customer rebates for wiring-related costs of EV charging infrastructure installation, up to $1,000 for residential and $2,000 for nonresidential customers.

Source: Atlas Public Policy 2023

Table C7. Utility incentive offerings for DCFC chargers—approved programs

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
California	Bear Valley, Pacific Gas & Electric, Southern California	•	•	•	•	A wide range of incentives for DCFC chargers exist, including make-ready and utility-owned programs from PG&E, SCE, and

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
	Edison, San Diego Gas & Electric, Liberty Utilities					Liberty Utilities. PG&E’s offerings include on- and off-grid charging ports at public parks. SCE offers a make-ready program with a 30% carve-out for underserved communities.
Colorado	Black Hills Energy, Xcel CO	•	•	•	•	Xcel CO will develop and own DCFC stations in rural and low-traffic areas where the private market will not develop. Black Hills Energy will also offer incentives for privately-owned DCFC chargers.
Connecticut	Eversource CT, United Illuminating Co.	•	•	•		Both utilities were authorized to have a DCFC make-ready program along transportation corridors and other high-traffic locations.

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
Delaware	Delmarva Power				•	In 2019 Delmarva Power was authorized to install utility-owned DCFC charging stations in its service area, to be powered through 100% renewable electricity.
District of Columbia	Potomac Electric				•	As part of its 2019 Transportation Electrification initiative, PEPCO plans to install 20 DCFC stations in public destinations, 20% of them in "disadvantaged" areas.
Florida	Duke Energy Florida, Florida Power & Light		•	•	•	Duke Energy Florida's transportation electrification pilot includes 30 utility-owned DCFC units located at fast-charge depots.
Georgia	Georgia Power				•	In its 2019 rate case, Georgia power was

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						approved to install, own, and operate EV charging islands at public sites.
Hawaii	Hawaiian Electric				•	In 2019 the utility was approved to own and operate four DCFC charging stations as part of its EVohana network.
Maryland	Baltimore Gas & Electric, Delmarva Power, Potomac Electric Co.				•	As part of a statewide electrification plan, all three utilities were approved in 2019 to install utility-owned DCFC charging stations at strategically located destinations throughout Maryland.
Massachusetts	Eversource, National Grid	•	•	•		Eversource's 2017 public EV infrastructure investment plan supports up to 72 DCFC stations, with 10% designated for environmental justice

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						communities. National Grid's 2018 plan invests in 80 DCFC stations in public, workplace, and MUD locations.
Michigan	Consumers Energy, DTE Energy	•	•	•	•	Consumers Energy was approved in 2019 to invest $4.2 million in its Power MiDrive program, which includes 24 DCFC stations. DTE Energy offers a rebate program for public DCFC ports along highway corridors and showcase locations, providing rebates for service connection and supply infrastructure costs.
Minnesota	Xcel Energy, Minnesota Power, Otter Tail Power	•	•		•	In 2019 Xcel Minnesota was approved for a multiyear pilot for DCFC make-ready and utility-owned chargers, focused on infrastructure

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						for DCFC-capable EV mobility hubs in partnership with the cities of Minneapolis and St. Paul.
Missouri	Ameren, Evergy, Kansas City Power & Light		•	•		Ameren's 2019 transportation electrification plan focuses on providing $7 million in incentives for public DCFC charging stations across the service territory, including up to $360,000 in direct financial incentives for sites with a capacity of more than 150 kW.
Nevada	Nevada Power		•	•	•	Nevada Power's 2018 EV infrastructure demonstration project includes $900,000 in direct financial incentives for DCFC charging stations.

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
New Jersey	Atlantic City Electric, Jersey Central Power and Light, PSE&G	•	•			All three utilities were approved to offer make-ready DCFC incentives, including PSE&G to cover up to $25,000 per port for up to 1,200 ports.
New Mexico	Public Service Co. of NM, Xcel NM	•	•		•	Xcel NM will offer make-ready incentives for public DCFC charging stations and a limited number of utility-owned DCFC stations in underserved and rural areas.
New York	Con Ed, National Grid, New York State Electric & Gas, Rochester Gas & Electric, Orange & Rockland, Central	•	•	•		Multiple programs exist as of July 2020, including all regulated utilities offering an incentive for up to 100% of DCFC make-ready expenses for site interconnection and infrastructure costs. NY State E&G offers annual

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
	Hudson Gas & Electric					incentive payments to customers operating a DCFC station. Orange & Rockland offers a per-plug DCFC incentive for stations receiving service on a demand-based tariff.
North Carolina	Duke Energy Carolinas, Duke Energy Progress				•	In 2020 the Duke utilities were approved to install and operate 40 DCFC stations across their service territories.
Ohio	Ohio Power, Duke Energy Ohio, Ohio Edison, Toledo Edison			•		In 2018 Ohio's PUC approved AEP Ohio (Ohio Power) to create incentives for 75 DCFC stations throughout its service territory, including 10% in disadvantaged/LMI communities.
Oregon	Portland General			•	•	In 2018 the Oregon PUC approved Pacificorp to

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
	Electric, Pacificorp					invest $4.6 million in three pilot programs that include 28 DCFC stations.
Pennsylvania	PECO Energy, West Penn Power, Duquesne Light		•	•		In Duquesne Light's 2018 rate filing, the utility was approved to invest $500,000 in 15 DCFC stations, with 10% earmarked for underserved communities.
Tennessee	Tennessee Valley Authority		•			TVA will spend about $15 million in cooperation with the Tennessee Department of Environment and Conservation to develop DCFC chargers along interstates and major highways.
Vermont	Green Mountain Power				•	Green Mountain is building out a network of utility-owned DCFC chargers as part of its statewide

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						transportation electrification plan.
Virginia	Dominion, Appalachian Power		•	•		In 2019 Dominion was approved for $5.9 million of investment in rebates for make-ready infrastructure and charging infrastructure for public DCFC stations.
Washington	Puget Sound Energy				•	As part of its transportation electrification pilot that was approved in 2018, the utility will select and install public DCFC stations in certain locations on an as-needed basis, with up to four DCFC chargers per site.

Source: Atlas Public Policy 2023

Table C8. Utility EV charging infrastructure incentive offerings for commercial charging (fleets)—approved programs

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
Arizona	Arizona Public Service Co., Tucson Electric Power			•		Tucson Electric was approved in 2019 for $450,000 in its Smart City EV Buildout Plan, focused on supporting electrification of fleet vehicles, and $663,000 for its Smart School EV Bus Pilot program. Arizona Public Service Co. offers a similar pilot to a limited number of school districts.
California	Bear Valley, Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Liberty Utilities	•	•	•	•	Many programs exist, including PG&E's 2017 Transportation Electrification Pilot for Schools and Parks; SCE's 2020 Charge Ready 2 Infrastructure program; and

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						SDG&E's make-ready investments for medium-duty/heavy-duty charging infrastructure at 50% of EV charger cost, with 30% reserved for disadvantaged communities.
Colorado	Xcel Energy		•	•	•	Xcel's fleet program provides potential studies and assessments for commercial fleets with five vehicles or more. Additional fleet electrification plans are pending approval by the state PUC.
Connecticut	Eversource CT, United Illuminating Co.	•	•			Both utilities were approved for a make-ready program to support light-duty

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						fleets, including government fleets and workplace charging.
District of Columbia	Potomac Electric				•	In 2019 PEPCO was approved to invest $540,000 in charging infrastructure to service electric commuter buses.
Florida	Duke Energy Florida, Florida Power and Light, Tampa Electric	•		•	•	Florida Power and Light was approved to own and operate chargers for fleets with a fixed monthly rate to cover these services.
Georgia	Georgia Power				•	Georgia Power was approved in 2019 to invest in its own fleet charging services for company-owned vehicles, which are also available to the

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						public for community charging.
Kansas	Evergy		•			Evergy offers a rebate to offset customer-side costs for fleet customers.
Maryland	Baltimore Gas and Electric, Delmarva Power, PEPCO MD		•			Baltimore Gas and Electric will offer rebates up to $30,000 per location for fleet operators and Delmarva and PEPCO will both cover 50% of station costs up to a total budget of $750,000.
Michigan	Consumers Energy, DTE Energy	•	•			DTE Energy's eFleets program was approved for $13.4 million in 2021, focusing on schools and other categories of fleets. The program

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						provides make-ready rebates for service connection and EV charging infrastructure costs, as well as Fleet Advisory Services.
Minnesota	Xcel Energy Minnesota, Otter Tail Power	•	•			Xcel offers a fleet EV service pilot to nonresidential customers including LD and MHD vehicles
Missouri	Ameren, Evergy			•		In 2019 Ameren was approved by the state PSC for its Charge Ahead EV Program, providing $2 million in incentives for workplace L2 chargers for fleet vehicles.
Nevada	Nevada Power			•		$150,000 out of Nevada Power's $4 million EVID program is allocated for

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						incentives for fleet and residential charging stations.
New Jersey	Atlantic City Electric	•	•			Atlantic City Electric was approved to cover 50% of make-ready costs up to $2,500 per port.
New Mexico	Public Service Co. of NM (PNM)		•			PNM was approved for a budget of $450,000 to support workplace charging and fleets hoping to electrify.
New York	Con Ed, National Grid, New York State Electric & Gas, Rochester Gas & Electric, Orange & Rockland, Central Hudson Gas & Electric	•	•	•		All New York utilities are running medium- and heavy-duty make-ready pilots, which provide incentives for private owners of EV fleets by covering up to 90% of utility-side make-ready costs.

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						Additionally, in 2020 the New York PSC directed all state-regulated utilities to establish the Transit Authority Make-Ready Program, working with transit agencies to achieve 25% electrification by 2025.
Pennsylvania	Duquesne Light, PECO Energy	•	•			Duquesne Light's approved make-ready program includes fleet charging and will cover 50% of customer-side costs.
Virginia	Dominion, Appalachian Power	•		•		In Dominion Energy's 2019 rate case with the Virginia PSC, it was approved for $3.15 million in spending on make-ready

State	Eligible utilities	Utility side	Customer side	EVSE	Utility owned	Program description
						infrastructure for transit buses.
Washington	Puget Sound Energy, Pacificorp, Avista			•		In 2018 Pacificorp was approved for a competitive grant program for nonresidential customers to construct EV charging infrastructure, with 25% of funds to serve low-income customers.

Source: Atlas Public Policy 2023

Table C9. Utility spending on EV charging infrastructure incentives

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
Alabama	Alabama Power	–	–	–	1,510,098
Alaska	Alaska Electric Light & Power	–	–	–	34,824
Arizona	Arizona Public Service Co., Tucson Electric Power, Salt River Project	$950,000	–	-	5,711,362
Arkansas	Entergy Arkansas	–	–	–	727,735
California	Bear Valley, Pacific Gas & Electric, Southern California Edison, San Diego Gas &	$639,280,878 $1,355,462,616	$270,833,017	$372,420,000	27,755,396

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	Electric, Liberty Utilities				
Colorado	Xcel Colorado, Black Hills Energy	$76,586,869	–	–	1,635,237
Connecticut	Eversource CT, United Illuminating Co.	$59,462,434	–	–	1,532,398
Delaware	Delmarva Power	$270,000	–	–	574,888
District of Columbia	Potomac Electric	$2,847,500	–	–	549,960
Florida	Duke Energy Florida, Florida Power & Light, Tampa Electric	$211,912,880	$27,500	–	15,832,518

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
Georgia	Georgia Power Co.	$19,200,000	–	–	5,315,898
Hawaii	Hawaiian Electric Co.	$4,515,000	–	$57,570,000	615,300
Idaho	Idaho Power Corp.	–	–	–	526,547
Illinois	Ameren IL, Com Ed	–	–	–	5,323,828
Indiana	Duke Energy Indiana, Indianapolis Power & Light, Indiana Michigan Power	–	–	–	1,839,510
Iowa	MidAmerican Energy,	–	–	–	713,409

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	Interstate Power & Light				
Kansas	Evergy	$11,550,000	–	$100,000	1,987,244
Kentucky	Kentucky Utilities, Duke Energy Kentucky, Louisville Gas & Electric	–	–	–	572,773
Louisiana	Entergy LA, Cleco Power, Southwestern	–	–	–	1,106,510
Maine	Emera Maine, Central Maine Power	$240,000	–	–	1,105,722
Maryland	Baltimore Gas & Electric, Delmarva	$48,376,964	–	$2,562,000	4,916,638

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	Power, Potomac Electric Co.				
Massachusetts	Eversource, National Grid	–	–	$356,987,600	5,641,472
Michigan	Consumers Energy, DTE Energy	$44,282,000	–	$24,375,000	8,241,110
Minnesota	Xcel Energy, Minnesota Power	$38,579,091	–	$325,090,000	5,740,818
Mississippi	Entergy MS, Mississippi Power	–	–	–	634,532
Missouri	Ameren, Evergy	$11,087,500	$400,000	$12,800,000	3,088,386
Montana	Northwestern	–	–	–	375,201

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
Nebraska	NA	–	–	–	NA
Nevada	Nevada Power	$91,125,000	–	–	1,969,540
New Hampshire	Public Service Co. of New Hampshire	–	–	–	399,340
New Jersey	Public Service Electric & Gas, Jersey Central Power & Light, Atlantic City Power	$199,961,750	$2,500,000	$4,225,000	3,968,151
New Mexico	El Paso Electric Co., Public Service Co. of New Mexico, Southwestern	$9,892,000	$1,800,000	–	1,079,682
New York	Con Ed, National Grid,	$589,736,418	$96,096,724	–	15,709,624

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	New York State Electric & Gas, Rochester Gas & Electric, Orange & Rockland, Central Hudson Gas & Electric				
North Carolina	Duke Energy Progress, Duke Energy Carolinas, Dominion	$21,436,275	–	$41,300,000	7,203,110
North Dakota	Montana-Dakota Utilities	–	–	–	92,973
Ohio	Ohio Power, Duke Energy Ohio, Ohio	–	–	–	3,271,346

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	Edison, Toledo Edison				
Oklahoma	Oklahoma Gas & Electric, Public Service Co. of Oklahoma	–	–	–	1,327,669
Oregon	Portland General Electric, Pacificorp	$6,995,000	–	–	3,026,748
Pennsylvania	PECO Energy, West Penn Power, Duquesne Light	$4,561,670	$261,985	$1,587,480	8,676,380
Rhode Island	Narragansett Electric	–	–	–	434,667

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
South Carolina	Duke Energy Carolinas, Dominion Energy	$8,230,000	–	–	2,814,234
South Dakota	Northern States Power, Northwestern	–	–	–	158,095
Tennessee	Tennessee Valley Authority	$14,800,000	–	–	3,537,564
Texas	Oncor Electric, Southwestern TX, Entergy TX	–	–	–	4,644,439
Utah	Pacificorp, Rocky Mountain Power	$2,000,000	–	–	5,876,481

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
Vermont	Green Mountain Power	–	–	–	266,659
Virginia	Dominion, Appalachian Power	$17,545,205	–	$18,700,000	5,148,460
Washington	Puget Sound Energy, Pacificorp, Avista	–	–	$34,244,000	3,177,814
West Virginia	Appalachian Power, Monongahela Power	–	–	–	949,173
Wisconsin	We Energies, Madison Gas & Electric,	–	–	$3,400,000	2,611,532

State	Eligible utilities	Approved spending since 2019	Approved spending for low-income, economically distressed, and EJ communities	Proposed spending	Total customers*
	Northern States Power				
Wyoming	Cheyenne Power, Pacificorp WY	–	–	–	181,625

*** Customers were determined using data from EIA 861 2021 where available. Customer totals represent the sum of residential and commercial bundled or delivery-only customers of investor-owned utilities. Sources: Atlas Public Policy 2023; EIA 2022.**

Table C10. Utility EV low-income and environmental justice programs

State	Eligible utilities	Low-income*	Environmental justice**	Description
California	Bear Valley, Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Liberty Utilities	•	•	Multiple programs throughout the state include an investment requirement for underserved/disadvantaged communities and designation of up to 50% of program budgets for make-ready, rebates, and public charging as well as education and outreach.

State	Eligible utilities	Low-income*	Environmental justice**	Description
Delaware	Delmarva Power	•		Delmarva Power installs and maintains utility-owned EV charging infrastructure in low-income areas as part of its 2019 Plug-in Electric Vehicle Charging program.
District of Columbia	PEPCO	•	•	PEPCO's 2019 transportation electrification plan calls for at least 20% of its utility-owned DCFC chargers to be deployed in communities identified as "disadvantaged," which include Wards 5, 6, and 7, identified as areas most highly affected by air pollution.
Florida	Duke Energy Florida	•		Duke Energy Florida's 2017 charging infrastructure pilot includes a 10% carve-out for income-qualified communities.
Maryland	Potomac Electric Co. (PEPCO)	•		Among the many programs proposed by PEPCO and approved in January 2019 were several focused on equity and access for low-income communities.
Massachusetts	Eversource, National Grid	•	•	Each utility included a 10% carve-out for environmental justice in its approved public charging infrastructure plan, Eversource in 2017 and National Grid in 2018.
Minnesota	Xcel Energy	•	•	The Twin Cities Electric Vehicle Mobility Network focuses on partnering with local community organizations to address

State	Eligible utilities	Low-income*	Environmental justice**	Description
				adoption barriers and deploy EVSE strategically in areas that are otherwise underserved.
Missouri	Ameren	•		Ameren's Charge Ahead program, approved in February 2019, includes a 10% carve-out for low-income communities.
Nevada	Nevada Power	•		Nevada Power offers charging incentives to multifamily properties that qualify as low-income housing.
New Mexico	Xcel Energy NM	•		Xcel Energy will offer 20 home wiring rebates of up to $2,500 to low-income customers.
New York	Con Ed, National Grid, New York State Electric & Gas, Rochester Gas & Electric, Orange & Rockland, Central Hudson Gas & Electric	•	•	New York utilities and NYSERDA were jointly approved in July 2020 to invest $701 million in make-ready EV charging infrastructure and environmental justice (EJ) pilot programs, with $206 million going to directly benefit low-income and EJ communities.
North Carolina	Duke Energy Progress, Duke Energy Carolinas	•		Duke's 2020 transportation electrification plan includes a specific number of utility-owned charging stations to be deployed to underserved market segments, including 80 L2 chargers for MUDs.
Ohio	Ohio Power	•		AEP Ohio's 2018 charging station investment program includes a 10% carve-out for low-income communities.

State	Eligible utilities	Low-income*	Environmental justice**	Description
Oregon	Pacificorp	•		Pacificorp's 2018 pilot involves $4.6 million to be invested in demonstration projects, public charging, and outreach and education, with an emphasis on reaching low-income communities.
Pennsylvania	Duquesne Light, Peco Energy	•	•	Duquesne Light was approved in December 2018 to invest in its EV ChargeUp pilot program, including more than $2.5 million for infrastructure, rebates, and make-ready investments. The program includes a 10% low-income carve-out and will prioritize these groups for education and outreach. Peco Energy will provide up to $3,000 or 75% of make-ready costs to three sites in EJ areas.
Washington	Pacificorp	•		Pacificorp's competitive grant program awards grants on a quarterly basis to nonresidential customers to address capital costs of EV charging infrastructure. Points are awarded for projects that deliver benefits to low-income customers, with up to 100% of project costs potentially covered.

***Low-income groups are defined differently depending on the state and program, but the definition is generally based on some percentage of the federal poverty level. ** Environmental justice communities are those that bear a disproportionate burden of environmental harms and negative impacts, such as poor air quality. Certain policies, such as those in California, refer to these communities as "disadvantaged." Source: Atlas Public Policy 2022a.**

Appendix D. Transportation System Efficiency Metrics

Table D1. GHG reduction goals

State	Policy	GHG reduction goal
California	CA Senate Bill-375	Senate Bill 375, which was passed in 2008, sets goals for transportation emissions reduction within the state. The bill sets a target to achieve a 1% increase to an 8% decrease in per capita GHG emissions by 2020, and a 1% increase to a 16% decrease in per capita GHG emissions statewide by 2035, relative to 1990 levels.
Colorado	Greenhouse Gas Pollution Reduction Roadmap	By 2030, the state plans to reduce 12.7 million metric tons of emissions from the transportation sector.
District of Columbia	Sustainable DC 2.0	Sustainable DC 2.0 (released April 2019) has a goal to

State	Policy	GHG reduction goal
		reduce greenhouse gas emissions from transportation by 60% by 2032.
Maryland	2020 Annual Attainment Report on Transportation System Performance	Maryland's 2020 Annual Attainment Report on Transportation System Performance cites a state goal for reducing on road GHG emissions 40% below 2006 levels by 2030.
Massachusetts	Massachusetts Clean Energy and Climate Plan for 2020	The state has a GHG reduction target of 25% below 1990 levels by 2020 and 80% below 1990 levels by 2050.
Minnesota	Statewide Multimodal Transportation Plan 2017 to 2036	The state Department of Transportation has formally adopted the target of reducing GHG emissions from the transportation sector by 30% from 2005 levels by 2036, in accordance with the

State	Policy	GHG reduction goal
		Minnesota Next Generation Energy Act.
Oregon	Executive Order No. 20-04	Executive Order No. 20-04 directs state regulators to cap and reduce GHG emissions from transportation fuels.
Washington	Washington House Bill 2815	The goal is to reduce overall emissions of greenhouse gases in the state to 25% below 1990 levels by 2035. By 2050, the state will do its part to reach global climate stabilization levels by reducing overall emissions to 50% below 1990 levels, or 70% below the state's expected emissions that year.

Source: ACEEE review of state climate, sustainability, and transportation plans

Table D2. GHG pricing policies

State	Policy	Description
California	CARB Cap-and-Trade Program	Launched in 2013, California's Cap-and-Trade Regulation establishes a declining limit on major sources of GHG emissions throughout California. The program applies to approximately 80% of the state's GHG emissions. The California emissions cap, which stood at 358 million tons of carbon in 2018, will drop to 200 million by 2030, a 44% decrease. Revenue from the carbon market is invested throughout the state: 45% invested in reducing emissions through renewable energy and energy efficiency measures, 35% rebated to households and businesses, 15% allocated to energy-intensive and trade-exposed industries, and 5% held in the state reserve.

State	Policy	Description
Oregon	Oregon Clean Fuels Program	Launched in 2016, Oregon's Clean Fuels Program is designed to decrease the amount of greenhouse gases created during the life cycle (i.e., the production, processing, transportation, and consumption) of fuel used in Oregon. The program's goal is to decrease the amount of pollution allowed from transportation fuels used in Oregon by 25% by 2035 (compared with 2015 levels).
Washington	Carbon Emissions Reductions Account	Washington's 2021 Climate Commitment Act established a cap-and-invest program for helping the state meet its GHG reduction targets. The Carbon Emissions Reductions Account is one of three accounts for holding funds from cap-and-invest auctions. Funds from this account must be used for reducing emissions from the transportation

State	Policy	Description
		sector, particularly through improving public transit and active transportation.

Source: ACEEE research

Table D3. Transit agency bus goals and procurement

State	Mandated target in place for transit agency EV procurement or nonbinding goal to electrify transit fleets	Description
Arizona	Arizona Statewide Transportation Electrification Plan: Phase II	By 2030 Arizona Public Service and Tucson Electric Power plan to operate 750 electric buses. By 2040 the City of Phoenix plans to electrify its entire bus fleet.
California	Zero-Emission Transit Bus Requirement	By 2040 all public transit agencies must transition to 100% zero-emission bus fleets. Zero-emission bus technologies include all-electric or fuel cell electric.
Colorado	Zero Emissions Transit Bus Goal	Per the Colorado Electric Vehicle Plan 2020, the state's Department of Transportation, Regional Air Quality Council, and Colorado Energy Office will work with transit agencies, electric utilities, and other stakeholders by July 2021 to establish timelines, identify strategies, and dedicate sufficient resources for the conversion of the state transit fleet to 100% zero-emission

State	Mandated target in place for transit agency EV procurement or nonbinding goal to electrify transit fleets	Description
		vehicles no later than 2050, with an interim target of at least 1,000 ZEV transit vehicles by 2030.
Connecticut	Zero-Emission Transit Bus Requirement	On and after January 1, 2030, at least 30% of all buses purchased or leased by the state shall be zero-emission buses.
District of Columbia	Clean Energy DC Act	The act mandates that 100% of public buses, public fleets, private fleets of more than 50 vehicles, and taxis and limousines are to be zero-emission by 2045, with an interim goal of 50% by 2030.
Illinois	Charging Forward Plan	By 2040 Chicago Transit Authority plans to have an all-electric bus fleet.
Maryland	Maryland Transit Administration - Conversion to Zero-Emission Buses	The Maryland Transit Administration will transition to a zero-emissions bus fleet, starting by only purchasing zero-emission buses from 2023 onward.
Massachusetts	Massachusetts Bay Transportation Authority Bus Electrification Plan	The Massachusetts Bay Transportation Authority plans to electrify its whole bus fleet by 2040.
Michigan	Healthy Climate Plan	By 2035,the State of Michigan plans to have a zero-emission light-duty vehicle fleet. By 2045, the State of Michigan plans to have a zero-emission medium- and heavy-duty vehicle fleet.
New Jersey	Zero-Emission Transit Bus Requirement	10% of new buses purchased by the New Jersey Transit Corporation must be zero-emission vehicles (ZEV) by December

State	Mandated target in place for transit agency EV procurement or nonbinding goal to electrify transit fleets	Description
		31, 2024. 50% of new buses must be ZEV by December 31, 2026, and 100% must be ZEV by December 31, 2032.
New York	Zero-Emission Transit Bus Requirement	Five of the largest upstate and suburban transit authorities in New York—which currently operate 1,400 buses—will be required to electrify 25% of their fleets by 2025 and 100% by 2035.
Vermont	Vermont Agency of Transportation Zero-Emission Transportation Plan	The Vermont Agency of Transportation plans to have a 100% renewable-energy-powered fleet by 2050.

Source: DOE 2023c

Table D4. State investment for electric transit bus deployment

State	Program	Description
California	Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)	The California Air Resources Board (CARB), in partnership with CALSTART, launched HVIP to accelerate the adoption of cleaner, more efficient trucks and buses. HVIP works directly with dealers to apply the

State	Program	Description
		voucher incentive at the time of purchase.
Colorado	ALT Fuels Colorado	Alt Fuels Colorado incentivizes the replacement and scrappage of pre-2009 vehicles with cleaner alternatives. These funds are available to all public, private, and nonprofit fleets within Colorado.
Maryland	Clean Fuels Incentive Program	The Clean Fuels Incentive Program, administered by the Maryland Energy Administration, provides grants to purchase new and converted fleet alternative fuel vehicles.
Massachusetts	MOR-EV Trucks	The MOR-EV Trucks Program offers rebates to purchasers of electric buses, trucks, vans, and other medium-duty/heavy-duty vehicles. Vehicle owners must register their vehicles with the Commonwealth of

State	Program	Description
		Massachusetts to be eligible for rebates.
New York	NY Truck Voucher Incentive Program (NYTVIP)	NYTVIP provides vouchers, or discounts, to fleets across the state to purchase or lease electric transit buses. Voucher incentive amounts differ by vehicle technology, vehicle weight class, and location where the vehicle is domiciled.
Ohio	Ohio Diesel Emission Reduction Grant Program	The Ohio Diesel Emission Reduction Grant Program provides support to public transit systems serving Ohio counties for the early retirement and replacement of older diesel transit buses.
Virginia	Making Efficient + Responsible Investments in Transit (MERIT) program	The state's Department of Rail and Public Transportation's MERIT program provides funding for capital improvement projects, including

State	Program	Description
		the purchase or lease of new plug-in electric vehicles.
Washington	Green Transportation Capital Grants	Green Capital Grants are provided to transit agencies to fund capital projects to reduce the carbon intensity of the Washington transportation system. Examples include electrification of vehicle fleets, capital facilities to advance fleet electrification and/or hydrogen refueling, and upgrades to electrical transmission and distribution systems.

Sources: DOE 2023c and additional ACEEE research

Table D5. State requirements for electric school bus deployment

State	Mandated target in place for electric school bus procurement or nonbinding goal to electrify school bus fleets	Description
Colorado	SB 22-193	Supports the adoption of 2,000 electric school buses by 2027 and a longer-term goal to achieve 100% zero-emission

State	Mandated target in place for electric school bus procurement or nonbinding goal to electrify school bus fleets	Description
		buses on the road by 2035, with a focus on adoption in school districts in disproportionately impacted communities.
Connecticut	SB 4	100% of all school buses to be electric by 2040 (2030 for buses operating in environmental justice communities)
Maine	LD 1579	75% of new school buses to be zero-emission by 2035
Maryland	SB 528	100% of new school buses to be zero-emission by 2025
New York	Budget Commitment	100% of new school buses to be zero-emission by 2027, school buses in use to be zero-emission by 2035; minimum of 35% but target of 40% of climate spending to benefit disadvantaged communities.

Table D6. State electric school bus investment policies

State	Program	Description of state program(s) that contribute funds to electric school buses
California	School Bus Replacement Program	The Energy Commission's School Bus Replacement Program is providing more than $94 million to public school districts, county offices of education, and joint power authorities

State	Program	Description of state program(s) that contribute funds to electric school buses
		to help transition from diesel school buses to zero- or low-emission vehicles. The Energy Commission has awarded $89.8 million of the program's funds to schools in 26 California counties.
Colorado	Electric School Bus Grant	The Colorado Department of Public Health and Environment (CDPHE) will administer the Electrifying School Buses Grant Program (Program), which provides funds to schools for the purchase of electric school buses and associated charging infrastructure. Eligible projects include the purchase and maintenance of electric school buses, the conversion of fossil-fuel powered school buses to electric buses, the purchase and installation of charging infrastructure, and electrical upgrades to support associated charging infrastructure.
Connecticut	Zero Emission School Bus Funding and Technical Assistance	The Connecticut Department of Energy and Environmental Protection (DEEP) must establish and administer a grant program to provide matching funds necessary for municipalities, school districts and school bus operators for the

State	Program	Description of state program(s) that contribute funds to electric school buses
		purchase or lease of zero-emission school buses and electric vehicle charging stations. School districts within environmental justice communities will be prioritized.
Illinois	School Bus Retrofit Reimbursement	The Illinois Department of Education will reimburse any qualifying school district for the cost of converting gasoline buses to more fuel-efficient engines or to engines using alternative fuels. Restrictions may apply. (Reference 105 Illinois Compiled Statutes 5/29-5).
Minnesota	Electric School Bus Grants	The Minnesota Pollution Control Agency (MPCA) provides matching funds for eligible entities that receive grants from the U.S. Environmental Protection Agency's Clean School Bus program for the replacement of diesel-powered school buses with electric school buses. MPCA provides grants up to $125,000 per eligible school bus and up to $7,000 per charging station. This program is funded by Minnesota's portion of the Volkswagen Environmental Mitigation Trust. For more information, including eligibility requirements, see the MPCA Electric School Bus Match Dollars

State	Program	Description of state program(s) that contribute funds to electric school buses
		Website. www.pca.state.mn.us/air/electric-school-bus-match-dollars www.afdc.energy.gov/laws/323
Nevada	S.B. 299	In 2019 Nevada's first school bus pilot program was established. The state's first electric school buses were expected to hit the road in 2020.
New Jersey	Electric School Bus Program	The New Jersey Department of Environmental Protection (DEP) must award grants to the eligible participants for the purchase or lease of electric school buses and associated charging infrastructure. At least half of program participants and grant funding must be located in low-income, urban, or environmental justice communities. Assembly Bill 1282, 2022
New York	NYSERDA's Truck Voucher Incentive Program	In White Plains, New York, five electric school buses are in use by the district and operated by National Express. This $1.8 million project was partially funded by $600,000 from NYSERDA's

State	Program	Description of state program(s) that contribute funds to electric school buses
		Truck Voucher Incentive Program and a $500,000 contribution by Consolidated Edison.
Oklahoma		The Oklahoma Department of Environmental Quality (DEQ) offers rebates for projects that repower or replace an actively used, engine model year 2009 or older, diesel school bus with an alternative fuel bus. Eligible alternative fuels and technologies include all-electric, electric hybrid, propane, and natural gas. Applicants may receive rebates of up to 45% of project costs.
Tennessee	2021 RDE4HT Rebate Program	Washington County has been assigned Volkswagen settlement funding to replace diesel school buses with new EV versions. Additionally, the state's Reducing Diesel Emissions for a Healthier Tennessee Rebate Program prioritizes projects that seek to replace diesel vehicles with alternative fuel alternatives. http://www.tncleanfuels.org/wp-content/uploads/2020/10/RDE4HT_2021-RFPApplication_10-21-20_fillable.pdf

State	Program	Description of state program(s) that contribute funds to electric school buses
Texas	TCEQ EV School Bus Program	Any school district or charter school may receive a grant through the Texas Commission on Environmental Quality (TCEQ) to pay for the incremental costs to replace school buses or install diesel oxidation catalysts, diesel particulate filters, emission-reducing add-on equipment, and other emissions reduction technologies in qualified school buses. Funds may also be used to purchase qualifying fuels, including any liquid or gaseous fuel or additive registered or verified by the U.S. Environmental Protection Agency (other than standard gasoline or diesel) that provides particulate matter emission reductions. Additional rules and conditions apply. For more information, see the TCEQ Texas Emissions Reduction Plan website.
Virginia	Alternative Fuel School Bus and Fueling Infrastructure Loans	The Virginia Board of Education may use funding from the Literary Fund to provide loans to school boards that convert school buses to operate on alternative fuels or construct alternative fueling stations.

State	Program	Description of state program(s) that contribute funds to electric school buses
		Virginia Code 22.1-146
West Virginia	Alternative Fuel School Bus Incentive	The West Virginia Department of Education offers a 10% reimbursement to any county that uses cleaner fuels for the operation of any portion of its school bus fleet, including electricity. The funds help offset maintenance, operation, and other costs. A county is eligible for an additional 5% reimbursement for the portion of the school bus system that is manufactured within the state of West Virginia. West Virginia Code 18-9A-7 and House Bill 4571

Sources: DOE 2023c and additional ACEEE research

Appendix E. Electric Grid Optimization Metrics

Table E1. Time-varying rates for L2 chargers

State	Utility	EV rate name	TOU rate*	EV rate**
Alabama	Alabama Power	BEVT—Business Electric Vehicle Time-of-Use	•	•
Alaska	Alaska Electric Light & Power	Rate Schedule 93: Off-Peak Electric Vehicle Charging	•	•
Arizona	Tucson Electric Power	TEP Electric Vehicle Infrastructure Program: Residential EV Tariff	•	•
Arkansas	Entergy Arkansas	Optional Residential Time-of-Use	•	
California	Bear Valley, Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Liberty Utilities	Bear Valley Experimental EV–TOU Rate Pilot, PG&E Commercial EV Rates, SCE TOU-D-PRIME, SDG&E EV-TOU, Liberty Utilities TOU-EV	•	•
Colorado	Xcel Colorado	Secondary Voltage Time-of-Use—Electric Vehicle Service (Schedule S-EV)	•	•
Connecticut	Eversource CT	Rate 7—Residential Time-of-Day Electric Service	•	
Delaware	Delmarva Power	Offering 3: Rate Schedule PIV	•	•
District of Columbia	Potomac Electric	Residential Service—Plug-In Vehicle Charging | Schedule R-PIV	•	•
Florida	Florida Power & Light	FP&L Residential Time-of-Use	•	
Georgia	Georgia Power Co.	TOU-PEV	•	•

State	Utility	EV rate name	TOU rate*	EV rate**
Hawaii	Hawaiian Electric Co.	EV Pilot Rate (EV-F & EV-U)	•	•
Idaho	Idaho Power Corp.	Idaho Time of Day Plan	•	
Illinois	Ameren IL, Com Ed	Hourly Pricing Rate (BESH) & Time-of-Day Pricing Rate Pilot	•	
Indiana	Indianapolis Power & Light,	IPL EVX Rate	•	•
Iowa	MidAmerican Energy	Rate RSI—Residential Time-of-Use Service	•	
Kansas	Evergy KS South	Electric Vehicle Plan	•	•
Kentucky	Louisville Gas & Electric	Residential Time of Day	•	
Maine	Central Maine Power	Rate A-TOU	•	
Maryland	Baltimore Gas & Electric,	Schedule EV	•	•
Massachusetts	National Grid	Off-Peak Charging Rebate Program	•	•
Michigan	Consumers Energy, DTE Energy	Consumers Energy Experimental Residential Plug-in Electric Vehicle Charging Program, DTE Energy Time-of-Day 3pm-7pm (D1.11), DTE	•	•

State	Utility	EV rate name	TOU rate*	EV rate**
		Energy Time of Day Plan (D1.2), DTE Energy Dynamic Peak Pricing (D1.8), DTE Energy EV Plan (D1.9)		
Minnesota	Xcel Energy, Otter Tail Power	Electric Vehicle Subscription Service Pilot, Off-Peak EV	•	•
Montana	Northwestern Energy MT	Residential Smart Grid Time-of-Use Demonstration	•	
Nevada	Nevada Power	Nevada Energy EV Rate	•	•
New Jersey	Atlantic City Electric	Residential Whole House TOU Rate and Residential Charging Program Off-Peak Incentive	•	•
New Mexico	Public Service Co. of NM	Non-Residential Charging Station AND Whole Home Electric Vehicle Charging Rate Pilot	•	•
New York	Con Ed	Residential Time-of-Use	•	
North Carolina	Duke Energy Progress	Duke Energy Progress R-TOU Program	•	
North Dakota	Montana–Dakota Utilities	Montana–Dakota Utilities Optional Time-of-Day Residential Electric Service Rate 16	•	
Oklahoma	Oklahoma Gas & Electric	SmartHours	•	
Oregon	Portland General Electric, Pacificorp	Schedule 50—Retail EV, Time of Use	•	•

State	Utility	EV rate name	TOU rate*	EV rate**
South Carolina	Duke Energy Carolinas, Dominion Energy	R-TOUD-61, Dominion Energy Residential Time of Use	•	
Tennessee	Kingsport Power Co.	General Service Time-of-Day (GS-TOD)	•	
Utah	Rocky Mountain Power	Rocky Mountain Power Time-of-Use Energy Rate	•	•
Vermont	Green Mountain Power	Rate 72—Residential Off Peak Electric Vehicle Service Rate 74—Residential Time-of-Use Electric Vehicle Service	•	•
Virginia	Dominion, Appalachian Power	Residential Electric Vehicle Charging (Experimental)	•	•
Wisconsin	We Energies, Northern States Power	Time-of-Use Savings Program, Residential Electric Vehicle Home Service Program	•	•

*** A time-of-use (TOU) rate varies in price depending on the time of day that the customer uses electricity. These rates generally include at least two price periods: an off-peak price and a more expensive on-peak price, reflecting different costs to the grid in different hours of the day. ** EV rates are time-varying rates that require customers to prove ownership of an EV in order to qualify. EV rates may be whole-home or may apply to a separately metered EV. Source: OpenEI 2020; utility tariffs; Atlas Public Policy 2022a.**

Table E2. DCFC-specific charging rates

State	Utility	DCFC rate name	Description
California	Pacific Gas & Electric, San Diego Gas & Electric	Schedule Business Electric Vehicle (BEV), Interim Rate Waiver for	Participants receive service on SDG&E's existing TOU-M rate,

State	Utility	DCFC rate name	Description
		Electric Vehicle High Power Charging	with the maximum demand limit waived for participants. PG&E's business EV rate is also applicable to DCFC charging.
Colorado	Xcel CO	Public DCFC Rate	TOU-based rate for utility-owned, public DCFC
Florida	Florida Power and Light	Rate Schedules GSD-1EV and GSLD-1EV and Rate Schedule UEV	Tariffs limit the amount of demand charges billed as a function of usage during low load factor periods and option for fixed rate from utility-owned chargers
Hawaii	Hawaiian Electric Co.	EV-MAUI Fast Charging Service	There are time-varying prices for DC fast charging at various utility-owned stations throughout Hawaii, and three time periods, with lowest prices during the middle of the day.

State	Utility	DCFC rate name	Description
Maine	Central Maine Power	DC Fast Charging Economic Business Development Incentive Program Pilot	CMP offers rate relief to DCFC customers in the form of a two-part demand rate pilot.
Maryland	Baltimore Gas & Electric, Delmarva Power, Potomac Electric Co.	Demand Charge Credit	All three utilities provide a bill credit for a fixed proportion of demand-based fees, based on 50% of the maximum capacity of L2 or DCFC public chargers.
Michigan	DTE Energy	Demand Charge Holiday for DCFC chargers	DTE does not apply demand charges to DCFC chargers on the commercial rate General Service D3.
Minnesota	Minnesota Power, Otter Tail Power, Xcel Energy	Minnesota Power EV Rate Pilot	Minnesota Power's 2020 pilot program limits demand charges to no more than 30% of the customer's EV-related electricity bill. Xcel Energy offers similar rate programs

State	Utility	DCFC rate name	Description
			that allow sporadic loads to avoid high demand-based charges. Otter Tail has begun offering a similar program beginning in December 2020.
Nevada	Nevada Power	EVCCR-TOU	Ten-year demand rate reduction applies to a portion of the DCFC user's kW time-of-use demand, to be offset with $/kWh volumetric rates.
New Jersey	Atlantic City Electric, Jersey Central Power and Light	DCFC Public Charging Sub-Program - Demand Charge Credit	Demand charge discount of 50% in the first and second year and 25% in the third and fourth
New York	Con Ed	EV Quick Charging Station Program	In its tariff filed in 2018, Con Edison offers a seven-year rate discount for new public EV quick charging

State	Utility	DCFC rate name	Description
			stations in its service area.
Pennsylvania	PECO Energy	PECO Energy DCFC Rate	Rate pilot provides a 50% fixed demand (kW) credit equal to the combined maximum nameplate capacity for all DCFC chargers connected to service.
Tennessee	Tennessee Valley Authority	TVA DCFC Enabling Rate	In 2020 TVA began development of a new DCFC enabling rate to avoid high demand charges.
Washington	Pacific Power	Optional Transitional Commercial EVSE Rate	Transitional rate for commercial DCFC charger stations applies a discount to demand charges and on-peak energy charges, to decline steadily over a 13-year period.
Wisconsin	Madison Gas & Electric	Low Load Factor Provision	Reduces maximum monthly on-peak

State	Utility	DCFC rate name	Description
			demand rates by 50% for customers taking service under schedules CG-4, CG-2, or CG-2A with an annual load factor less than 15%

Sources: OpenEI 2020; utility tariffs; Atlas Public Policy 2022a

Table E3. Managed charging program details

State	Utility	Managed charging program name	Description	Private	Public
California	Bear Valley, Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Liberty Utilities	LADWP Charge Up L.A., PG&E EV Charge Network—Load Management Plan, SCE Charge Ready, SDG&E Power Your Drive	Variety of programs, including incentives for managed charging–capable infrastructure, make-ready with demand response, public charging with interruptible service	•	•
Colorado	Xcel Colorado	Electric Vehicle Charging Station Pilot	A 2014 pilot program gave customers a credit in exchange for allowing Xcel to interrupt their private vehicle charging for a limited number of hours per year.	•	
Florida	Duke Energy Florida	Park & Plug Program	Between 2019 and 2022, Duke Florida will own and operate more than 500 privately sited EV charging stations that are DR-capable. Data from these stations will be used to better evaluate the potential for EV charging as a DR resource.	•	•

State	Utility	Managed charging program name	Description	Private	Public
Hawaii	Hawaiian Electric Co.	Electrification of Transportation: Strategic Roadmap	HECO's 2019 EV road map includes a focus on "smart" charging for workplaces, MUDs, and buses. Pilot includes a DR, V2G, and a battery reuse program.		○
Massachusetts	Eversource, National Grid	EV Market Development Program	National Grid will make ready approximately 700 L2 and 80 DCFC DR-capable charging stations in private and public sites.	•	•
Michigan	Consumers Energy, DTE Energy	Consumers Energy Smart Charging Program, OVGIP PEV DR Pilot	Consumers Energy and General Motors are deploying new technology for private EV chargers to delay charging start times until overnight hours. DTE's EV DR pilot, which began in 2018, serves to evaluate the potential of various EV-related DSM measures.	•	
Minnesota	Xcel Energy,	EV Service Pilot	In a pilot for 100 residential customers, Xcel provides turnkey EV charging infrastructure for a monthly fee and includes load monitoring and data management.	○[37]	
New York	Con Ed,	SmartCharge New York	Con Edison's pilot uses behavioral feedback and financial rewards to encourage off-peak charging. The program is available to any driver, including fleets, as	•	

[37] A hollow circle indicates a pilot program with limited participation and/or duration. Small-scale pilots/demonstrations received 0.5 points whereas larger-scale pilots and programs received full points.

State	Utility	Managed charging program name	Description	Private	Public
			well as drivers who are not Con Ed customers but charge in the Con Ed service territory. Other New York utilities filed managed charging proposals in December 2020.		
Ohio	Ohio Power,	AEP Ohio EV Charging Incentive Program	In April 2018 AEP (Ohio Power) began offering rebates for 375 public charging stations that are managed charging–capable. Rebates apply to EV chargers and make-ready infrastructure costs.		•
Oregon	Portland General Electric, Pacificorp	PGE Workplace Smart Charging Pilot, Pacificorp EV Charging Station Grant Program	As of 2017, 20 of 69 workplace chargers installed by PGE are DR-enabled. In its grant awards, Pacificorp offers additional points to EV projects that are DR/VGI capable.	○	•
South Carolina	Duke Energy Carolinas	Residential EV Charging Program	Up to 400 customers with qualifying L2 chargers can receive a rebate for participating in demand response events.	○	
Utah	Rocky Mountain Power	Intermodal Hub Project	Project serves a diversity of electric charging needs among LD, MD, and HD vehicles and transit bus stations while also providing 400 kW of distributed capacity through a multi-megawatt managed charging system.		•
Vermont	Green Mountain Power	eCharger	GMP provides a free at-home level 2 charger to new EV customers. These chargers collectively represent one of the largest residential managed charging programs in the	•	

State	Utility	Managed charging program name	Description	Private	Public
			country, with 300 customers enrolled in the program as of February 2019.		
Washington	Puget Sound Energy, Pacificorp, Avista	EVSE Pilot Program	This 2019 pilot allows Avista to own, maintain, and install EVSE on customer premises. The EVSE installed may be called on for DR events with advance notice to the customer.	○	

Sources: SEPA 2019; ACEEE Research; Atlas Public Policy 2022a

Table E4. Electric power sector emissions goals

State	State or utility electric power sector emission reduction goal, including renewable portfolio standard, description
Arizona	Interim target of 2000 levels by 2020
California	2000 emissions levels by 2010; 1990 levels by 2020; 100% clean energy by 2045; 40% emissions reduction by 2030
Colorado	26% emissions reduction by 2025; 50% by 2030 based on 2005 baseline
Connecticut	1990 emissions levels by 2010; 10% below 1990 by 2020 45% below 2001 by 2030
District of Columbia	50% reduction by 2032
Delaware	40% renewable by 2035

State	State or utility electric power sector emission reduction goal, including renewable portfolio standard, description
Hawaii	100% renewable by 2045
Illinois	40% renewable by 2030, 50% by 2040
Massachusetts	25% emissions reduction by 2020, 28% by 2025, 60% in 2030, 80% in 2050
Maryland	40% emissions reduction by 2030 based on 2006 baseline, interim target of 25% by 2020
Maine	45% reduction by 2030, 80% by 2050 (1990 baseline)
Minnesota	15% emissions reduction by 2015, 30% by 2025 (2005 baseline)
North Carolina	70% emissions reduction by 2030
Nebraska	100% carbon-free by 2050
New Hampshire	20% reduction by 2025 (1990 baseline)
New Jersey	1990 emissions level by 2020, 100% clean energy by 2050
New Mexico	50% renewable by 2030, 100% carbon-free by 20245
Nevada	28% emissions reduction by 2025, 45% by 2030 (2005 baseline)
New York	40% emissions reduction by 2030 (1990 baseline)
Oregon	90% emissions reduction by 2035

State	State or utility electric power sector emission reduction goal, including renewable portfolio standard, description
Pennsylvania	26% emissions reduction 2025 (2005 baseline)
Rhode Island	10% emissions reduction by 2020, 45% by 2035 (1990 baseline)
Virginia	100% clean power by 2045
Vermont	40% emissions reduction by 2030 (1990 baseline)
Washington	25% emissions reduction by 2035, 50% by 2050 (1990 baseline)

Table E5. Vehicle-to-grid programs

State	Utility	Vehicle-to-grid (V2G) program name	Description
California	San Diego Gas & Electric	[Torrance Electric School Buses]	This demonstration project, funded by the California Energy Commission and South Coast Air Quality Management District, deployed six V2G-capable school buses in the Torrance school district. When connected with buildings or specific grid outlets, the school buses are capable of delivering 96 kWh/22 kW to site buildings, allowing for demand charge management and grid services such as frequency response and load shifting.
Florida	Duke Energy Florida	Ford F-150 Lightening Pilot	Duke Energy will employ five Ford-150 Lightning vehicles to its fleet to test how the vehicle interacts with distributed energy resources, how the vehicle performs during an

State	Utility	Vehicle-to-grid (V2G) program name	Description
			outage and can feed back to the grid, and how that affects the vehicle's battery over time.
Hawaii	Hawaiian Electric Co.	Electrification of Transportation: Strategic Roadmap / SmartMAUI	Project deployed 80 vehicle-to-home chargers which demonstrated discharge in response to grid signals over the 6–9 p.m. peak period, thereby helping manage distribution system loads and frequency events.
Massachusetts	National Grid	Electric School Bus V2G Pilot	National Grid, Proterra, Thomas Built Buses, Rhombus Energy Solutions, and Highland Electric Fleets tested how to use ESBs when not in use to support the grid. They provided more than 7 MWh of electricity to the grid in the summer of 2021.
New York	Consolidated Edison	NYSERDA Demonstration Project	This demonstration project, funded by NYSERDA, deployed three managed-charging and two V2G-capable EVs to provide bidirectional grid services on the CUNY Queens College campus, including demand charge management and emergency backup power.
North Carolina	Duke Energy Carolinas	Duke Energy F-150 Lightning Pilot	Duke seeks to enroll 100 customers who lease F-150 Lightnings into a pilot program where they will receive financial incentives in exchange for allowing Duke Energy to draw some electricity from their batteries.
Tennessee	Tennessee Valley Authority	Nissan Energy Share	At Nissan's North American headquarters in Franklin, Tennessee, the company's fleet of Nissan LEAFs deploy vehicle-to-building energy services and provide demand charge management as well as emergency backup power.
Virginia	Dominion Energy	Electric School Bus V2G	In 2020, Dominion deployed a fleet of 50 all-electric school buses that are V2G capable, replacing diesel buses in school fleets.

***Source*: Atlas Public Policy 2022a**

Appendix F. Transportation Electrification Outcomes Metrics

Table F1. Light-duty EV registrations

State	Number of registered LD EVs	Population (2021)	EVs per 100,000 people
Alabama	4,296	5,024,803	85.50
Alaska	1,085	732,441	148.13
Arizona	37,422	7,177,986	521.34
Arkansas	1,921	3,012,232	63.77
California	474,034	39,499,738	1200.09
Colorado	28,756	5,784,308	497.14
Connecticut	10,224	3,600,260	283.98
Delaware	2,425	991,886	244.48
District of Columbia	2,747	690,093	398.06
Florida	81,418	21,569,932	377.46
Georgia	30,235	10,725,800	281.89
Hawaii	11,560	1,451,911	796.19
Idaho	3,130	1,847,772	169.39
Illinois	29,870	12,785,245	233.63

State	Number of registered LD EVs	Population (2021)	EVs per 100,000 people
Indiana	8,711	6,785,644	128.37
Iowa	3,106	3,188,669	97.41
Kansas	3,978	2,935,880	135.50
Kentucky	3,907	4,503,958	86.75
Louisiana	3,098	4,651,203	66.61
Maine	2,472	1,362,280	181.46
Maryland	20,753	6,172,679	336.21
Massachusetts	23,693	7022220	337.40
Michigan	21,119	10,067,664	209.77
Minnesota	12,217	5,707,165	214.06
Mississippi	1,356	2,956,870	45.86
Missouri	9,051	6,154,481	147.06
Montana	1,445	1,086,193	133.03
Nebraska	2,391	1,961,455	121.90
Nevada	15,670	3,114,071	503.20
New Hampshire	3,282	1,377,848	238.20
New Jersey	35,553	9,279,743	383.12
New Mexico	3,859	2,117,566	182.24

State	Number of registered LD EVs	Population (2021)	EVs per 100,000 people
New York	37,891	20,154,933	188.00
North Carolina	22,461	10,457,177	214.79
North Dakota	365	778,962	46.86
Ohio	18,633	11,790,587	158.03
Oklahoma	7,249	3,962,031	182.96
Oregon	24,613	4,241,544	580.28
Pennsylvania	23,266	12,989,625	179.11
Rhode Island	1,897	1,096,229	173.05
South Carolina	6,423	5,130,729	125.19
South Dakota	596	887,099	67.19
Tennessee	11,633	6,920,119	168.10
Texas	69,986	29,217,653	239.53
Utah	13,953	3,281,684	425.18
Vermont	2,656	642,495	413.39
Virginia	24,768	8,632,044	286.93
Washington	53,828	7,718,785	697.36
West Virginia	881	1,789,798	49.22
Wisconsin	7,888	5,892,323	133.87

State	Number of registered LD EVs	Population (2021)	EVs per 100,000 people
Wyoming	409	577,267	70.85

Sources: IHS Markit; U.S. Census Bureau 2021

Table F2. Heavy-duty EV registrations

State	Number of registered HD EVs	Population (2021)	EVs per 100,000 people
Alabama	10	5,024,803	0.20
Alaska	2	732,441	0.27
Arizona	13	7,177,986	0.18
Arkansas	1	3,012,232	0.03
California	1,585	39,499,738	4.01
Colorado	84	5,784,308	1.45
Connecticut	3	3,600,260	0.08
Delaware	15	991,886	1.51
District of Columbia	15	690,093	2.17
Florida	35	21,569,932	0.16

State	Number of registered HD EVs	Population (2021)	EVs per 100,000 people
Georgia	86	10,725,800	0.80
Hawaii	25	1,451,911	1.72
Idaho	16	1,847,772	0.87
Illinois	62	12,785,245	0.48
Indiana	55	6,785,644	0.81
Iowa	16	3,188,669	0.50
Kansas	9	2,935,880	0.31
Kentucky	22	4,503,958	0.49
Louisiana	3	4,651,203	0.06
Maine	6	1,362,280	0.44
Maryland	84	6,172,679	1.36
Massachusetts	62	7,022,220	0.88
Michigan	14	10,067,664	0.14
Minnesota	20	5,707,165	0.35
Mississippi	1	2,956,870	0.03
Missouri	24	6,154,481	0.39

State	Number of registered HD EVs	Population (2021)	EVs per 100,000 people
Montana	15	1,086,193	1.38
Nebraska	9	1,961,455	0.46
Nevada	23	3,114,071	0.74
New Hampshire	0	1,377,848	0.00
New Jersey	57	9,279,743	0.61
New Mexico	22	2,117,566	1.04
New York	145	20,154,933	0.72
North Carolina	72	10,457,177	0.69
North Dakota	0	778,962	0.00
Ohio	20	11,790,587	0.17
Oklahoma	5	3,962,031	0.13
Oregon	25	4,241,544	0.59
Pennsylvania	59	12,989,625	0.45
Rhode Island	4	1,096,229	0.36
South Carolina	81	5,130,729	1.58
South Dakota	0	887,099	0.00

State	Number of registered HD EVs	Population (2021)	EVs per 100,000 people
Tennessee	10	6,920,119	0.14
Texas	66	29,217,653	0.23
Utah	34	3,281,684	1.04
Vermont	12	642,495	1.87
Virginia	84	8,632,044	0.97
Washington	313	7,718,785	4.06
West Virginia	3	1,789,798	0.17
Wisconsin	18	5,892,323	0.31
Wyoming	8	577,267	1.39

Sources: IHS Markit; U.S. Census Bureau 2021

Table F3. Statewide L2 charging infrastructure

State	Population	L2 stations	L2 stations per 100,000 people	L2 ports	L2 ports per 100,000 people
Alabama	5,024,803	238.00	8.64	434	8.64
Alaska	732,441	54.00	10.24	75	10.24
Arizona	7,177,986	894.00	25.88	1,858	25.88
Arkansas	3,012,232	188.00	15.20	458	15.20
California	39,499,738	13684.00	73.08	28,866	73.08
Colorado	5,784,308	1603.00	52.69	3,048	52.69
Connecticut	3,600,260	501.00	28.64	1,031	28.64
Delaware	991,886	143.00	24.10	239	24.10
District of Columbia	690,093	233.00	105.20	726	105.20
Florida	21,569,932	2599.00	23.77	5,128	23.77
Georgia	10,725,800	1446.00	27.04	2,900	27.04
Hawaii	1,451,911	361.00	48.83	709	48.83
Idaho	1,847,772	112.00	10.99	203	10.99
Illinois	12,785,245	992.00	14.81	1,893	14.81

State	Population	L2 stations	L2 stations per 100,000 people	L2 ports	L2 ports per 100,000 people
Indiana	6,785,644	348.00	9.64	654	9.64
Iowa	3,188,669	283.00	12.54	400	12.54
Kansas	2,935,880	449.00	27.62	811	27.62
Kentucky	4,503,958	230.00	9.79	441	9.79
Louisiana	4,651,203	162.00	6.00	279	6.00
Maine	1,362,280	390.00	46.76	637	46.76
Maryland	6,172,679	1188.00	43.87	2,708	43.87
Massachusetts	7,022,220	2233.00	66.79	4,690	66.79
Michigan	10,067,664	1047.00	18.64	1,877	18.64
Minnesota	5,707,165	558.00	19.08	1,089	19.08
Mississippi	2,956,870	93.00	7.07	209	7.07
Missouri	6,154,481	969.00	29.83	1,836	29.83
Montana	1,086,193	90.00	12.15	132	12.15
Nebraska	1,961,455	204.00	16.16	317	16.16
Nevada	3,114,071	441.00	34.81	1,084	34.81
New Hampshire	1,377,848	170.00	19.89	274	19.89

State	Population	L2 stations	L2 stations per 100,000 people	L2 ports	L2 ports per 100,000 people
New Jersey	9,279,743	786.00	16.58	1,539	16.58
New Mexico	2,117,566	186.00	14.21	301	14.21
New York	20,154,933	3090.00	36.54	7,365	36.54
North Carolina	10,457,177	1018.00	18.12	1,895	18.12
North Dakota	778,962	76.00	13.61	106	13.61
Ohio	11,790,587	1142.00	17.95	2,116	17.95
Oklahoma	3,962,031	301.00	9.64	382	9.64
Oregon	4,241,544	866.00	37.25	1,580	37.25
Pennsylvania	12,989,625	1204.00	17.78	2,310	17.78
Rhode Island	1,096,229	269.00	51.45	564	51.45
South Carolina	5,130,729	354.00	11.95	613	11.95
South Dakota	887,099	61.00	8.68	77	8.68
Tennessee	6,920,119	578.00	16.21	1,122	16.21
Texas	29,217,653	2252.00	15.12	4,417	15.12
Utah	3,281,684	746.00	46.56	1,528	46.56
Vermont	642,495	331.00	111.13	714	111.13

State	Population	L2 stations	L2 stations per 100,000 people	L2 ports	L2 ports per 100,000 people
Virginia	8,632,044	1065.00	24.79	2,140	24.79
Washington	7,7187,85	1554.00	39.70	3,064	39.70
West Virginia	1,789,798	111.00	13.35	239	13.35
Wisconsin	5,892,323	438.00	12.98	765	12.98
Wyoming	577,267	68.00	16.98	98	16.98

Sources: DOE 2021; U.S. Census Bureau 2021

Table F4. Statewide DCFC charging infrastructure

State	Population	DCFC ports	DCFC ports per 100,000 people
Alabama	5,024,803	73	1.45
Alaska	732,441	17	2.32
Arizona	7,177,986	169	2.35
Arkansas	3,012,232	31	1.03
California	39,499,738	3,374	8.54
Colorado	5,784,308	422	7.30
Connecticut	3,600,260	89	2.47
Delaware	991,886	21	2.12
District of Columbia	690,093	16	2.32
Florida	21,569,932	479	2.22
Georgia	10,725,800	370	3.45
Hawaii	1,451,911	71	4.89
Idaho	1,847,772	37	2.00
Illinois	12,785,245	236	1.85

State	Population	DCFC ports	DCFC ports per 100,000 people
Indiana	6,785,644	67	0.99
Iowa	3,188,669	109	3.42
Kansas	2,935,880	48	1.63
Kentucky	4,503,958	25	0.56
Louisiana	4,651,203	27	0.58
Maine	1,362,280	59	4.33
Maryland	6,172,679	355	5.75
Massachusetts	7,022,220	184	2.62
Michigan	10,067,664	238	2.36
Minnesota	5,707,165	97	1.70
Mississippi	2,956,870	9	0.30
Missouri	6,154,481	113	1.84
Montana	1,086,193	24	2.21
Nebraska	1,961,455	48	2.45
Nevada	3,114,071	134	4.30
New Hampshire	1,377,848	34	2.47

State	Population	DCFC ports	DCFC ports per 100,000 people
New Jersey	9,279,743	242	2.61
New Mexico	2,117,566	61	2.88
New York	20,154,933	431	2.14
North Carolina	10,457,177	192	1.84
North Dakota	778,962	21	2.70
Ohio	11,790,587	244	2.07
Oklahoma	3,962,031	588	14.84
Oregon	4,241,544	251	5.92
Pennsylvania	12,989,625	227	1.75
Rhode Island	1,096,229	44	4.01
South Carolina	5,130,729	54	1.05
South Dakota	887,099	18	2.03
Tennessee	6,920,119	107	1.55
Texas	29,217,653	318	1.09
Utah	3,281,684	117	3.57
Vermont	642,495	51	7.94

State	Population	DCFC ports	DCFC ports per 100,000 people
Virginia	8,632,044	373	4.32
Washington	7,718,785	421	5.45
West Virginia	1,789,798	7	0.39
Wisconsin	5,892,323	71	1.20
Wyoming	577,267	20	3.46

Sources: DOE 2023c; U.S. Census Bureau 2021

Table F5. Electric transit buses per 100,000 people

State	EVs in transit bus fleets	Population	EV transit buses per 100,000
Alabama	21	5,024,803	0.42
Alaska	5	732,441	0.68
Arizona	38	7,177,986	0.53
Arkansas	5	3,012,232	0.17
California	1,977	39,499,738	5.01

State	EVs in transit bus fleets	Population	EV transit buses per 100,000
Colorado	141	5,784,308	2.44
Connecticut	30	3,600,260	0.83
Delaware	30	991,886	3.02
District of Columbia	48	690,093	6.96
Florida	450	21,569,932	2.09
Georgia	107	10,725,800	1.00
Hawaii	59	1,451,911	4.06
Idaho	37	1,847,772	2.00
Illinois	137	12,785,245	1.07
Indiana	101	6,785,644	1.49
Iowa	21	3,188,669	0.66
Kansas	19	2,935,880	0.65
Kentucky	40	4,503,958	0.89
Louisiana	39	4,651,203	0.84
Maine	6	1,362,280	0.44
Maryland	119	6,172,679	1.93

State	EVs in transit bus fleets	Population	EV transit buses per 100,000
Massachusetts	141	7,022,220	2.01
Michigan	28	10,067,664	0.28
Minnesota	31	5,707,165	0.54
Mississippi	1	2,956,870	0.03
Missouri	40	6,154,481	0.65
Montana	18	1,086,193	1.66
Nebraska	16	1,961,455	0.82
Nevada	47	3,114,071	1.51
New Hampshire	5	1,377,848	0.36
New Jersey	42	9,279,743	0.45
New Mexico	44	2,117,566	2.08
New York	489	20,154,933	2.43
North Carolina	121	10,457,177	1.16
North Dakota	-	778,962	-
Ohio	63	11,790,587	0.53
Oklahoma	12	3,962,031	0.30

State	EVs in transit bus fleets	Population	EV transit buses per 100,000
Oregon	65	4,241,544	1.53
Pennsylvania	53	12,989,625	0.41
Rhode Island	63	1,096,229	5.75
South Carolina	42	5,130,729	0.82
South Dakota	-	887,099	-
Tennessee	79	6,920,119	1.14
Texas	271	29,217,653	0.93
Utah	54	3,281,684	1.65
Vermont	14	642,495	2.18
Virginia	36	8,632,044	0.42
Washington	179	7,718,785	2.32
West Virginia	-	1,789,798	-
Wisconsin	60	5,892,323	1.02
Wyoming	26	577,267	4.50

Sources: Chard et al. 2023 ; U.S. Census Bureau 2021

Table F6. Percentage change in transportation GHG emissions over a 5-year period

State	% change in GHG over a five-year period (2014 to 2018)
Alabama	5.60%
Alaska	2.56%
Arizona	8.31%
Arkansas	4.21%
California	8.55%
Colorado	4.61%
Connecticut	3.31%
Delaware	16.67%
District of Columbia	0.00%
Florida	8.61%
Georgia	3.18%
Hawaii	13.13%
Idaho	18.28%
Illinois	6.00%

State	% change in GHG over a five-year period (2014 to 2018)
Indiana	–3.23%
Iowa	–1.91%
Kansas	–6.34%
Kentucky	10.39%
Louisiana	10.16%
Maine	–14.77%
Maryland	2.53%
Massachusetts	7.29%
Michigan	7.26%
Minnesota	2.98%
Mississippi	12.01%
Missouri	0.27%
Montana	3.85%
Nebraska	5.04%
Nevada	10.64%
New Hampshire	2.99%

State	% change in GHG over a five-year period (2014 to 2018)
New Jersey	–5.95%
New Mexico	9.79%
New York	3.29%
North Carolina	2.03%
North Dakota	–7.00%
Ohio	–1.42%
Oklahoma	–0.06%
Oregon	2.88%
Pennsylvania	3.45%
Rhode Island	0.00%
South Carolina	9.27%
South Dakota	1.49%
Tennessee	6.25%
Texas	15.12%
Utah	7.74%
Vermont	–6.06%

State	% change in GHG over a five-year period (2014 to 2018)
Virginia	–0.61%
Washington	16.30%
West Virginia	17.11%
Wisconsin	1.99%
Wyoming	–1.23%

Source: DOT 2023

Table F7. Electric school bus fleet commitment percentages

State	Number of committed ESBs	School bus fleet	Percentage of fleet committed
California	1,669	19,900	8.39%
Maryland	336	8,908	3.77%
Virginia	171	11,486	1.49%
Montana	9	660	1.36%
Florida	218	17,949	1.21%
Rhode Island	9	862	1.04%

State	Number of committed ESBs	School bus fleet	Percentage of fleet committed
Maine	11	1,491	0.74%
Vermont	10	1,765	0.57%
Colorado	36	6,838	0.53%
Connecticut	45	8,814	0.51%
Massachusetts	41	8,182	0.50%
New Jersey	78	17,866	0.44%
Minnesota	9	2,189	0.41%
Illinois	89	21,898	0.41%
Washington	41	12,640	0.32%
New York	126	46,593	0.27%
Oregon	20	7,503	0.27%
Utah	8	3,303	0.24%
New Mexico	4	1,964	0.20%
Nevada	5	2,876	0.17%
Mississippi	6	3,674	0.16%
South Carolina	8	5,686	0.14%

State	Number of committed ESBs	School bus fleet	Percentage of fleet committed
Pennsylvania	21	15,426	0.14%
Oklahoma	2	1,476	0.14%
Arizona	9	6,643	0.14%
Hawaii	1	818	0.12%
Michigan	19	16,699	0.11%
Alaska	1	954	0.10%
Indiana	16	15,669	0.10%
North Carolina	11	12,707	0.09%
Missouri	9	12,226	0.07%
Delaware	1	1,551	0.06%
North Dakota	1	2,039	0.05%
Tennessee	3	9,065	0.03%
Iowa	2	6,840	0.03%
Alabama	2	10,482	0.02%
Ohio	2	19,572	0.01%
Texas	3	46,016	0.01%

State	Number of committed ESBs	School bus fleet	Percentage of fleet committed
Georgia	1	20,125	0.00%
Arkansas	0	7,016	0.00%
District of Columbia	0	683	0.00%
Idaho	0	3,803	0.00%
Kansas	0	4,115	0.00%
Kentucky	0	9,527	0.00%
Louisiana	0	3,569	0.00%
Nebraska	0	3,426	0.00%
New Hampshire	0	2,358	0.00%
South Dakota	0	2,684	0.00%
West Virginia	0	3,920	0.00%
Wisconsin	0	11,868	0.00%
Wyoming	0	1,828	0.00%

Source: WRI 2023