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Transportation Electrification: An Examination of the Utility's Role

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TRANSPORTATION ELECTRIFICATION: AN EXAMINATION OF THE UTILITY'S ROLE

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I. INTRODUCTION

Not only are utilities at the center of the effort to reduce greenhouse gas emissions by using renewable energy resources to generate electricity, they also play an instrumental role in transportation electrification. Regulators across the country view utility investments in electric vehicle (EV) infrastructure as the key to igniting increased EV ownership and use.

According to the Environmental Protection Agency, the transportation sector is now the leading source of greenhouse gas emissions, surpassing the

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level of pollution caused by the generation of electricity.[1] In response, state legislatures across the country are taking steps to incentivize the purchase of EVs, including directing utilities to file transportation electrification plans as a means of increasing the availability of EV charging infrastructure, a barrier to EV ownership. States are counting on the availability of publicly accessible charging stations as an effective way to meet an unfulfilled demand for EVs, while exploring various, but similar, approaches to engaging utilities in this effort.

To begin, this article explains generally how EVs work and the potential for advances in EV technology. The article then discusses the growth of the EV market and how data on greenhouse gas emissions has influenced public perceptions and public policy. Next, the article discusses transportation electrification plans and how states are using these plans to engage utilities in the effort to increase the availability of electricity as a power source for vehicles.

II. ELECTRIC VEHICLES

A. A Working Definition

The United States Department of Energy, Office of Energy Efficiency and Renewable Energy (DOE EE) explains what an EV is and how EV charging works:

> There are two basic types of EVs: all-electric vehicles (AEVs) and plug-in hybrid electric vehicles (PHEVs). AEVs include Battery Electric Vehicles (BEVs) and Fuel Cell Electric Vehicles (FCEVs). In addition to charging from the electrical grid, both types are charged in part by regenerative braking, which generates electricity from some of the energy normally lost when braking. Which type of vehicle will fit your lifestyle depends on your needs and driving habits. Find out which BEVs and PHEVs are available to suit your needs.
>
> All-electric vehicles (AEVs) run only on electricity. Most have all-electric ranges of 80 to 100 miles, while a few luxury models have ranges up to 250 miles. When the battery is depleted, it can take from 30 minutes (with fast charging) up to nearly a full day (with Level 1 charging) to recharge it, depending on the type of charger and battery.

[1] *Sources of Greenhouse Gas Emissions*, U.S. ENVTL. PROT. AGENCY, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions [https://perma.cc/EH8G-3PN6] [hereinafter *Sources of Greenhouse Gas Emissions*].

> If this range is not sufficient, a plug-in electric vehicle (PHEV) may be a better choice. PHEVs run on electricity for shorter ranges (6 to 40 miles), then switch over to an internal combustion engine running on gasoline when the battery is depleted. The flexibility of PHEVs allows drivers to use electricity as often as possible while also being able to fuel up with gasoline if needed. Powering the vehicle with electricity from the grid reduces fuel costs, cuts petroleum consumption, and reduces tailpipe emissions compared with conventional vehicles. When driving distances are longer than the all-electric range, PHEVs act like hybrid electric vehicles, consuming less fuel and producing fewer emissions than similar conventional vehicles. Depending on the model, the internal combustion engine may also power the vehicle at other times, such as during rapid acceleration or when using heating or air conditioning. PHEVs could also use hydrogen in a fuel cell, biofuels, or other alternative fuels as a back-up instead of gasoline.[2]

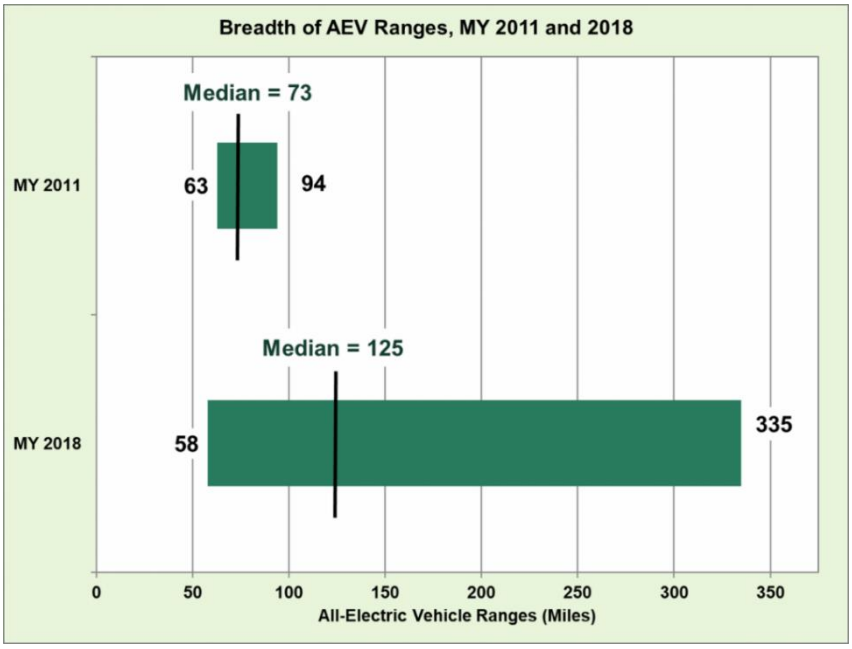
B. Technology

Scientists and engineers are furiously working to develop new EV battery technologies to increase driving range and improve battery performance. These efforts are spurring a variety of results, as discussed below.

[2] *Electrical Vehicle Basics*, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/electricvehicles/electric-vehicle-basics [https://perma.cc/9W7J-PH6M].

1. Range

Once fully charged, EVs can travel over 200 miles, although the average range is closer to 125 miles, as shown below[3]:



*MY – Model Year

The distance an EV can travel on a single charge is important for several reasons. First is the driver's obvious need to get to a destination. Because it is possible to charge EVs from home, it is clearly less worrisome to make a trip if one charge supports a full round trip of a known distance.[4] Second, the limited availability of publicly accessible charging stations means that drivers will limit their trips depending on how far they can drive with a full charge.[5] Third, the longer the charge lasts, the less likely that the

[3] *Median All-Electric Vehicle Range Grew from 73 Miles in Model Year 2011 to 125 Miles in Model Year 2018*, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY (Jan. 14, 2019), https://www.energy.gov/eere/vehicles/articles/fotw-1064-january-14-2019-median-all-electric-vehicle-range-grew-73-miles [https://perma.cc/3C2Z-F494].

[4] Steven Loveday, *11 Reasons People Don't Buy Electric Cars (and Why They're Wrong)*, U.S. NEWS & WORLD REPORT (Apr. 16, 2018), https://cars.usnews.com/cars-trucks/why-people-dont-buy-electric-cars [https://perma.cc/MPL2-CEDZ].

[5] *Electric Cars 101: The Answers to All Your EV Questions*, CONSUMER REPORTS (July 21, 2019), https://www.consumerreports.org/hybrids-evs/electric-cars-101-the-answers-to-all-your-ev-questions/ [https://perma.cc/DP86-8LY2] [hereinafter *Electric Cars 101*] ("[f]or EV drivers, planning when and where the car will be charged is a constant part of ownership.").

driver will have to compensate for other conditions, such as weather.[6] In colder temperatures, batteries do not stay charged as long. Relatedly, the time it takes to charge a vehicle discourages drivers from traveling further if waiting on a charge is lengthy; the colder the temperature, the longer it takes to charge the battery.[7]

According to Consumer Reports, owners in colder climates should plan to drive EVs that double the range of distance needed, explaining that "owners who drive 40 miles each way to work (for a total of 80 miles per day) should make sure their EV is estimated to get at least 160 miles of range unless they can reliably charge while they're at work . . . ."[8]

The American Automobile Association found that "when the mercury dips to 20°F and the HVAC system is used to heat the inside of the vehicle, the average driving range is decreased by 42 percent. This means for every 100 miles of combined urban/highway driving, the range at 20°F would be reduced to 59 miles."[9]

2. Battery Performance

The Energy Storage Group at the Idaho National Laboratory (Energy Storage Group), a national laboratory of the DOE, runs experiments to improve battery performance. They work with the Society of Automotive Engineers, industry groups, regulators, and utilities to establish safety and efficiency standards for charging stations and to develop methods for safely integrating charging systems into the electric power grid.[10]

Testing conducted by the Energy Storage Group is aimed at ensuring that "levels of efficiency meet industry standards; wireless charging systems detect potentially hazardous interactions with the electromagnetic field;

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[6] Tom Krisher, *AAA: Cold Weather Can Cut Electric Car Range Over 40 Percent*, ASSOCIATED PRESS (Feb. 7, 2019), https://www.apnews.com/04029bd1e0a94cd59ff9540a398c12d1 [https://perma.cc/YDZ8-ELLJ] (stating cold weather can sap electric car battery life by 40 percent).

[7] *Electric Cars 101*, *supra* note 5.

[8] Patrick Olsen, *Buying an Electric Car for a Cold Climate? Double Down on Range*, CONSUMER REPORTS (Feb. 13, 2019), https://www.consumerreports.org/hybrids-evs/buying-an-electric-car-for-a-cold-climate-double-down-on-range/ [https://perma.cc/TKM2-947A].

[9] *Icy Temperatures Cut Electric Vehicle Range Nearly in Half*, AM. AUTOMOBILE ASS'N: NEWSROOM (Feb. 7, 2019), https://newsroom.aaa.com/2019/02/cold-weather-reduces-electric-vehicle-range/ [https://perma.cc/46EK-N44B]. "HVAC" means heating, ventilation, and air conditioning.

[10] IDAHO NAT'L LAB., ELECTRICAL VEHICLE INFRASTRUCTURE LABORATORY (2015) https://inl.gov/wp-content/uploads/2015/12/EVI_Info_interior.pdf [https://perma.cc/44Q4-VQ36].

automated systems shut down when a hazard is detected; and charging systems work consistently across brands."[11]

Ensuring effective grid management includes "analyzing communication capabilities between utility companies and EVs for blackouts and brownouts - peak energy loads; and fluctuations of renewable resources on a microgrid; and assessing cybersecurity vulnerabilities associated with linking EV charging systems to smart grids."[12]

To facilitate these outcomes, the Energy Storage Group conducts research to determine the most effective batteries, considering battery composition:

> Everyday batteries might be charged by zinc and carbon, zinc and magnesium dioxide, lead-acid, lithium ions, or many other electrolyte combinations. But some electrolytes are more effective than others. Energy Storage Group research seeks to determine which electrolyte combinations will be most effective in different types of batteries. First, teams synthesize electrolytes to form new combinations. Then, they perform comprehensive testing on each combination to measure various characteristics, including different thermal and physical properties.[13]

3. Emerging Technologies

As the race for the most effective battery continues, competition for the best technology also grows.

Innolith, a Swiss startup company, claims that it has developed a lithium-ion battery which uses inorganic electrolytes to move power.[14] According to Innolith, this technology reduces the risk of fire compared to the highly flammable organic material ordinarily used in lithium-ion

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[11] *Id.*

[12] *Id.*

[13] IDAHO NAT'L LAB., ENERGY STORAGE GROUP (2014) https://inl.gov/wp-content/uploads/2014/10/Energy_Storage_Group_interior.pdf [https://perma.cc/665F-LGEM].

[14] Steve Hanley, *Swiss Startup Innolith Claims 1000 Wh/kg Battery Breakthrough*, CLEANTECHNICA (Apr. 4, 2019), https://cleantechnica.com/2019/04/04/swiss-startup-innolith-claims-1000-wh-kg-battery-breakthrough/ [https://perma.cc/A8CB-BXNZ].

batteries.[15] It also creates a higher-density energy battery, resulting in longer ranges of up to 600 miles.[16] This technology is currently under testing.

Flow battery technology is also in development.[17] This technology uses battery and hydrogen power to produce an energy density high enough to enable a car to travel up to 5000 kilometers on a single charge.[18] Researchers at Purdue University are testing this technology on golf carts, but its use would require drivers to *replace* the battery's electrolytes—not recharge them as is the case with electrolytes in a lithium-ion battery.[19] If drivers can charge lithium-ion batteries at home, replacing electrolytes at a station might not be optimal. Further, it is not clear whether this technology would be affordable and reliable in comparison to lithium-ion batteries.[20] Although at-scale manufacturing of cars with flow battery technology is still miles away, the research continues.[21]

C. Electric Vehicle Charging Infrastructure

Charging stations use specific infrastructure to deliver electricity to EVs, and new investments in that infrastructure are aimed at meeting the demand for publicly accessible charging stations. EV charging infrastructure is often referred to, broadly, as *electric vehicle supply equipment*, which

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[15] *Id.* The Chief Engineer of Innolith, Markus Borck, claims that the use of inorganic electrolytes removes "the risk of ignition and fire." Bryony Collins, *Innolith Battery Strikes at 'Flammable' Lithium-Ion: Q&A*, BLOOMBERGNEF (May 13, 2019), https://about.bnef.com/blog/innolith-battery-strikes-flammable-lithium-ion-qa/ [https://perma.cc/SX95-BMEX].

[16] Hanley, *supra* note 14.

[17] Bridie Schmidt, *New "Refillable" Battery Tech Could Allow Electric Cars Over 5000km Range*, THE DRIVEN (Feb. 18, 2019), https://thedriven.io/2019/02/18/refillable-electric-car-tech-purdue-university/ [https://perma.cc/PDB4-6GSY].

[18] *Id.*

[19] *Id.* Researches expect that the electrolytes, once removed, can be recharged for subsequent use in other vehicles. *See* Jon Cartwright, *Tenfold Improvement in Liquid Batteries mean Electric Car Refueling could take Minutes*, PHYS.ORG (Sept. 17, 2018), https://phys.org/news/2018-09-tenfold-liquid-batteries-electric-car.html [https://perma.cc/6KRF-XQ8K] ("[E]lectrolytes are green—the depleted ones can be recharged, hopefully using renewable electricity, and given to the next customer."); *see also* Eric C. Evarts, *Purdue Scientists Test Flow Battery for EVs, Claim 300-Mile Range*, GREEN CAR REP. (Feb. 12, 2019), https://www.greencarreports.com/news/1120397_purdue-scientists-test-flow-battery-for-evs-claim-300-mile-range [https://perma.cc/D3V2-XQ4U].

[20] Lithium-Ion batteries retain a significant advantage in power density. *See* Jamie Daggett, *Can Flow Batteries Compete with Li-ion?*, DNVGL: ENERGY IN TRANSITION (Jan. 11, 2019), https://blogs.dnvgl.com/energy/can-flow-batteries-compete-with-li-ion [https://perma.cc/WJ4D-H5TB].

[21] Schmidt, *supra* note 17; *see also* Cartwright, *supra* note 19.

includes various components, particularly the charger itself along with power supply cables, vehicle connectors, and protection components.[22] Infrastructure such as conduit, wiring, distribution lines, and transformers—which connects a charger to the electric grid—is often called *make-ready infrastructure*.[23] In some instances, the charger is also treated as make-ready infrastructure.[24] Chargers can be in any location where the equipment needed to connect the charger to the electric grid can be installed, including homes, workplaces, or public charging stations.[25]

Reliance on publicly accessible charging is likely to continue for two primary reasons. First, to facilitate longer-distance driving, EV drivers will need or want access to charging infrastructure other than at home.[26] Non-EV drivers have the option to fill up their gas tanks almost anywhere, giving those drivers enormous flexibility. Second, and perhaps equally importantly, not all EV drivers live in residences where EV charging is feasible; people in apartments or condominiums, for example, will more heavily rely on publicly accessible charging stations.[27]

According to the DOE EE, there are several types of charger options: alternating current (AC) Level 1, AC Level 2, and direct current (DC) fast charging.[28]

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[22] *Electric Vehicle Supply Equipment (EVSE)*, ENERGY STAR, https://www.energystar.gov/products/other/evse [https://perma.cc/8FFY-AKLQ].

[23] Adela Spulber & Brett Smith, *Are We Building The Electric Vehicle Charging Infrastructure We Need?*, INDUSTRY WEEK (Nov. 21, 2018), https://www.industryweek.com/technology-and-iiot/are-we-building-electric-vehicle-charging-infrastructure-we-need [https://perma.cc/PSS4-DR9E].

[24] *Id.*

[25] Electric Vehicle Charging Station Guidebook: Planning for Installation and Opertation, CHITTENDEN COUNTY RPC (2004) https://www.ccrpcvt.org/wp-content/uploads/2016/01/20140626-EV-Charging-Station-Installation-Guide.pdf [https://perma.cc/D6AM-SKYB].

[26] ALANA MILLER ET AL., CALPIRG EDUC. FUND & ENV'T CAL. RESEARCH & POLICY CENTER, FIVE WAYS CALIFORNIA CAN IMPROVE CHARGING TO UNLEASH THE POWER OF ELECTRIC CARS 8 (2019), https://environmentcaliforniacenter.org/reports/ame/ready-charge [https://perma.cc/X84E-ST6D].

[27] *Id.* at 11.

[28] *Vehicle Charging*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/vehicle-charging [https://perma.cc/XJZ4-PDYV]; *see also Charging at Home*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/charging-home [https://perma.cc/Z3Q6-UC4A]; *Charging on the Road*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/charging-road [https://perma.cc/BUU4-GGQT]; *Workplace Charging*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/workplace-charging [https://perma.cc/4A5R-AFYR].

> **Level 1**: Provides charging through a 120 V AC plug and does not require installation of additional charging equipment. Can deliver 2 to 5 miles of range per hour of charging. Most often used in homes, but sometimes used at workplaces.
>
> **Level 2**: Provides charging through a 240 V (for residential) or 208 V (for commercial) plug and requires installation of additional charging equipment. Can deliver 10 to 20 miles of range per hour of charging. Used in homes, workplaces, and for public charging.
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> **DC Fast Charge**: Provides charging through 480 V AC input and requires highly specialized, high-powered equipment as well as special equipment in the vehicle itself. (Plug-in hybrid electric vehicles typically do not have fast charging capabilities.) Can deliver 60 to 80 miles of range in 20 minutes of charging. Used most often in public charging stations, especially along heavy traffic corridors.[29]

To help people determine the cost of owning various makes and models of cars, including EVs and non-EVs, the DOE EE provides a cost calculator;[30] it also lists the location of public charging stations within each state.[31]

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[29] *Vehicle Charging, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/vehicle-charging [https://perma.cc/XJZ4-PDYV].*

[30] *Vehicle Cost Calculator*, U.S. DEP'T OF ENERGY: ALTERNATIVE FUELS DATA CENTER, https://afdc.energy.gov/calc/ [https://perma.cc/SHL8-KBGL].

[31] *Id.*; *see also Electric Vehicle Charging Outlets by State*, U.S. DEP'T OF ENERGY, https://afdc.energy.gov/data/10366 [https://perma.cc/XCA2-X9G3].

D. EV Market Share

Between 2017 and 2018, EV sales increased meaningfully, with California leading the country by achieving market shares of 5.02% in 2017 and 7.84% in 2018. Market shares in other states are shown below.[32]

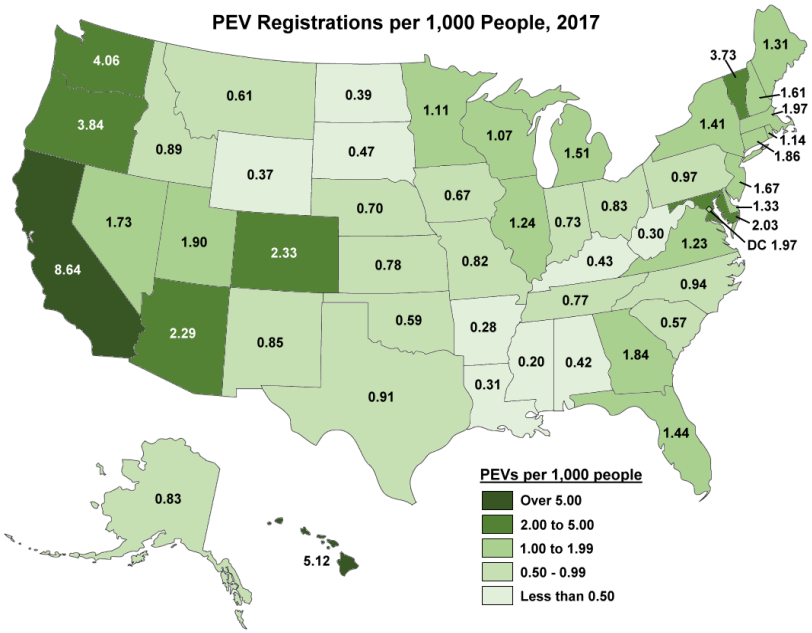
Position	State	EV Sales 2017	EV Sales 2018	2018-2017 Year over Year Sales Increase	2017 EV Market Share W/in State	2018 EV Market Share W/in State	2018 vs 2017 Year over Year Share % Increase
2	New York	10,090	15,752	56.11%	1.03%	1.56%	51.46%
3	Washington	7,068	12,650	78.98%	2.51%	4.28%	70.52%
4	Florida	6,573	13,705	108.50%	0.52%	1.03%	98.08%
5	Texas	5,419	11,764	117.09%	0.39%	0.78%	100.00%
6	New Jersey	5,033	9,230	83.39%	0.91%	1.59%	74.73%
7	Massachusetts	4,632	8,990	94.08%	1.35%	2.53%	87.41%
8	Colorado	4,156	7,051	69.66%	1.57%	2.61%	66.24%
9	Oregon	3,988	5,976	49.85%	2.36%	3.41%	44.49%
10	Illinois	3,812	7,357	93.00%	0.62%	1.20%	93.55%
11	Pennsylvania	3,346	6,063	81.20%	0.55%	0.92%	67.27%

While EV sales are on the rise nationally, it is important to recognize per capita rates of ownership as well. According to the DOE EE, there are eight states in the country that exceed two plug-in electric vehicles (PEVs) per 1000 people as shown below[33]:

- California – 0.864%
- Hawaii – 0.512%
- Washington – 0.406%
- Oregon – 0.384%
- Vermont – 0.373%
- Colorado – 0.233%
- Arizona – 0.229%
- Maryland – 0.203%

[32] Christopher McFadden, *6 Interesting Statistics About Electric Vehicles*, INTERESTING ENGINEERING (June 17, 2019), https://interestingengineering.com/6-interesting-statistics-about-electric-vehicles [https://perma.cc/PX32-JE2P] (citing data from the Alliance of Auto Manufacturers).

[33] *PEV Registrations per 1,000 People, 2017*, U.S. DEP'T OF ENERGY (2017) https://www.energy.gov/sites/prod/files/styles/borealis_photo_gallery_large_respondxl/public/fotw1059.png?itok=q2PMnRnW [https://perma.cc/97CJ-E8CP].



To facilitate the growth of EV markets, many states use rebates and tax credits to increase the demand for alternative fuel technologies and for EVs.[34]

California offers nearly three dozen state incentives. These include, for example, vouchers applicable to the purchase price of low-emission trucks and buses, rebates for EV supply equipment, exemption from high occupancy vehicle road tolls, vehicle replacement incentives, emissions reductions grants, and technology advancement funding.[35]

Hawaii offers two state incentives, including a renewable fuels production tax credit and a plug-in EV high-occupancy vehicle fee exemption.[36] Although Hawaii has the second highest per-capita EV registrations, the lack of charging infrastructure risks slowing market growth,

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[34] *Electric Vehicles: Tax Credits and Other Incentives*, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/electricvehicles/electric-vehicles-tax-credits-and-other-incentives [https://perma.cc/ZF4K-PUZR] [hereinafter *Tax Credits and Other Incentives*].

[35] *California Laws and Incentives*, U.S. DEP'T OF ENERGY: ALTERNATIVE FUELS DATA CENTER (Mar. 2018), https://afdc.energy.gov/laws/state_summary?state=CA [https://perma.cc/JUQ4-GUG4].

[36] *Hawaii Laws and Incentives*, U.S. DEP'T OF ENERGY: ALTERNATIVE FUELS DATA CENTER (May 2019), https://afdc.energy.gov/laws/state_summary?state=HI [https://perma.cc/LG35-F9NA].

according to a study conducted by the Ulupono Initiative, an investment firm that "strives to improve the quality of life for the people of Hawai'i by working toward solutions that create more locally grown food, increase clean renewable energy, and better management of waste and water."[37]

According to the study, 71% of EV owners prefer parking structures with charging infrastructure, while 73% of EV owners stated that the availability of charging stations affected their likelihood of visiting various businesses or establishments.[38]

The study concludes with the following observations about EV charging accessibility:

> In order to maximize the role of EVs in reducing Hawai'i's dependence on imported fuel and fully benefit from this emerging market, it is critical that public- and private-sector stakeholders foster a supportive ecosystem for EVs by adopting progressive policy and ensuring that infrastructure, in the form of charging stations, keeps pace and precedes demand.

It should also be noted that postponing investments in such infrastructure is unlikely to generate cost savings. Requiring new facilities to be EV-ready adds less than 1 percent to the cost of development, while installing EV infrastructure post-construction costs three times more. Upfront investments are cost-effective, smart and essential future proofing.[39]

A number of other states also offer incentives aimed at increasing EV demand. The incentives vary by type, but include, for example: EV plug-in rebates; fuel and emission reduction incentives; grants for alternative fuel vehicles and infrastructure; parking incentives for alternative fuel vehicles; fuel cell EV tax credits; reduced alternative fuel vehicle license tax; assistance programs for public fleets; and pollution control equipment exemptions, among others. Colorado[40] and New York[41] have more than a

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[37] ULUPONO INITIATIVE, THE EXTRA MILE: WHY ELECTRIC VEHICLES MAKE SENSE FOR HAWAI'I'S ECONOMY, ENVIRONMENT AND COMMUNITIES 18 (2019), http://ulupono.com/media/W1siZiIsIjIwMTkvMDQvMTEvMTdfMDFfMTNfMjkzX1VsdXBvbm9fSW5pdGlhdGl2ZV9XaGl0ZV9QYXBlcl9UaGVfRXh0cmFfTWlsZV8wNF8xMV8xOV8wMy5wZGYiXV0/Ulupono%20Initiative%20White%20Paper%20-%20The%20Extra%20Mile%2004-11-19%2003.pdf?sha=9e2e22a2 [https://perma.cc/D7RL-DR26].

[38] *Id.* at 13.

[39] *Id.* at 17.

[40] *Colorado Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (June 2019), https://afdc.energy.gov/laws/state_summary?state=CO [https://perma.cc/6TA3-V8F3].

[41] *New York Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (Nov. 2019), https://afdc.energy.gov/laws/state_summary?state=NY [https://perma.cc/ZM2P-52B7].

dozen such incentives; Washington[42] has nearly a dozen; Oregon[43] has seven; Maryland[44] has more than six; Arizona[45] has six; and Vermont[46] has five.

Even with these efforts, the percentage of EV sales throughout the United States remains relatively small, though estimates show an expected rise in EV demand, particularly in states encouraging such results.[47]

In addition to state action, the federal government also plays an important role in incentivizing EV ownership. According to the DOE EE, tax credits of between $2500 and $7500 are available to reduce the up-front costs of plug-in hybrids and all-electric vehicles.[48]

II CLEAN TRANSPORTATION GOALS

A. Greenhouse Gas Emissions

The emphasis on expanding the EV market is directly tied to the goal of reducing greenhouse gas emissions, including carbon dioxide (CO_2) resulting from the combustion of petroleum-based products such as gasoline.[49] According to the Environmental Protection Agency, transportation is now the single leading cause of greenhouse gas emissions.[50]

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[42] *Washington Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (Apr. 2019), https://afdc.energy.gov/laws/state_summary?state=WA [https://perma.cc/B86V-3RC8].

[43] *Oregon Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (Oct. 2019), https://afdc.energy.gov/laws/state_summary?state=OR [https://perma.cc/NQ6M-RJV9].

[44] *Maryland Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (Apr. 2019), https://afdc.energy.gov/laws/state_summary?state=MD [https://perma.cc/R8XF-69R8].

[45] *Arizona Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (May 2019), https://afdc.energy.gov/laws/state_summary?state=AZ [https://perma.cc/N29Q-XYW9].

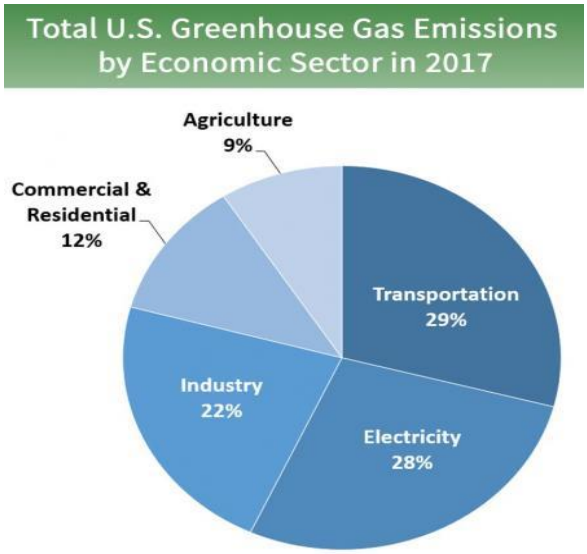
[46] *Vermont Laws and* Incentives, ALTERNATIVE FUELS DATA CENTER (June 2019), https://afdc.energy.gov/laws/state_summary?state=VT [https://perma.cc/2Z25-Y43B].

[47] CHRISTINE GRANT ET AL., TRANSPORTATION ELECTRIFICATION FOR ELECTRIC UTILITIES2 (2019), https://forthmobility.org/storage/app/media/Documents/Forth-Utility-White-Paper.pdf [https://perma.cc/3KWF-GKEY].

[48] *Tax Credits and Other Incentives*, *supra* note 34.

[49] *See Emissions from Hybrid and Plug-In Electric Vehicles*, U.S. DEP'T OF ENERGY: ALTERNATIVE FUELS DATA CENTER, https://afdc.energy.gov/vehicles/electric_emissions.html [https://perma.cc/A6FJ-TQX4]; *see also* ELECTRIC VEHICLE SURVEY FINDINGS AND METHODOLOGY, UNION OF CONCERNED SCIENTISTS (July 2019), https://www.ucsusa.org/sites/default/files/attach/2019/07/2019-EV-Survey.pdf [https://perma.cc/ZKY3-5927]; Christion Morris, *Charging Ahead: are Electric Vehicles the Future of Transportation?*, CLIMATEXCHANGE (OCT. 24, 2019) https://climate-xchange.org/2019/10/24/charging-ahead-are-electric-vehicles-the-future-of-transportation/ [https://perma.cc/5954-LCPB].

[50] *Sources of Greenhouse Gas Emissions*, *supra* note 1.



[51]

The EPA states that "[T]he largest sources of transportation-related greenhouse gas emissions include passenger cars and light-duty trucks, including sport utility vehicles, pickup trucks, and minivans."[52] A 2019 report by the Minnesota Pollution Control Agency echoes this finding, stating "[T]ransportation is now the largest source of GHG [greenhouse gas] emissions in Minnesota. This sector will require ongoing, focused effort to reduce emissions to the levels necessary to meet statutory goals."[53] According to the report, "more than 70% of emissions from the transportation sector come from light-duty trucks, passenger vehicles, and medium to heavy-duty trucks."[54]

Data from the U.S. Energy and Information Administration "show[s] that the U.S. transportation sector has produced more carbon pollution than any other sector of the economy over the last 12 months, including the electric power, industrial, residential, and commercial sectors."[55]

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[51] *Id.*

[52] *Id.*

[53] ANNE CLAFLIN & FAWKES STEINWAND, MINN. POLLUTION CONTROL AGENCY, GREENHOUSE GAS EMISSIONS IN MINNESOTA: 1990-2016 2 (2019) https://www.pca.state.mn.us/sites/default/files/lraq-2sy19.pdf [https://perma.cc/F5WJ-V7TN].

[54] *Id.* at 7.

[55] *New Federal Data Show Transportation Sector Now the Largest Source of Carbon Pollution in the United States, First Time in Nearly 40 Years*, U.S. PUB. INTEREST RESEARCH

According to the Union of Concerned Scientists (UCS), an EV has a climate impact that is equivalent to that of a gasoline vehicle reaching 80 miles per gallon.[56] This advantage grows, says UCS, as EV technology improves and as the electric grid is increasingly powered by renewable energy resources.[57] A survey by UCS and Consumer Reports reflects public interest and support for EVs.[58] The survey showed that 63% of Americans are interested in EVs, 31% would consider purchasing one as their next vehicle, and that policies encouraging EVs have broad support.[59] The survey also found:

- 65% of survey respondents want incentives and tax rebates for plug-in electric cars to be available to all consumers in every region and income bracket;
- 67% say electric utilities should offer discount rates for electric car charging;
- 67% want their state to invest in electric car charging infrastructure;
- 64% want their state to electrify public transit, including school buses.[60]

B. The Federal Clean Air Act

In 1966, California "established the first tailpipe emissions standards in the nation."[61] To establish national uniform standards, the subsequent Federal Clean Air Act of 1970 barred individual states from adopting their own emissions standards but effectively authorized California to do so, if the standards "will be, in the aggregate, at least as protective of public health and welfare as applicable Federal standards."[62]

GRP. (Aug. 4, 2016), https://uspirg.org/news/usp/new-federal-data-show-transportation-sector-now-largest-source-carbon-pollution-united [https://perma.cc/PKJ2-ADK5].

[56] *Surveying Consumers on Electric Vehicles (2019)*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/clean-vehicles/electric-vehicles/ev-survey-2019 [https://perma.cc/UE2L-SQV5] [hereinafter *Surveying Consumers*].

[57] David Reichmuth, *New Data Show Electric Vehicles Continue to Get Cleaner*, UNION OF CONCERNED SCIENTISTS (Mar. 8, 2018), https://blog.ucsusa.org/dave-reichmuth/new-data-show-electric-vehicles-continue-to-get-cleaner [https://perma.cc/2N8H-QANC].

[58] *Surveying Consumers*, *supra* note 56.

[59] *Id.*

[60] *Id.*

[61] *History*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/about/history [https://perma.cc/MTE3-29C5] [hereinafter *History*].

[62] Four years after California passed the first tailpipe emission standards, Congress passed the Federal Clean Air Act of 1970. *See* Pub. L. No. 91-604, 84 Stat. 1694 (codified as 42 U.S.C. § 7543(b)(1) (1970)).

In 1967, the California Air Resources Board (CARB) was established, which describes its role as follows:

Under the provisions of the Clean Air Act, CARB has adopted, implemented and enforced a wide array of nation-leading air pollution controls, based on a strong foundation of science over the next five decades. This regulatory history reflects a longstanding partnership between state and federal air quality regulators during both Republican and Democratic presidential administrations. This partnership has allowed California to develop and implement air pollution control strategies that have proven to be a model for other states, the nation and other countries.[63]

Under the Federal Clean Air Act, states other than California are prohibited from establishing emissions standards different from the federal standards, with one exception. States may adopt the standards established by California.[64] To date, the following states have done so: Colorado, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington, as well as the District of Columbia.

California's efforts to reduce greenhouse gas emissions in the transportation sector go far beyond setting and enforcing standards. In October 2018, CARB approved a $483 million plan that would "fund clean car rebates, zero-emission transit and school buses, clean trucks, and other innovative clean transportation mobility projects."[65]

The plan includes:

> **$200 million** for the Clean Vehicle Rebate Project (CVRP), including increased rebates for low-income consumers. (CVRP promotes clean-vehicle adoption by offering rebates for the purchase or lease of new, eligible zero-emission vehicles, including electric, plug-in hybrid electric and fuel cell vehicles.)
>
> **$75 million** for Transportation Equity Projects, including the Enhanced Fleet Modernization Plus-Up/Clean Cars 4 All Program (incentives for lower-income drivers to scrap and replace older, high-polluting cars with zero- or near-zero-emission cars), Financing Assistance for Lower-Income Consumers, Clean Mobility Options, Agricultural Worker Vanpools, Rural School Bus Pilot Project, and the new Clean Mobility in Schools Project.

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[63] *History*, *supra* note 61.

[64] 42 U.S.C. § 7507 (1990).

[65] *CARB Approves $483 Million Funding Plan for Clean Transportation Investments*, CAL. AIR RES. BD. (Oct. 25, 2018), https://ww2.arb.ca.gov/news/carb-approves-483-million-funding-plan-clean-transportation-investments [https://perma.cc/TRN3-94DX].

> **$180 million** for Clean Truck & Bus Vouchers (HVIP and Low NOx [Nitrogen Oxides] Engine Incentives) and the Zero- and Near-Zero Emission Freight Facilities Project.
>
> **$28.6 million** for Air Quality Improvement Program or AQIP-funded heavy-duty vehicle investments, including the Truck Loan Assistance Program and new Diesel Particulate Filter Retrofit Replacements.[66]

C. The Volkswagen Settlement

Many state programs and policies aimed at funding EVs, as described above, are supported in part by a settlement reached by the EPA and the Federal Trade Commission with German automaker, Volkswagen.[67] The settlement arose as a result of allegations that the Company had disabled emissions controls in diesel vehicles, resulting in the release of thousands of tons of nitrogen oxides (NOx) emissions in excess of legal limits.[68] The rate of NOx emissions in diesel engines is higher because such engines operate at a higher pressure and temperature.[69] High concentrations of NOx harm respiratory systems in people and interact with water, oxygen, and other chemicals in the air to cause acid rain, resulting in harm to ecosystems and water resources.[70]

Volkswagen agreed to settle the dispute for approximately $14.7 billion, which requires in part that the Company:

> create a National Zero Emission Vehicle (ZEV) Investment Plan and spend $2 billion on ZEV infrastructure and programs and brand neutral media activities aimed at increasing public awareness of zero emission vehicles. The amount will be divided between California ($800 million) and the rest of the United States ($1.2 billion).[71]

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[66] *Id.*

[67] *About the Settlement*, NASEO & NACAA VW SETTLEMENT CLEARINGHOUSE, https://vwclearinghouse.org/about-the-settlement/ [https://perma.cc/23GT-JQAX].

[68] *Id.*

[69] İBRAHIM ASLAN REŞITOĞLU, NOX POLLUTANTS FROM DIESEL VEHICLES AND TRENDS IN THE CONTROL TECHNOLOGIES 4 (2018), https://www.intechopen.com/online-first/nox-pollutants-from-diesel-vehicles-and-trends-in-the-control-technologies [https://perma.cc/A28J-GYAT].

[70] *Id.* at 1–2.

[71] *About the Settlement, supra* at 67.

III. TRANSPORTATION ELECTRIFICATION PLANS

According to Corinne Le Quéré, a professor of climate change science and policy at the University of East Anglia, "[W]e have electric cars, but we need charging points, we need to lower the costs of electric vehicles."[72]

The availability of charging infrastructure has traditionally garnered less attention from legislators and policymakers compared to that of EV rebates, credits, and similar incentives. But transportation electrification plans across the country are changing that reality.

Generally, transportation electrification plans describe and direct utilities' role in the deployment of EV charging infrastructure, in developing incentives for EV use, and in implementing educational and outreach programs.[73] These plans vary from state to state, but they are aimed at EV market expansion as a means of reducing greenhouse gas emissions.[74]

As shown above, transportation is the single leading cause of emissions.[75] Reducing emissions is tied not only to EV incentives but also to the availability of public charging infrastructure, as demand for EVs continues to increase nationally.

Transportation electrification plans act as an incentive not only for EV drivers but also for utility companies. As more people drive EVs, the demand for electricity increases, giving utilities an opportunity to benefit.[76] Under these plans, utilities are typically directed to propose rate structures designed to incentivize charging during off-peak periods as a way to limit the

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[72] Kendra Pierre-Louis, *Greenhouse Gas Emissions Accelerate Like a 'Speeding Freight Train' in 2018*, N.Y. TIMES (Dec. 5, 2018), https://www.nytimes.com/2018/12/05/climate/greenhouse-gas-emissions-2018.html [https://perma.cc/9JWJ-NFW3].

[73] PHILLIP B. JONES ET AL., FUTURE ELEC. UTIL. REGULATION, THE FUTURE OF TRANSPORTATION ELECTRIFICATION: UTILITY, INDUSTRY, AND CONSUMER PERSPECTIVES 19 (2018), https://www.nclc.org/images/pdf/energy_utility_telecom/electric_vehicles_evs/future-transportation-report-2018.pdf [https://perma.cc/VH4P-CFF8].

[74] Nancy E. Ryan & Luke Lavin, *Engaging Utilities and Regulators on Transportation Electrification*, 28 ELEC. J. 5 (2015), https://www.sciencedirect.com/science/article/pii/S1040619015000755 [https://perma.cc/4G3B-E95R].

[75] *See Sources of Greenhouse Gas Emissions*, *supra* note 50.

[76] Robert Walton, *EVs Could Drive 38% Rise in US Electricity Demand, DOE Lab Finds*, UTILITY DIVE (July 10, 2018), https://www.utilitydive.com/news/evs-could-drive-38-rise-in-us-electricity-demand-doe-lab-finds/527358/ [https://perma.cc/7KAK-RSQ8]; *see also* TRIEU MAI ET AL., NAT'L RENEWABLE ENERGY LAB., ELECTRIFICATION FUTURES STUDY: SCENARIOS OF ELECTRIC TECHNOLOGY ADOPTION AND POWER CONSUMPTION FOR THE UNITED STATES 82 (2018), https://www.nrel.gov/docs/fy18osti/71500.pdf [https://perma.cc/2G9J-JM8S] (showing that the expected rise in electricity use is between twenty and thirty-eight percent greater than if no transportation electrification).

impact of energy demand on the utility's overall electric distribution system.[77] Managing energy demand is a core component of utility engagement in transportation electrification.[78] Incentivizing demand during off-peak hours benefits utilities by increasing sales but also protects ratepayers by limiting the need for new power plants and the associated ratepayer costs of those plants.[79] At the same time, utility investments in charging infrastructure are needed to increase the availability of charging stations.

Although there is broad support for this approach, groups representing fossil fuel interests argue that it is not the role of the ratepayer to subsidize infrastructure to support EVs, further claiming that EV benefits are overblown.[80] They maintain that the development of such infrastructure should be left to the competitive market to avoid thwarting further innovation.[81] And, they argue that the potential environmental benefits are outweighed by the impact of electric use for battery charging, stating that environmental studies do not fully account for the costs associated with battery and EV manufacturing.[82]

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[77] *See* CAL. PUB. UTIL. COMM'N ENERGY DIV., ACTIONS TO LIMIT UTILITY COSTS AND RATES PUBLIC UTILITIES CODE SECTION 913.1 ANNUAL REPORT TO THE GOVERNOR AND LEGISLATURE 14 (May 2017), https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/Office_of_Governmental_Affairs/Legislation/2017/SB%20695_Master%20Draft_final_5-12-17.pdf [https://perma.cc/V3GH-KM3G] ("It is also a priority for the CPUC to approve well-crafted rates that properly incentivize charging during off-peak hours to help stabilize the distribution system and integrate the increasing amount of renewable energy available in the state.").

[78] *See* TRIEU MAI ET AL., *supra* note 69, at 15 ("How electrification impacts load shapes could have significant impact on electric utility planning, grid operations, reliability assessments, and electricity markets.").

[79] F. Todd Davidson, et al., *Is America's Power Grid Ready for Electric Cars?*, CITYLAB (Dec. 7, 2018), https://www.citylab.com/transportation/2018/12/americas-power-grid-isnt-ready-electric-cars/577507/ [https://perma.cc/N3BZ-F9K4]; Herman K. Tabish, *EV Charging Promises A Demand Response Bonanza for Utilities, If They Can Handle It*, UTILITY DIVE (Oct. 18, 2019) https://www.utilitydive.com/news/ev-charging-promises-a-demand-response-bonanza-for-utilities-if-they-can-h/563453/ [https://perma.cc/UUE9-9WUZ].

[80] Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, E&E NEWS (Oct. 25, 2018), https://www.eenews.net/stories/1060104353 [https://perma.cc/N8LY-RHQ9]; *see also* Gavin Bade, *The Oil Industry vs. The Electric Car*, POLITICO (Sept. 16, 2019), https://www.politico.com/story/2019/09/16/oil-industry-electric-car-1729429 [https://perma.cc/8XXU-7ACV].

[81] Tomich, *supra* note 80.

[82] *Id.*

In 2018, the Illinois Commerce Commission opened a proceeding to consider the utility role in EV charging infrastructure, and in response to concerns raised that the utility role should be limited, "Chicago-based Commonwealth Edison and Ameren Corp., based in St. Louis, said EVs significantly reduce air emissions, including greenhouse gases and ozone- and smog-forming nitrogen oxides. The utilities said the emissions benefits will only increase over time as fossil-fuel-based generation is displaced by cleaner energy."[83]

Some organizations representing ratepayer interests echo the concern that infrastructure investment costs should not be shouldered by ratepayers, cautioning against a system in which utilities profit from such investments.[84] Ratepayer advocates include various state chapters of the Citizens Utility Board and some state Attorneys General.[85]

Environmental groups generally respond to ratepayer cost concerns by asserting that increased retail electricity sales will put downward pressure on rates and that incentivizing charging during off-peak periods will limit the need for new power plants.[86]

As the EV market continues to grow, the need for EV infrastructure will also continue to grow despite efforts to limit such growth. The Trump administration recently attempted to roll back Obama-era EPA fuel-economy and emissions standards that were developed using the higher standards set by California, and subsequently revoked California's right to waive federal emissions standards in favor of higher standards.[87] Reducing or repealing the standards would compel California (and other states that signed onto California's standards) to either follow standards far lower than those set by the Obama administration, or in the alternative, significantly reduce the fines automakers would pay for violating the standards.[88]

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[83] *Id.*

[84] *Id.*

[85] *Id.*

[86] Eric Schmidt, *Electric Utility Led EV Incentive Programs Help Grid Stability, Reduce Emissions, Manage Costs, and Provide Greater Efficiency*, FLEETCARMA (July 24, 2017), https://www.fleetcarma.com/electric-utility-led-ev-incentive-programs-grid-stability-emissions/ [https://perma.cc/8Y88-LAWC]; Herman K. Trabish, *Team of Rivals: Utilities, Enviros Unite to Push Electric Vehicles*, Utility Dive (Feb. 26, 2018), https://www.utilitydive.com/news/team-of-rivals-utilities-enviros-unite-to-push-electric-vehicles/517330/ [https://perma.cc/T2Q5-WT9Z].

[87] Coral Davenport & Hiroko Tabuchi, *Automakers, Rejecting Trump Pollution Rule, Strike a Deal with California*, N.Y. TIMES (July 25, 2019), https://www.nytimes.com/2019/07/25/climate/automakers-rejecting-trump-pollution-rule-strike-a-deal-with-california.html?module=inline [https://perma.cc/XZ9Y-P785].

[88] Shane O'Kane, *Trump's Vehicle Emissions Rollback Is Dicey, So He's Lowering The Fine for Gas Guzzlers*, THE VERGE (July 15, 2019),

The current administration's move comes on the heels of an agreement between California and four automakers that would authorize a "slightly looser standard than the original Obama rule: Instead of reaching an average 54.5 miles per gallon by 2025, they would be required to hit about 51 miles per gallon by 2026."[89] The four automakers include Ford Motor Company, Volkswagen of America, Honda, and BMW, which represent approximately 30% of the U.S. auto market.[90] California also signed a clean-car deal with Canada, which would adopt the state's standards.[91] That step, according to Daniel Lashof, of the World Resources Institute, "shows that state leadership is indispensable. That's where the leadership is coming from right now in the U.S. on climate."[92]

Mercedes-Benz is expected to join the four other automakers in the California agreement, and California officials expect other automakers to ultimately join as well.[93] The administration's plan to roll back the federal emission standards faces a daunting task: to assemble a coherent technical and scientific analysis required by law to implement a rule change of this scope.

Several analyses by academics and consumer advocates have questioned the administration's claim of benefits to the public. An Aug. 7 report by Consumer Reports concluded that Mr. Trump's proposed rollback would cost consumers $460 billion between vehicle model years 2021 and 2035, an average of $3,300 more per vehicle, in car prices and gasoline purchases. It also found the rollback would increase the nation's oil consumption by 320 billion gallons.[94]

Under the agreement with California, automakers agree to produce a fleet of cars that would be available nationwide to meet the state's higher standards, regardless of changes by the federal government.[95] The groundbreaking agreement effectively rendered moot efforts to reduce the

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https://www.theverge.com/2019/7/15/20695407/trump-vehicle-emissions-rollback-fines-epa-nhtsa [https://perma.cc/2ZQK.D6HF].

[89] Davenport & Tabuchi, *supra* note 87.

[90] *Id.*

[91] *Id.*

[92] *Id.*

[93] *Id.*

[94] CORAL DAVENPORT & HIROKO TABUCHI, *Trump's Rollback of Auto Pollution Rules Show Signs of Disarray*, N.Y. TIMES (Aug. 28, 2019), https://www.nytimes.com/2019/08/20/climate/trump-auto-emissions-rollback-disarray.html [https://perma.cc/FYN9-M2Y9].

[95] Anna M. Phillips & Tony Barboza, *California Reaches Climate Deal with Automakers, Spurning Trump*, L.A. TIMES (July 25, 2019), https://www.latimes.com/politics/story/2019-07-25/california-reaches-climate-deal-with-automakers-spurning-trump [https://perma.cc/4RPV-KDP3].

national standards put into place by the Obama administration.[96] In the meantime, however, California has sued the current administration to protect its right to waive federal emissions standards, in light of the attempt to reduce or repeal the Obama-era standards.[97]

IV. THE FORK IN THE ROAD

Although the national trend toward transportation electrification is growing, states are taking different approaches to engaging utilities in the effort. An examination of these approaches is set forth below.

A. California

In 2015, California adopted the Clean Energy and Pollution Reduction Act (Senate Bill 350, or SB 350),98 which states, in part:

> The Legislature finds and declares that, in addition to other ratepayer protection objectives, a principal goal of electric and natural gas utilities' resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity, and to improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency, development of renewable energy resources, such as wind, solar, biomass, and geothermal energy, and widespread transportation electrification.[99]

The change directs utilities to address, in their integrated resource plans, steps for the procurement of transportation electrification, which is defined as follows:

> "Transportation electrification" means the use of electricity from external sources of electrical power, including the electrical grid, for all or part of vehicles, vessels, trains, boats, or other equipment that are mobile sources of air pollution and greenhouse gases and the related programs and charging propulsion infrastructure investments to enable and encourage this use of electricity.[100]

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[96] *Id.*

[97] *See generally* Tony Barnoza. *California sues Trump again for revoking state's authority to limit auto emissions*, L.A. TIMES, (Nov. 15, 2019 https://www.latimes.com/california/story/2019-11-15/california-trump-administration-lawsuit-auto-emissions-climate-change) [https://perma.cc/N6CX-UKQH].

[98] CAL. PUB. UTIL. CODE § 400.

[99] *Id.* § 701.1(a)(1).

[100] *Id.* § 237.5.

On January 11, 2018, the California Public Utilities Commission made its first decision under the new legislation by approving portions of transportation electrification applications filed by San Diego Gas and Electric Company, Pacific Gas and Electric Company, and Southern California Edison Company.[101]

San Diego Electric Company's application included two pilot programs involving make-ready infrastructure. The first is a residential make-ready rebate pilot, and the second is an electric transit bus make-ready project.[102]

Under the residential make-ready rebate pilot, the program will provide funding to residential customers seeking to charge at home, offsetting the cost of a new circuit, new panel, or new meter socket.[103] The pilot program is available to customers who agree to take charging under one of two rate structures designed to incentivize charging during off-peak hours.[104] San Diego Electric Company stated that it anticipates up to 5000 residential participants in the program and that subsequent reporting will demonstrate the effectiveness of the program.[105] Half the funds must be made available to persons in disadvantaged communities but may be subsequently made available to other eligible customers if those funds have not been allocated mid-way through the enrollment period.[106] Approved program costs total approximately $4 million.[107]

The second program will offset the cost of charging equipment and installation for commuter buses operating in San Diego Electric Company's service territory.[108] It will develop and serve approximately twenty charge ports. The goal is to assist government transit agencies with the challenges of siting charging infrastructure, as well as the process of determining charging times and training maintenance technicians.[109] Eligible customers must agree to take service under rate structures that incentivize charging during off-peak periods, and they are directed to maximize routes in disadvantaged communities.[110] The California Commission approved

[101] Pac. Gas & Elec. Co., 17-04-028, 2018 WL 555615, at *1 (Cal. P.U.C. Jan. 11, 2018) (final decision).
[102] San Diego Gas & Elec. Co., 343 P.U.R.4th 15, 57 (Cal. P.U.C. Jan. 11, 2018) (final decision).
[103] *Id.* at 45.
[104] *Id.* at 47.
[105] *Id.*
[106] *Id.* at 49.
[107] *Id.* at 4.
[108] *Id.* at 59.
[109] *Id.* at 58.
[110] *Id.* at 59.

approximately $4 million in program costs,[111] noting that the cost of charging infrastructure is one of the key barriers to electrification of the public transit sector.[112]

Prior to adoption of SB 350, the California Commission approved other similar plans in response to then-Governor Brown's executive order directing the Commission to engage utilities in EV infrastructure development to support one million EVs on the road by 2020.[113] The application of Pacific Gas and Electric Company for approval of an infrastructure investment plan and education program resulted in Commission approval of $130 million in pilot program costs for EV infrastructure, including 7500 Level 2 charging ports.[114] In that decision, the Commission authorized utility ownership of make-ready infrastructure, as well as ownership of thirty-five percent of EV supply equipment.[115]

Parties concurred on Pacific Gas and Electric Company's request to earn a rate-of-return on the make-ready infrastructure costs but disputed the reasonableness of authorizing the Company to earn a rate-of-return on the cost of EV supply equipment.[116] The California Commission ultimately authorized the recovery of costs in the same manner, to be included in the rate base, determining that the investments will be used and useful in rendering electric service.[117]

Since approval of these and numerous other plans, the California Commission initiated a rulemaking proceeding to further explore the utility ownership model and to standardize the process for achieving state goals for EV ownership and use, thereby increasing certainty and clarity for stakeholders.[118] That rulemaking will explore numerous issues, including the potential ratepayer benefits of utility ownership of charging infrastructure, rather than ownership of only make-ready infrastructure.

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[111] *Id.*

[112] *Id.* at 60.

[113] OFFICE OF GOVERNOR EDMUND G. BROWN JR., Exec. Order B-16-2012 (Mar. 23, 2012).

[114] *See* Pac. Gas & Elec. Co., 16-12-065, 2016 WL 7449470, at *2 (Cal. P.U.C. Dec. 15, 2016).

[115] *Id.* at *2.

[116] Decision Directing Pacific Gas and Electric Company to Establish an Electric Vehicle Infrastructure and Education Program, In the Matter of the Application of Pacific Gas and Electric Company for Approval of its Electric Vehicle Infrastructure and Education Program (U39E), Application 15-02-009, Decision 16-12-065, December 15, 2016, at 64, 84.

[117] *Id.*

[118] Order Instituting Rulemaking to Continue the Dev. of Rates & Infrastructure for Vehicle Electrification, R. 18-12-0006. Order Instituting Rulemaking to Consider Alternative-Fueled Vehicle Programs, Tariffs, & Policies., R. 13-11-007, 2018 WL 6830161, at *1 (Cal. P.U.C. Dec. 13, 2018).

The proceeding will also examine the reasonableness of authorizing utilities to earn a rate-of-return on infrastructure costs, rather than to treat such costs as expenses to be recovered as pass-through costs.[119] Along these lines, the proceeding will also consider the cost-effectiveness of large-scale utility investments compared to the benefits of an open, competitive market that could potentially drive down infrastructure costs.[120] Further, the proceeding will examine how to encourage use of off-peak electricity as a transportation fuel in a manner that will be less costly than diesel and petroleum, as well as how to incentivize charging during peak periods of renewable energy generation.[121]

B. Hawaii

According to Hawaii's State Energy Office, in 2015 the state was the national leader in per capita public EV charging stations.[122]

Registered EVs and Public Charging Systems in Hawaii, November 2015[123]

County	Electric Vehicles	Level 2 Charging System Ports	DC Fast Charging System Ports	Total Ports
Oahu	2,957	252	10	262
Maui	655	67	35	102
Hawaii	172	56	2	58
Kauai	135	33	1	34
Total Statewide	**3,919**	**408**	**48**	**456**

Although there are no state requirements that utilities file transportation electrification plans, the Hawaii Public Utilities Commission noted that the four "mayors of Honolulu, Maui, Hawaii, and Kauai counties jointly committed to transition to 100% renewable fuels in transportation by

[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] STATE ENERGY OFFICE, DEP'T OF BUS., ECON. DEV., & TOURISM, ELECTRIC VEHICLE; ELECTRIC VEHICLE CHARGING SYSTEM INSTALLATION 2 (2015), http://files.hawaii.gov/dbedt/annuals/2015/2015-act-164-installation-of-ev-charging-stations.pdf [https://perma.cc/9FGQ-9K5K].
[123] *Id.* at 3.

2045."[124] The Commission further stated that "developing the necessary infrastructure to further encourage the growth and viable development of the EV market is consistent with the State of Hawaii's overall policy of promoting the use of EVs as a viable option and alternative to traditional fossil fuel modes of transportation."[125]

In March 2018, in response to a Hawaii Commission directive, Hawaiian Electric companies filed an Electrification of Transportation Strategic Roadmap to identify, among other things, the utilities' role in infrastructure investment.[126] In response to the filing, the Commission identified rate design and charging infrastructure as areas of short-term priority and therefore directed the utilities to file a detailed work plan to address these issues.[127] That plan is forthcoming.

Prior to this most recent step, the Hawaii Commission approved five-year pilot programs for Hawaiian Electric Company, Inc.; Hawaii Electric Light Company, Inc.; and Maui Electric Company, Limited, governing commercial operators of public EV charging facilities.[128] The Companies subsequently requested to extend the programs, which affect the rates charged to the charging station operators but not the rates charged to EV drivers.[129] Under the pilots, the Hawaii Commission authorized the utilities to own and operate DC fast-charging stations.[130] The upcoming plans that the utilities are required to file will address, among other issues, whether to make the pilot programs permanent.[131]

According to Hawaii's State Energy Office,

> With appropriate EV charging infrastructure in place, EVs can be timed to charge at periods that best support the integration of renewable energy and do not overburden the electric grid, such as

[124] Hawaiian Elec. Cos.' Electrification of Transp. Strategic Roadmap, Order No. 35527, Docket No. 2018-0135, at 4 (Haw. Pub. Util. Comm'n June 13, 2018).
[125] *Id.* at 4–5.
[126] Hawaiian Electric Company, Inc. Report, Review of Demand-Side Management Reports and Requests for Program Modifications, Hawaiian Electric Annual Program Accomplishments and Surcharge Report, No. 2007-0341 (Haw. Pub. Util. Comm'n Mar. 29, 2018).
[127] Hawaiian Elec. Cos.' Electrification of Transp. Strategic Roadmap, *supra* note 117, at 4.
[128] Order Dismissing the HECO Cos.' Transmittal No. 12-05, Order No. 31061 (Haw. Pub. Util. Comm'n Feb. 28, 2013).
[129] News Release, Hawaiian Elec., Maui Electric, Hawai'i Electric Light, Hawaiian Electric Companies' EV Fast Charger Program Extended (June 8, 2017), https://www.hawaiianelectric.com/documents/about_us/news/2017/20170608_hawaiian_electric_companies_ev_fast_charger_program_extended.pdf [https://perma.cc/8K23-TGUP].
[130] *Id.*
[131] *See* Dismissing Without Prejudice Transmittal No. 12-05, Order No. 31061, at 4 (Haw. Pub. Util. Comm'n Feb. 28, 2013).

> during the middle of the day when solar generation is at its peak or during the middle of the night when loads are low but wind turbines are still generating.[132]

C. Washington

In 2019, the Washington Legislature passed bills that authorize the Utilities and Transportation Commission "to review and approve EV infrastructure and incentive plans for Washington's regulated investor-owned utilities."[133] The legislation also directs the utilities to file electrification of transportation plans.[134] The legislation authorizes utilities to invest in:

> EV infrastructure, allowing an incentive rate of return of up to 2% on capital invested in EV supply equipment deployed for the benefit of ratepayers. However, those capital expenditures may not increase the utility's annual retail revenue requirements by more than one-quarter of one percent after accounting for the revenue benefits of EV adoption.[135]

Although utilities are allowed to earn a return on expenditures for EV supply equipment, such as chargers, the Washington Commission "must consider and may adopt other policies to improve access to and promote fair competition in the provision of electric vehicle supply equipment."[136]

D. Oregon

In 2016, Oregon passed sweeping legislation to increase electricity generation through use of renewable energy resources and to set the stage for transportation electrification.[137] In adopting the legislation, the Legislature declared that:

> (a) Transportation electrification is necessary to reduce petroleum use, achieve optimum levels of energy efficiency and carbon reduction, meet federal and state air quality standards, meet this

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[132] STATE OF HAWAII DEP'T OF BUS., ECON. DEV., & TOURISM, ELECTRIC VEHICLES; PUBLIC BENEFITS FEE 15 (2015), http://files.hawaii.gov/dbedt/annuals/2015/2015-act-164-installation-of-ev-charging-stations.pdf [https://perma.cc/9FGQ-9K5K].

[133] Eric Christensen & David Weber, *New Washington Legislation Steps on the Electric Vehicle Accelerator*, JD SUPRA (July 5, 2019), https://www.jdsupra.com/legalnews/new-washington-legislation-steps-on-the-14703/ [https://perma.cc/DF9K-HKRF].

[134] *Id.*

[135] *Id.*

[136] WASH. REV. CODE § 80.28.360 (2019).

[137] OR. REV. STAT. § 757.357 (2019).

> state's greenhouse gas emissions reduction goals described in ORS 468A.205 and improve the public health and safety;
> (b) Widespread transportation electrification requires that electric companies increase access to the use of electricity as a transportation fuel . . . .
> [. . .]
> (d) Widespread transportation electrification should stimulate innovation and competition, provide consumers with increased options in the use of charging equipment and in procuring services from suppliers of electricity, attract private capital investments and create high quality jobs in this state . . . .[138]

One of the key elements of the statutory changes requires the Oregon Commission to direct utilities to file plans for accelerating transportation electrification and authorizes utility infrastructure investments.[139] The statute states that a "program proposed by an electric company may include prudent investments in or customer rebates for electric vehicle charging and related infrastructure."[140] Notably, the statute is clear that "electric vehicle charging infrastructure provides utility service to the customers of an electric company."[141]

In response to the legislation, the Oregon Commission promulgated a rule requiring public utilities to file plans every two years that include "a discussion of the electric company's potential impact on the competitive electric vehicle supply equipment market, including consideration of alternative infrastructure ownership and business models, and identification of a sustainable role for the electric company in the transportation electrification market."[142]

Since that time, the Oregon Commission approved three pilot programs. The first is a public charging pilot in which PacifiCorp (Pacific Power), a regulated electric company, *will own and operate* up to seven charging sites that provide DC fast chargers and at least one Level 2 port.[143] The program expenses are capped at $1.85 million.[144] The second pilot is an outreach and education program to test strategies for informing the public about electric transportation options.[145] Program costs are capped at

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[138] *Id.*
[139] *Id.*
[140] *Id.* § 757.357(3).
[141] *Id.* § 757.357(6).
[142] Rulemaking Regarding Transp. Electrification Plans, Order No. 19-134, AR 609 (Or. Pub. Util. Comm'n Apr. 16, 2019).
[143] Order Authorizing PacifiCorp to Undertake Transp. Electrification Programs, Order No. 18-075, UM 1810 (Or. Pub. Util. Comm'n Feb. 27, 2018).
[144] *Id.* at 3.
[145] *Id.*

$1.105 million.[146] The third pilot is a demonstration and development pilot that will invite Pacific Power's customers to file for grants to own and operate EV supply equipment, with program costs capped at $1.685 million.[147]

In response to the public charging pilot, ChargePoint, Inc. (ChargePoint) filed comments opposing Pacific Power's ownership of charging infrastructure, stating that the program is anti-competitive.[148] ChargePoint is, according to its website, the largest network of EV charging stations in the U.S., and claimed that Pacific Power would have an unfair advantage in its service territory and become the largest provider of charging stations.[149] ChargePoint stated that the pilot is inconsistent with the Legislature's goal that transportation electrification should stimulate innovation and competition.[150]

The Oregon Commission disagreed with ChargePoint's assertions, stating:

> In responding to ChargePoint's arguments in docket UM 1811, we first confirmed that SB 1547 does not prohibit utility ownership of EV service equipment. Although the bill contains no language that expressly addresses utility ownership, we concluded that testimony on the floor of the House of Representatives during the passage of the bill made clear that the legislature expected utilities to own and operate EV charging infrastructure.
>
> Second, we concluded that, in evaluating a program to accelerate transportation electrification, we were required to consider the six factors set out Section 20(4) of SB 1547, but need not make specific findings as to each criterion. Specifically, we determined that the legislature's use of the word "consider," read in its immediate context, makes clear that we are to take in account these factors during our review, but that we retain discretion in our decision-making whether to approve a program.[151]

E. Colorado

In 2019, Colorado passed legislation authorizing utility ownership of EV infrastructure, including charging stations.[152] The changes authorize public utilities to invest in charging infrastructure, as follows:

> An electric public utility may recover the costs of distribution system investments to accommodate alternative fuel vehicle

[146] *Id.*
[147] *Id.* at 4.
[148] *Id.* at 5.
[149] *Id.*
[150] *Id.*
[151] *Id.* at 6.
[152] 2019 Colo. Legis. Serv. Ch. 383 (West).

> charging, subject to evaluation and cost recovery provisions that are comparable to other regulated investments in the distribution grid; except that distribution system investments that are a component of a transportation electrification plan submitted in accordance with section 40-5-107 are subject to sections 40-3-116 and 40-5-107. The commission shall consider revenues from electric vehicles in the utility's service territory in evaluating the retail rate impact. The retail rate impact from the development of electric vehicle infrastructure must not exceed one-half of one percent of the total annual revenue requirements of the utility.[153]

The legislation directs public utilities to file transportation electrification plans, consistent with the following:

> 1 (a) No later than May 15, 2020, and on or before May 15 every three years thereafter, an electric public utility shall file with the commission an application for a program for regulated activities to support widespread transportation electrification within the area covered by the utility's certificate of public convenience and necessity. (b) To comply with this subsection (1), an application must seek to minimize overall costs and maximize overall benefits and may include:
>
> (I) investments or incentives to facilitate the deployment of customer-owned or utility-owned charging infrastructure, including charging facilities, make-ready infrastructure, and associated electrical equipment that support transportation electrification.[154]

F. Vermont

In May 2018, the Vermont Legislature directed the state's Public Utility Commission to submit a report by July 1, 2019 on the utility role in transportation electrification.[155] In response, the Commission identified numerous issues for consideration, particularly the utilities' involvement in the deployment and operation of charging stations.[156] The report states that the Commission intends to invite utilities to file transportation electrification plans, while noting that some utilities had already sought non-ratepayer utility funds to deploy charging infrastructure within their service territories.[157]

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[153] COLO. REV. STAT. § 40-1-103.3(6) (2019).
[154] COLO. REV. STAT. § 40-5-107 (2019).
[155] Act 158 (H.917) § 25, 2018 Gen. Assemb. (Vt. 2018).
[156] VT. PUB. UTIL. COMM'N, REPORT TO THE VERMONT STATE LEGISLATURE: PROMOTING THE OWNERSHIP AND USE OF ELECTRIC VEHICLES IN THE STATE OF VERMONT 2–3 (2018).
[157] *Id.* at 14.

More specifically, the report identified as a key issue utility ownership of public charging stations, recognizing that some states have adopted public-interest tests to evaluate whether it is reasonable for utilities to own charging stations.[158] Typical considerations include the need for public charging and the importance of facilitating a competitive market. The report states:

> In most contexts today, the business case for investing in, owning, and operating public charging infrastructure is not attractive for private investment alone to appropriately scale the market. Therefore, utility ownership and operation of EV charging stations may be appropriate in places or in situations not served by the private market (for example, to serve rural or low-to-moderate income neighborhoods or communities that may not otherwise attract private investment).[159]

The report further states that "there may be instances where the public interest in advancing public EV charging infrastructure warrants a deviation from traditional cost-causation principles. We recommend considering proposed deviations on a case-by-case basis."[160]

The report also emphasizes the need for utility proposals to include alternative rate designs to limit the impact of demand charges and to establish time-of-use rates for home, public, and workplace charging to incentivize charging during off-peak hours or during periods of renewable energy generation as a way to absorb surplus renewable energy through use of renewable energy resources, such as solar.[161] Demand charges are calculated based on a location's maximum instantaneous power draw.[162] Fast-charging stations require larger and more expensive distribution networks to meet that demand, and utilities would, therefore, typically apply demand charges, making fast-charging convenient but more costly.[163]

To address this barrier to the development of a fast-charging marketplace, the report recommends that utilities consider alternatives to demand charges, such as volumetric charges, to kickstart market growth.[164]

Since receiving the report, the Vermont Legislature proposed statutory changes that would allow utility ownership of charging stations, consistent with the goal of balancing ratepayer costs and overall EV benefits. The proposed legislation also directs the Vermont Commission to develop

[158] *Id.* at 18.
[159] *Id.* at 18.
[160] *Id.* at 19.
[161] *Id.* at 8–18.
[162] *Id.* at 9–10.
[163] *Id.* at 10.
[164] *Id.*

requirements for evaluating a utility's proposed ownership model that would authorize the recovery of some portion of EV-related infrastructure costs, particularly "where the competitive market does not provide an incentive for deployment of purely market-based infrastructure . . . ."[165]

G. Massachusetts

In November 2017, the Massachusetts Department of Public Utilities approved a $45 million charging program for two utility companies called Eversource Energy,[166] which proposed "(1) increased investment in long dwell-time EV charging make-ready infrastructure in public and workplace settings and at multi-unit dwellings (MUDs); and (2) increased market education and outreach targeting potential car buyers in the two utilities' service territories."[167] Outside California, the Massachusetts proposal was the largest of its kind at the time.[168]

Beginning in 2018, Eversource Energy would, over five years, "support the deployment of up to 72 direct charging (DC) fast charging ports at 36 charging sites, and up to 3,955 Level II charging ports at 452 charging sites throughout Eversource Energy's service territories."[169] Ten percent of the charging infrastructure would be deployed in environmental justice communities, along with rebates for EV chargers in those same communities.[170]

To fulfill its role, Eversource Energy proposed installing and owning the following: "(1) distribution primary lateral service feed; (2) necessary transformer and transformer pad; (3) new service meter; (4) new service panel; and (5) associated conduit and conductor necessary to connect each piece of equipment."[171]

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[165] Letter from the State of Vt. Pub. Util. Comm'n to Chairs Cummings, Bray, Mazza, Briglin, and McCormack, Committee Chairs for the Vt. House and Senate (Jan. 23, 2019), https://legislature.vermont.gov/Documents/2020/WorkGroups/Senate%20Finance/Electric%20Vehicles/W~John%20Cotter~Electric%20Vehicle%20Charging%20Stations~1-30-2019.pdf [https://perma.cc/8ETN-SFUH].

[166] Order Establishing Eversource's Revenue Requirement, D.P.U. 17-05, at 501 (Mass. Dep't Pub. Util. Nov. 30, 2017). Eversource Energy includes the following: NSTAR Electric Company and Western Massachusetts Electric Company.

[167] *Id.* at 471.

[168] Noah Garcia, *Massachusetts Approves Precedential Electric Vehicle Program*, NAT. RES. DEF. COUNCIL (Dec. 4, 2017), https://www.nrdc.org/experts/noah-garcia/massachusetts-approves-precedential-electric-vehicle-program [https://perma.cc/E2L4-NALF].

[169] Order Establishing Eversource's Revenue Requirement, *supra* note 165, at 472.

[170] *Id.* at 473.

[171] *Id.* at 472–73.

Citing one of its prior decisions, the Massachusetts Department of Public Utilities stated that cost-recovery of EV supply equipment (charging station and connector or cord supplying electricity to the EV) may be allowed but that any utility proposal for the ownership and operation of EV supply equipment must: "(1) be in the public interest; (2) meet a need regarding the advancement of EVs in the Commonwealth that is not likely to be met by the competitive EV charging market; and (3) not hinder the development of the competitive EV charging market."[172]

In approving the proposal, the Department found that "the Companies' proposed EV infrastructure program meets a need regarding the advancement of EVs in the Commonwealth that is not likely to be met by the competitive EV charging market."[173]

In 2018, the Department approved a second similar plan filed by National Grid; this plan authorizes a $45 million investment in a charging network of residential, work, and public charging stations.[174] The program involves the deployment of 600 Level 2 charging stations and 80 fast-charging stations.[175]

H. Maryland

In January 2019, the Maryland Public Service Commission approved proposals by utility companies to install a network of more than 5000 residential, workplace, and public charging stations (less than what the utilities originally proposed) as a way to reduce the cost to ratepayers.[176] Under the plan, more than 900 of the stations will be utility-owned.[177]

In its decision, the Maryland Commission addressed challenges to its authority to allow utilities to own and operate charging stations without explicit legislative authority, stating, "[W]hile EV charging stations, themselves, are facilities that use specialized equipment to provide electricity to charge an EV battery, what takes place at the station is the retail sale of electricity."[178]

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[172] *Id.* at 475 (citing D.P.U. 13-182-A at 13 (2014)).

[173] *Id.* at 477.

[174] Noah Garcia, *Massachusetts Approves New EV Program*, NAT. RES. DEF. COUNCIL (Sept. 11, 2018), https://www.nrdc.org/experts/noah-garcia/massachusetts-approves-new-ev-program [https://perma.cc/5JQK-V842].

[175] *Id.*

[176] Colin Campbell, *Maryland Public Service Commission Authorizes Utilities to Install 5,000 Electric Vehicle Charging Stations Statewide*, BALT. SUN (Jan. 14, 2019), https://www.baltimoresun.com/news/environment/bs-md-electric-vehicle-charging-stations-20190114-story.html [https://perma.cc/2GTR-PJ9X].

[177] *Id.*

[178] Elec. Vehicle Work Group for Implementation of a Statewide Elec. Vehicle Portfolio, Order No. 88997, Case No. 9478 (Pub. Serv. Comm'n of Md. Jan. 14, 2019).

The Maryland Commission further explained its authority to authorize utility ownership and operation of charging stations as follows:

> The Commission's authority over EV charging programs is also consistent with the Commission's general duty to consider "the economy of the State, the conservation of natural resources, and the preservation of environmental quality" when supervising and regulating public service companies. It is alleged that the Utility-owned charging stations will have a direct impact on the number of EVs in Maryland and that the level of EV adoption in Maryland will affect the State's ability to curb carbon emissions and meet its GHG emissions reduction targets. It follows that the Commission's jurisdictional authority extends to utility-operated charging services, which impacts the conservation of natural resources and preservation of the environment.[179]

I. New York

In February 2019, the New York Public Service Commission authorized $31.6 million in utility infrastructure investments to support 1075 fast-charging stations across the state.[180] As Commissioner Gregg C. Sayre explained, "EVs, as is well known, have a chicken-and-egg problem. Chargers aren't being built because there aren't enough EVs and EVs aren't being bought because there aren't enough chargers. This item helps us get out of that cycle."[181]

In making its decision, the New York Commission required that utilities file annual reports on the following:

> [T]he cumulative number of plugs for which the utility has received applications; the number of plugs in service and their geographic siting; the number of plugs under construction and their estimated in-service dates; station equipment type; installation costs; energy usage data including kWh dispensed, start/stop times, peak kW per charging station, amount of time each vehicle is plugged in, amount of time each vehicle is actually charging, and load curves; comparisons of peak DCFC station demand with local peak demand and system peak demand; usage fees; and, technologies used to manage demand. This interim

[179] *Id.* at 40.
[180] Philip Gordon, *New York Combats Range Anxiety with EV Plan*, SMART ENERGY INT'L (Feb. 12, 2019), https://www.smart-energy.com/industry-sectors/electric-vehicles/new-york-state-combats-range-anxiety-with-ev-plan/ [https://perma.cc/MKH9-3FT8].
[181] *Id.*

> review will allow the Commission to evaluate the success of the per-plug incentive program, and make any prudent changes.[182]

The New York Commission also noted the importance of prudently investing in EV charging infrastructure, while anticipating that increased utility revenues will lower ratepayer costs. The Commission also acknowledged, however, that it is unable to predict with certainty the extent to which those savings will occur.[183] "Nonetheless, the Commission recognizes the importance of meeting our State ZEV [zero-emission vehicle] targets and commits electric ratepayer funds to incentivize the market to build the necessary infrastructure and capture the benefits those goals will realize."[184]

Tesla is challenging the decision in state court, arguing that the New York Commission's decision denying the Company incentives under the plan due to its use of proprietary charging technology is unlawful.[185] Tesla's charging infrastructure is not compatible with other car models, and the Commission's goal is to standardize the technology to ensure that ratepayer-funded infrastructure investments are broadly available to the public.[186] That case is pending.

J. Missouri

In 2018, the Missouri Court of Appeals Western District ruled in favor of Kansas City Power and Light Company's appeal of a decision by the Missouri Public Service Commission denying the Company recovery of costs for owning and operating EV charging stations.[187] The court disagreed with the Commission's decision that EV charging stations do not fall within the definition of "electric plant," which is defined under Missouri law[188] as follows:

> [A]ll real estate, fixtures and personal property operated, controlled, owned, used or to be used for or in connection with or

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[182] Order Establishing Framework for Direct Current Fast Charging Infrastructure Program, Case 18-E-0138, at 42 (N.Y. Pub. Serv. Comm'n Feb. 7, 2019).
[183] *Id.* at 44–49.
[184] *Id.* at 49.
[185] Liz Young, *Tesla Fights New York's Decision to Exclude the Automaker from $31 Million Incentive Program*, ALB. BUS. REV. (Aug. 7, 2019), https://www.bizjournals.com/albany/news/2019/08/07/tesla-new-york-state-ev-charging-incentives.html [https://perma.cc/ZJG6-6Y3K].
[186] Order Establishing Framework for Direct Current Fast Charging Infrastructure Program, *supra* note 175, at 45.
[187] Kansas City Power & Light (KCP&L) v. Missouri Pub. Serv. Comm'n, 557 S.W.3d 460, 462 (Mo. App. 2018).
[188] MO. ANN. STAT. § 386.020(14) (West 2019).

> to facilitate the generation, transmission, distribution, sale or furnishing of electricity for light, heat or power; and any conduits, ducts or other devices, materials, apparatus or property for containing, holding or carrying conductors used or to be used for the transmission of electricity for light, heat or power.[189]

Kansas City Power and Light had requested that its EV charging station infrastructure costs be included in the Company's rate base, but the Missouri Commission denied the request, stating that EV charging equipment is not the transmission of electricity but rather a battery-charging service.[190]

The court disagreed with the Missouri Commission, stating that the customer purchases nothing from the charging station other than electricity for the purpose of powering his or her vehicle.[191] The court was not persuaded that the sale of electricity becomes a battery-charging service because the electricity is not immediately consumed.[192] Rather, the court found that the battery serves as a storage device, similar to how other appliances increasingly use rechargeable batteries, such as cellular phones.[193]

The court also rejected the Missouri Commission's comparisons of EV charging stations to other types of battery-charging services, such as recreational vehicle parks and airports, finding that electricity service is ancillary to the services offered by those proprietors.[194] In those instances, rental space and other amenities are the primary service.[195] Importantly, the court also recognized public accessibility of charging stations as a distinguishing factor in analyzing the utility's role.[196] Because the electricity offered at charging stations is indiscriminately and reasonably made available to the general public, the service triggers the Commission's jurisdiction.[197]

Further, the court dismissed the Missouri Commission's policy concerns that ratepayers would be required to subsidize the utility's infrastructure investments or that utility ownership would give utilities a competitive advantage over private investments in charging stations.[198] The court reasoned that the Commission has the authority to balance ratepayer

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[189] *Id.*
[190] *KCP&L*, 557 S.W.3d at 465.
[191] *Id.* at 470.
[192] *Id.*
[193] *Id.*
[194] *Id.* at 471.
[195] *Id.*
[196] *Id.*
[197] *Id.*
[198] *Id.* at 472.

interests and review the prudence of a utility's costs.[199] The court concluded that the Commission could, in its role, exercise its full range of regulatory authority to address issues raised in specific proceedings.[200]

K. Minnesota

In February 2019, the Minnesota Public Utilities Commission issued an order on EV charging and infrastructure, making a number of key findings, including, *inter alia* that: transportation electrification is in the public interest; there are barriers to EV adoption; optimizing EV benefits is critical to effective grid management; utilities have a central role in transportation electrification; utilities should take steps to encourage cost-effective EV adoption; utility proposals should be comprehensive; and cost recovery of infrastructure investments will be evaluated on a case-by-case basis.[201]

The Minnesota Commission subsequently approved two pilot programs proposed by Xcel Energy (Xcel).[202] The first is a public charging pilot, and the second is an EV fleet charging program (for three public entities with fleets of vehicles that will be transitioned to EVs).[203] In both instances, Xcel would own the make-ready infrastructure, not the charging stations.[204] In the Fleet EV pilot program, Xcel would own chargers at the request of any customer who would then be required to make an up-front payment for the full cost of the equipment.[205]

Xcel Large Industrials is challenging the Minnesota Commission's decision approving Xcel's pilot programs.[206] The group includes: Covia Holdings Corporation; Flint Hills Resources Pine Bend, LLC; Gerdau Ameristeel US Inc.; Marathon Petroleum Company LP; and USG Interiors, Inc.[207] The group argued that it is not the role of the ratepayer to subsidize the development of an EV charging marketplace and claimed that the Commission does not have statutory authority to authorize Xcel to own make-ready infrastructure or charging equipment for purposes of advancing

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[199] *Id.*

[200] *Id.* at 472–73.

[201] Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/CI-17-879 at 2 (Feb. 1, 2019).

[202] Xcel Energy's Petition for Approval of Elec. Vehicle Pilot Programs, Docket No. E-002/M-18-643, at 3 (Minn. Pub. Util. Comm'n July 17, 2019).

[203] *Id.*

[204] *Id.* at 6.

[205] *Id.* at 4–6.

[206] Petition for Reconsideration and Motion, Docket No. E-002/M-18-643, at 6, (Minn. Pub. Util. Comm'n Aug. 6, 2019).

[207] *Id.*

transportation electrification.[208] They further argued that the Commission's decision would harm the competitive market for such infrastructure.[209]

The Minnesota Commission found that because the applicable statute "does not preclude coexistence of utility and non-utility retail electric vehicle charging within a service area, the Commission is not persuaded that the specter of statutory exclusivity is a reason to reject these pilots."[210] That case is pending.

V. CONCLUSION

The demand for EVs is on the rise and automakers are geared up to meet that demand, but regulators see a role for utilities as well.

Regardless of whether state legislatures have explicitly directed utilities to file transportation electrification plans or have otherwise encouraged them, the mechanisms for effective implementation are being left largely to state utility commissions. Ownership models, cost recovery approaches, and rate structures are being left in the hands of regulators with the expertise to determine the most effective approaches for balancing the goal of achieving transportation electrification, while keeping ratepayers' costs low and making efficient use of the electric grid.

Pilot programs will continue to inform the role of the utility, as will decisions that authorize investments for both utility-owned and privately-owned charging infrastructure. Development of a private, competitive, and innovative marketplace for publicly accessible EV charging stations continues to be on the minds of state regulators, who are working to balance stakeholders' interests, while achieving targets for increased EV ownership.

[208] *Id.* at 6.
[209] *Id.* at 5.
[210] *Id.* at 6.