Fuels Institute

EVC ELECTRIC VEHICLE COUNCIL

EV Market Regulatory Report

ANALYSIS OF THE REGULATIONS AFFECTING THE INSTALLATION AND OPERATION OF EV CHARGING EQUIPMENT IN THE U.S. AND CANADA

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Providing market and policy intelligence with unique insight and analysis for the fuels industry, including conventional, biofuels and alternative fuels market and policy issues.

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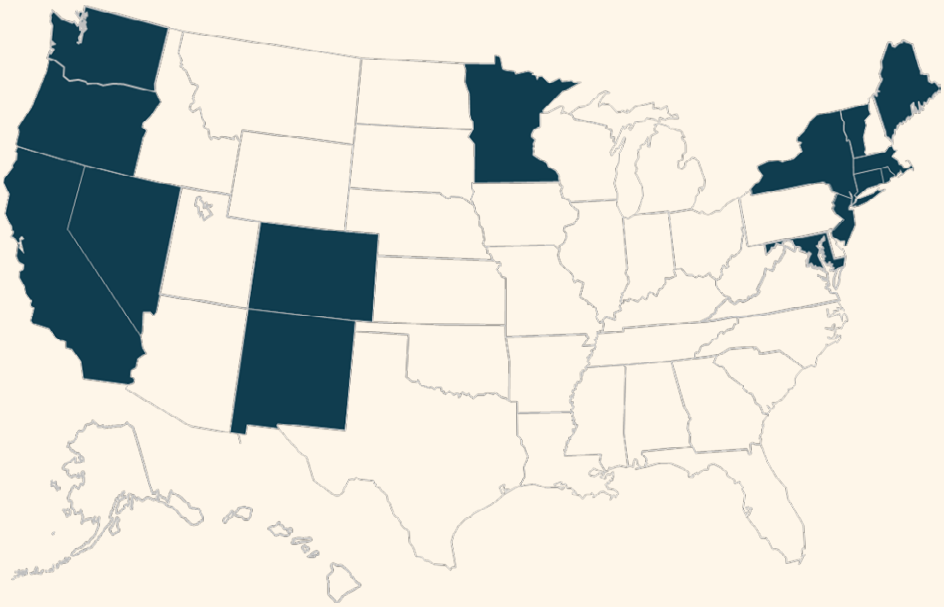
EXECUTIVE SUMMARY

EV Market Regulatory Report

As the electric vehicle (EV) market continues to grow and charging continues to expand in North America, companies in the public charging space continue to evaluate whether, how, and where to enter the market.[1]

The EV market is evolving rapidly and so are policies.[2] Many states have developed light-duty zero-emission vehicle (ZEV) mandates (Figure 1).[3] According to the U.S. Department of Energy (DOE), there are more than 26,963 electric vehicle charging stations (EVCS) in the U.S. with 87,047 charging outlets.[5] From 2016 to 2020, the number of charging

FIGURE 1: STATE LIGHT-DUTY ELECTRIFICATION MANDATES[3]



Source: Compiled by Transport Energy Strategies, October 2020

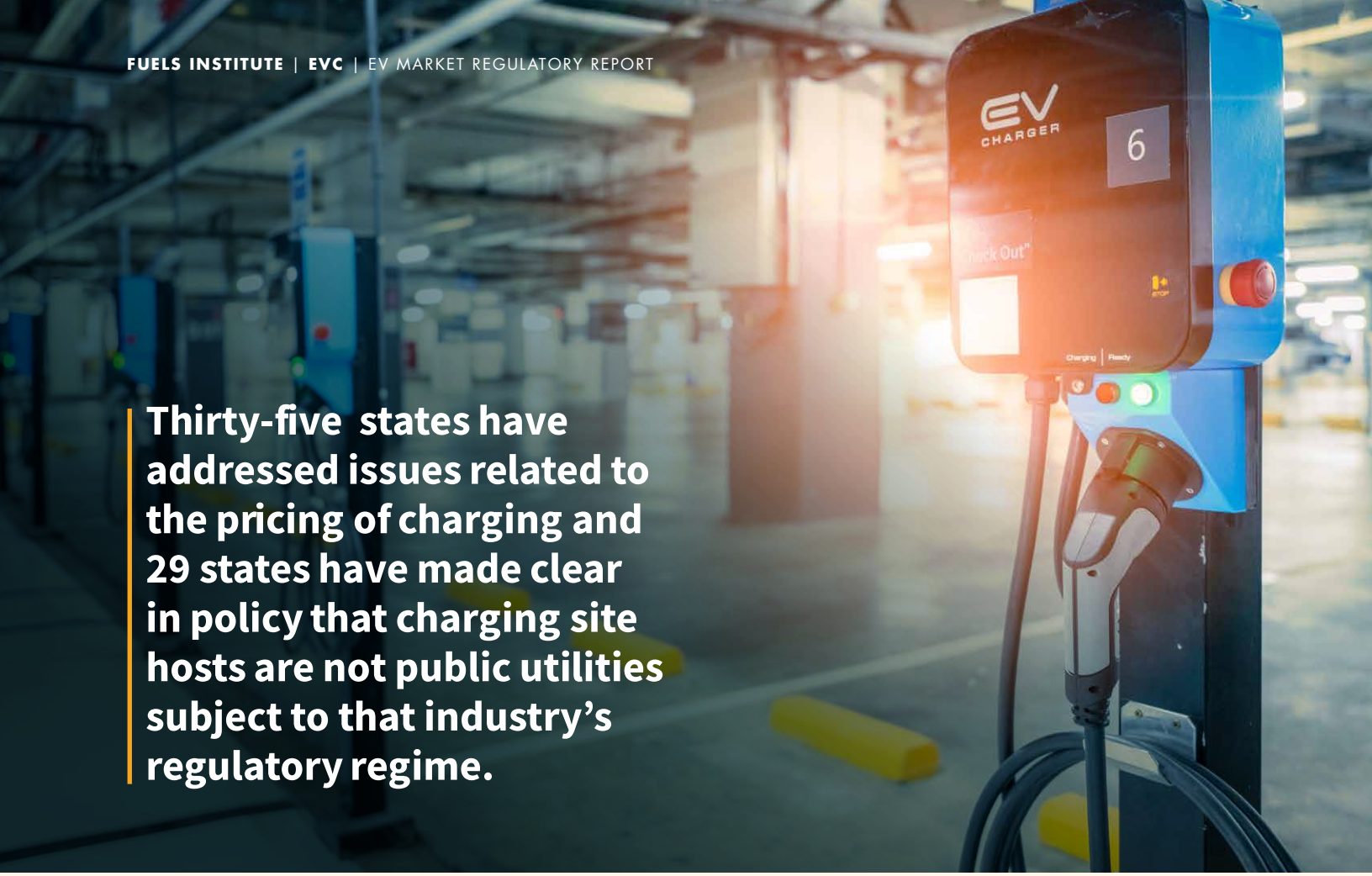
1 Public charging is defined as those charging facilities not located at a private residence, multi-unit dwelling, workplace, private fleet depot, or anywhere else that restricts parking access.

2 Three states (CA, MA, NJ) plan to ban the sale of ICEs in 2035. https://www.caranddriver.com/news/a35104768/massachusetts-ban-new-gas-cars-2035/#:~:text=Massachusetts%20announces%20a%20plan%20to,New%20Jersey%20earlier%20this%20year.

3 In July 2020, California, Colorado, Connecticut, District of Columbia, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington signed a memorandum of understanding (MOU) to support the deployment of medium- and heavy-duty ZEVs through involvement in a Multi-State ZEV Task Force that will, among other things, develop a multi-state action plan to support electrification of medium- and heavy-duty vehicles. The Multi-State Medium- and Heavy-Duty Zero Emission Vehicle MOU is available here: https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf/.

4 Many states may have specific state-fleet electrification goals as well, but these are not included in this report.

5 "EVCS Locations," Alternative Fuels Data Center, U.S. Department of Energy, last accessed October 1, 2020, https://afdc.energy.gov/fuels/electricity_locations.html#/analyze?fuel=ELEC.



Thirty-five states have addressed issues related to the pricing of charging and 29 states have made clear in policy that charging site hosts are not public utilities subject to that industry's regulatory regime.

ports grew 154%, from nearly 34,000 to more than 85,000.[6]

As charging continues to grow, particularly public charging, what kinds of policies are states and localities setting? The Fuels Institute Electric Vehicle Council commissioned this project to answer that question and identify federal, state, and local policies (both legislation and regulation) and requirements relevant to installation and operation of public charging. The analysis considered policies that:

- **Relate to the installation and operation of electric vehicle supply equipment (EVSE), including those related to siting, permitting, and zoning associated with site preparation and equipment installation;**
- **Affect utility participation in preparing sites for installing and operating EVSE; and**
- **Relate to the operation of public charging such as methods of sale, billing practices, and marketing of charging services.**

An analysis was undertaken to identify commonalties and differences in states as well as more than 100 cities and counties. In summary, 35 states have addressed issues related to the pricing of charging (allowing kilowatt hour (kWh) pricing) and 29 states have made clear in policy that charging site hosts are not public utilities subject to that industry's regulatory regime. California is the only state that has set a range of different policies governing public charging, specifically addressing installation- and operation-related EVSE issues. For example, it has

6 Jessica Leung and Janet Peace, *Electric Vehicle Charging for Retailers* (Arlington, VA: Center for Climate and Energy Solutions, April 2020) https://www.c2es.org/site/assets/uploads/2020/05/electric-vehicle-charging-for-retailers.pdf.

addressed expedited permitting and charging accessibility policies, among others. Beyond finding that EV charging is not a public utility as defined in some state policies and allowing kWh pricing, 10 states address other installation-related issues; five states, operation. Installation-related policies tend to address issues such as licensing of installers, site design, signage, and parking. Several states address operation-related questions such as requiring multiple payment options and/or prohibiting subscriptions plans. Many states do not address installation or operation issues related to public charging and have no policies in place related to EVSE.

Several states are beginning to address issues related to utilities (both investor-owned and public) and EV charging both in legislatures and through their public utility commissions (PUCs). These issues include designing rates, requiring utilities to submit transportation electrification plans (TEPs) to PUCs that detail how they will help the state achieve its electrification goals, and addressing whether utilities can and should own and operate charging stations, among others. In 2019, policymakers and regulators in more than half of U.S. states considered plans to expand customer access to EVCS through the direct deployment of charging infrastructure and granted approval to 20 such plans totaling $329 million in investment.[7]

With respect to incentives, which are addressed in this report, 24 states offer incentives for expanding EV charging, which may be applicable to public charging. These incentives are in addition to what utilities offer and through the Volkswagen (VW) Clean Air Act Civil Settlement. Moreover, a total of 34 states plan to use the full 15% allotment under the VW settlement and several others do plan to fund charging, including public charging, but not at the full allocation. More than $318 million has been apportioned under the settlement so far for developing charging infrastructure in the states, and a number already have developed requests for proposals (RFPs) for projects that include public charging. Public charging companies and those that may want to partner with them may be eligible for these funds as many states are looking to expanding EVSE infrastructure in government, workplaces, and public places.

With respect to localities, 49 cities and counties have set ordinances or other regulations governing EVSE installation, 23 of which are in California. One city out of the group surveyed included operation related EVSE requirements. Except for the California localities, policies address aspects of installation such as parking or signage. Within metropolitan statistical areas (MSAs), which was the lens used to evaluate these cities and counties, there was a lack of alignment on issues generally related to EVSE installation, including permitting, except for California localities and the Atlanta MSA. However, even in California, not all cities have yet adopted requirements set by the state respecting expedited and streamlined permitting. This inconsistency is one stated intent behind the enactment of the policy.[8]

Finally, a similar trend was observed for Canada as in the U.S.: If there are relevant public charging EVSE policies at all, installation and operation guidance tends to be incomplete. Of the provinces surveyed, British Columbia and particularly Vancouver have set several such policies. There also is a federal-level policy with EVSE requirements for installation under Canada's electrical code.

7 NC Clean Technology Center, *50 States of Electric Vehicles Annual Report and Q4 2019 Update*, February 2020, 30 at https://nccleantech.ncsu.edu/2020/02/12/the-50-states-of-electric-vehicle-2019-annual-review-and-q4-update-49-states-and-dc-took-action-on-electric-vehicles-during-2019/.

8 California AB-1236 Local Ordinances: EVCS, Chapter 598 (approved October 8, 2015). Available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB-1236.

Contents

INTRODUCTION

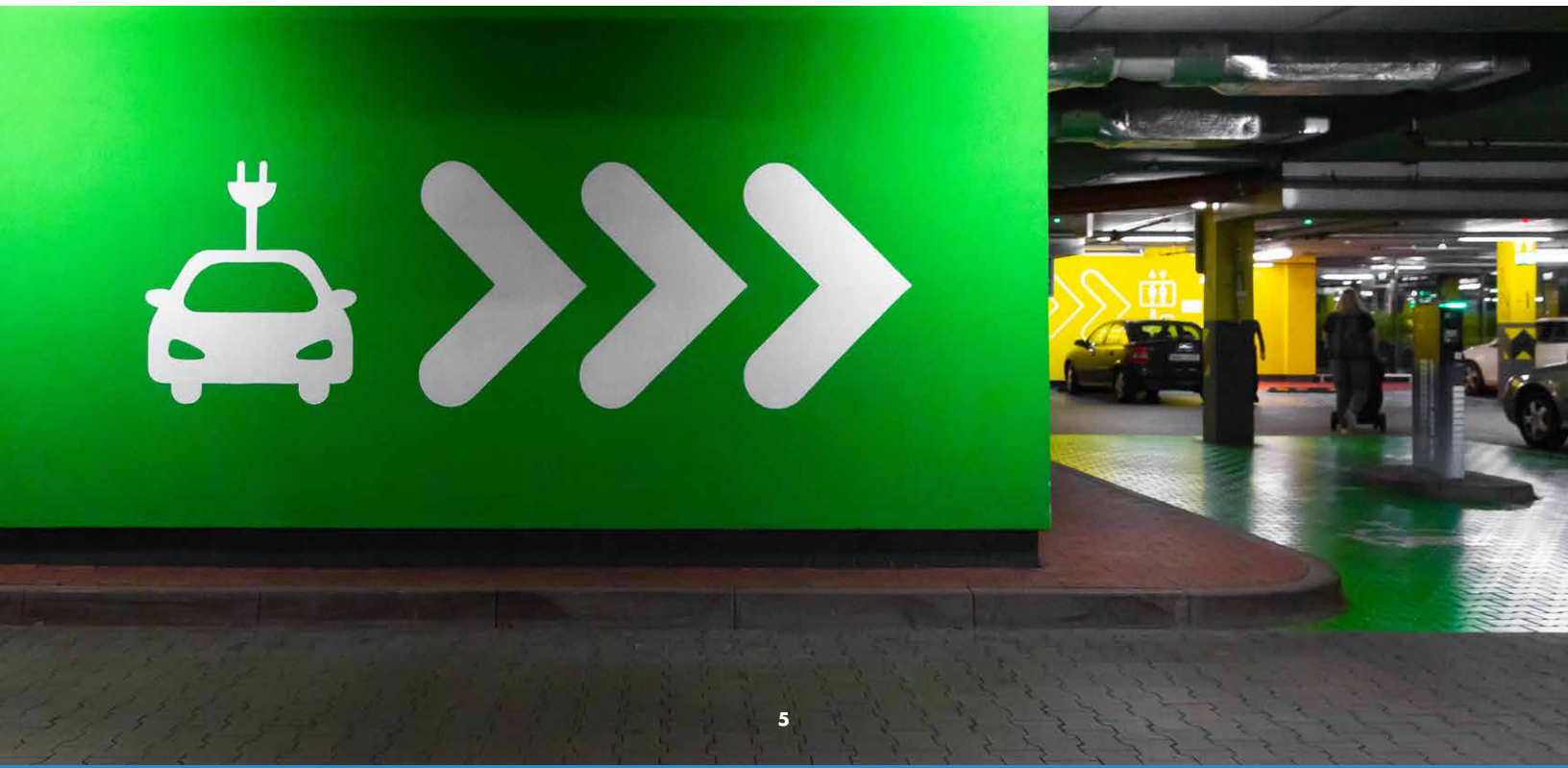
This report identifies primarily U.S. state and local regulations and requirements relevant to installation and operation of public charging. Canada is included as well. The existence of federal-level requirements in Canada was surveyed along with requirements in three provinces and the largest cities in those provinces: British Columbia and Vancouver; Ontario and Toronto; and Québec and Montréal.

The aim of the project was to identify relevant public charging policies governing the installation and operation of EVSE, their commonalities and differences, as well as policies that may be best suited to facilitate the installation and operation of EVSE.

Respecting installation, the following topics were covered:

- **Siting**
- **Permitting**
- **Zoning**
- **Site design** (such as Americans with Disability Act (ADA) requirements, property flow, curb cuts, proximity of charging equipment to other equipment on-site such as petroleum dispensers, etc.)
- **Construction**
- **Installation**
- **Utility engagement with site host for site development**

Respecting operation—which means how electricity is sold, the marketing of charging services,



disclosures required to be provided to customers, the unit of measurement required in selling electricity, and type of receipt required, among other issues—the following topics and questions were addressed:

- **What policies and regulations exist that affect how electricity can be sold to consumers?** What unit of measurement is required or permitted? For example, must the sale be based on kWh delivered or is that prohibited? If prohibited, what other methods of sale are permissible as an alternative?
- **What regulations apply to the marketing of EV-charging services?** What disclosures are required and where must the disclosures be presented?
- **What type of receipt is required to be provided to the customer at the conclusion of a charging session?**
- **The research on these topics covered all 50 states, the District of Columbia, and an additional 100 cities and counties in more than 25 MSAs and the forementioned areas in Canada.** As there is no U.S. national policy respecting installation and operation of EVSE beyond federal ADA requirements, which are implemented and enforced at the local level, the report largely focuses on state/provincial and local policies.

States/provinces were grouped into five simple "archetype groupings" to set a context for deeper analysis ranging from those states with light-duty ZEV mandates and a host of policies addressing installation and operation of public charging EVSE to those states with no policies at all. As part of the analysis on state actions, the role of utilities and relevant decisions of respective state PUCs relevant to public charging were included. Statutes, administrative codes, PUC decisions, session laws that have not yet been codified, and other relevant state materials were consulted with a research cut-off date of September 30, 2020.

Also addressed in this report are state and local incentives, utilities, and the role of the VW settlement, in which nearly $3 billion has been committed to develop EV-charging infrastructure. Public charging companies and site hosts may be eligible for many of these incentives, especially under the VW settlement. The DOE's Alternative Fuels Data Center was consulted to determine relevant utility incentives with a research cut-off date of September 30, 2020. For incentives available under the VW settlement, each state's beneficiary mitigation plan and associated websites were consulted with a research cut-off date of August 30, 2020.

Further, surveying localities within MSAs proved helpful in identifying trends. For example, several localities within MSAs such as Seattle and Atlanta have set similar policies respecting installation of public charging EVSE. In other cases, different policies may exist in one locality within an MSA but not in another, or there may be no relevant policies within a MSA at all. Municipal laws, ordinances, and codes were consulted for the 100 cities and counties featured in this project with a research cut-off date of July 31, 2020.

The report reviews and provides a deeper look into state requirements for installation and operation of public charging. It then characterizes the five archetypes and explains the intersection of the roles of public charging EVSE and utilities, including policies set by respective state PUCs and incentives offered by the utilities. The report then reviews other state incentives and the role of the VW settlement. The same archetype groupings were kept for the local-level research. Canada is included as a separate chapter with the same archetype groupings applied. The appendices at the end of this report provide summaries of relevant policies and incentives.

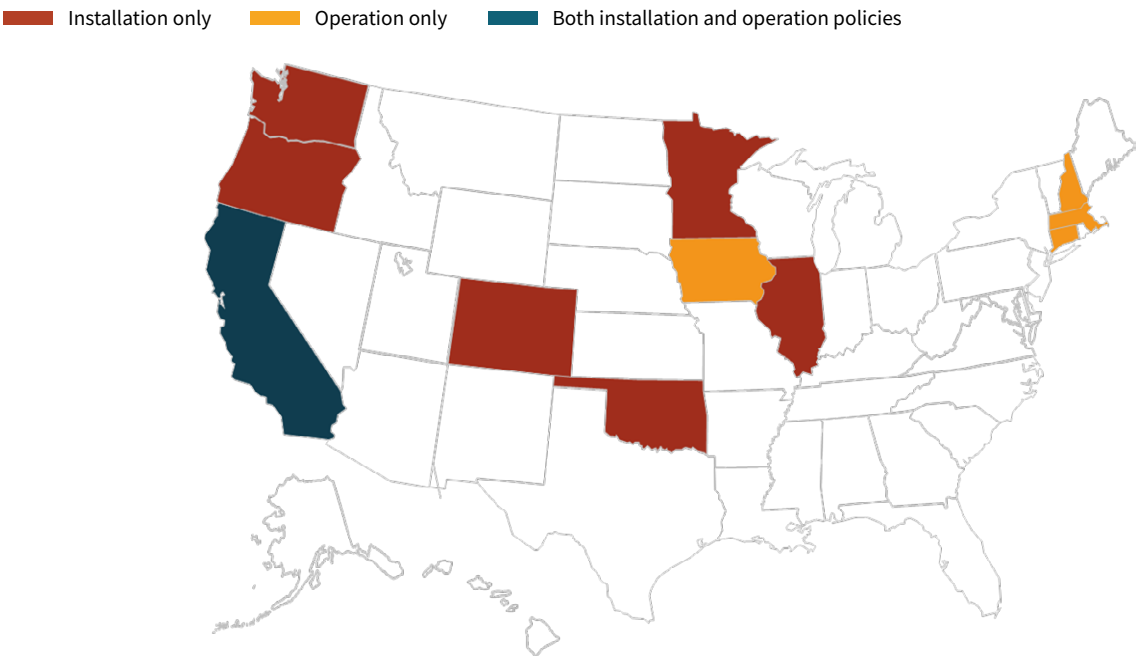
U.S. STATE REQUIREMENTS

Summary of U.S. State Requirements on the Installation and Operation of Public Charging

Ten states have legislation and regulation that governs the installation of EVSE; five cover EVSE operation (Figure 2). Most of these policies cover certain issues related to EVSE installation and operation that are pertinent to public charging companies.

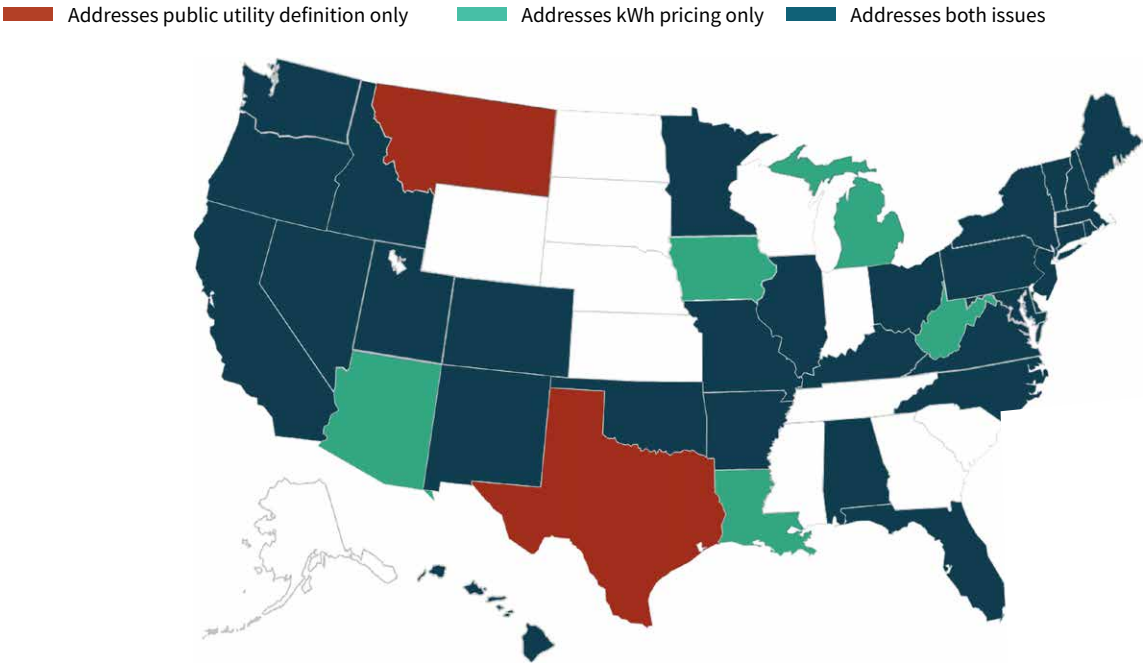
There are two common issues that more than 30 states have addressed. The first is clarifying that an EVSE site host is not a public utility and thus not subject to the regulatory regime that governs them, and the second is allowing charging by the kWh (Figure 3). Even if a state has not yet clarified that EVSE or site hosts are not defined as public utilities and not subject to that regulatory regime, no state to date has regulated third-party EVSE as public

FIGURE 2: STATES WITH INSTALLATION OR OPERATION POLICIES THAT IMPACT PUBLIC CHARGING



Source: Compiled by Transport Energy Strategies, October 2020

FIGURE 3: STATES ADDRESSING KWH PRICING AND PUBLIC UTILITY DEFINITION



Source: Compiled by Future Fuel Strategies, October 2020

utilities or prohibited third-party deployments for that reason.

Currently, California is the only state with what may be described as a comprehensive regulatory regime with many policies in place addressing installation and operation of public charging EVSE. Other states, in addition to addressing the foregoing issues on the public utility definition and kWh pricing, have developed installation policies. For example, some states require EVSE installer certification, direct local permitting, and set "green building codes" requiring EVSE in new buildings. Several states have set operation policies governing subscription and membership fees for charging and payment options. Localities have tended to address issues such as siting/zoning, station design, parking, and signage.

It is important to note at the outset that charging is expanding in states that have policies in place governing public charging. Moreover, several states are studying statewide EV infrastructure needs and developing detailed plans to build out EV infrastructure, most recently in Ohio, Utah, Oregon, and Florida.[9] It is possible additional policies may emerge as a result of those state analyses in the next few years. And, while there may be no specific EVSE-related policy in place in a locality, existing zoning, building codes, and electrical codes, for example, still apply to EVSE installation in a city or county.

Further, an authority having jurisdiction (AHJ) such as a state, city or county may not have installation or operation EVSE policies in place but may provide other guidance addressing both issues.[10]

9 NC Clean Energy Technology Center, Executive Summary of *50 States of Electric Vehicles*, Q2 Quarterly Report, August 2020, https://nccleantech.ncsu.edu/wp-content/uploads/2020/08/Q2-20_EV_execsummary_Final.pdf.

10 One example of a state that provides a best practice guide is New York. The New York State Energy Research and Development Authority has developed a guide for site hosts. See New York State Energy Research and Development Authority, *Site Owners of EVCS on Commercial Properties: Best Practices Guide*, December 2015, available at https://www.nyserda.ny.gov/All-Programs/Programs/ChargeNY/Charge-Electric/Best-Practices.

For example, states that are members of the Regional Electric Vehicle Plan for the West (REV West) have developed voluntary minimum and "stretch" standards for public charging.[11] AHJs may also have specific installation and/or operation requirements for public charging EVSE as a condition of receiving incentive funding.[12] For example, states in RFPs under the VW settlement may have installation and/or operation requirements that must be met. Similarly, states that provide incentives for charging may have specific requirements as well as a condition of receiving funding.

One original objective for this project, in addition to identifying policies and their commonalities and differences, was to note policies that seem best suited to facilitating the expansion of public charging; in particular, those that reduce compliance complexity and cost. The fact is all of the policies described in this report have the potential to impact the expansion of public charging EVSE. How a policy is implemented may be just as important as what policy is implemented. For example, the intent behind California's charging policies is to remove obstacles and reduce costs of providing EV charging so that charging can expand to meet the state's ZEV targets.[13] However, the effect may result in the opposite: increased costs and regulatory complexity resulting in slower expansion of public charging. Consider this example from Electrify America about its experience in California with respect to permitting:

> At the end of Q2 [2020], the average time to complete the permitting process for [direct current fast chargers (DCFC)] station-sites in California as 77 business days—nearly 60% longer than the national average. Permitting processes also resulted in station-sites being redesigned 33% more frequently in California than in the rest of the nation during Electrify America's last comparison, which increases both cost and delays.

Specifically, it costs Electrify America 28% more, on average, to design and construct a station in California than it costs Electrify America to build a station with the same number of chargers in another state. The additional permitting burdens imposed in California—including costs to address aesthetic requests of local jurisdictions—appear to be the primary cause for this difference. This higher cost per station ultimately means that California will receive fewer stations per dollar invested by Electrify America.[14]

11 Memorandum of Understanding: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming Regional Electric Plan for the West, December 13, 2019, available at https://www.naseo.org/Data/Sites/1/revwest_mou_2019_final.pdf; *REV West: Voluntary Minimum Station Standards*, posted by the National Association of State Energy Officials at https://www.naseo.org/Data/Sites/1/revwest_volminimumstandards.pdf.

12 For example, the state of Massachusetts does have some installation requirements associated with its public access MassEVIP program. See Massachusetts Department of Environmental Protection, *MassEVIP Public Access Charging Program Requirements*, updated January 17, 2019, https://www.mass.gov/doc/massevip-public-access-charging-requirements. See also "ZEV Resources and Readiness," California Governor's Office of Business and Economic Development, https://businessportal.ca.gov/zero-emission-vehicle-program/zev-resources/.

13 California AB-1236: "It is the intent of the Legislature that local agencies comply not only with the language of this section, but also the legislative intent to encourage the installation of EVCS by removing obstacles to, and minimizing costs of, permitting for charging stations so long as the action does not supersede the building official's authority to identify and address higher priority life-safety situations."

14 Electrify America, *Q2 2020 Report to California Air Resources Board*, August 17, 2020, https://newspress-electrifyamerica.s3.amazonaws.com/documents%2Foriginal%2F502-Q22020ElectrifyAmericaReporttoCARBPublic.pdf.

The policies that are in place are identified for the AHJs covered in this report and a discussion of their commonalities and differences are covered in the sections below.

ANALYSIS OF COMMONALITIES AND DIFFERENCES IN STATE PUBLIC CHARGING ELECTRIC VEHICLE SUPPLY EQUIPMENT POLICIES

To facilitate analysis of the commonalities and differences that exist for public charging in the states, archetypes or "groupings" have been developed based on the following simple criteria:

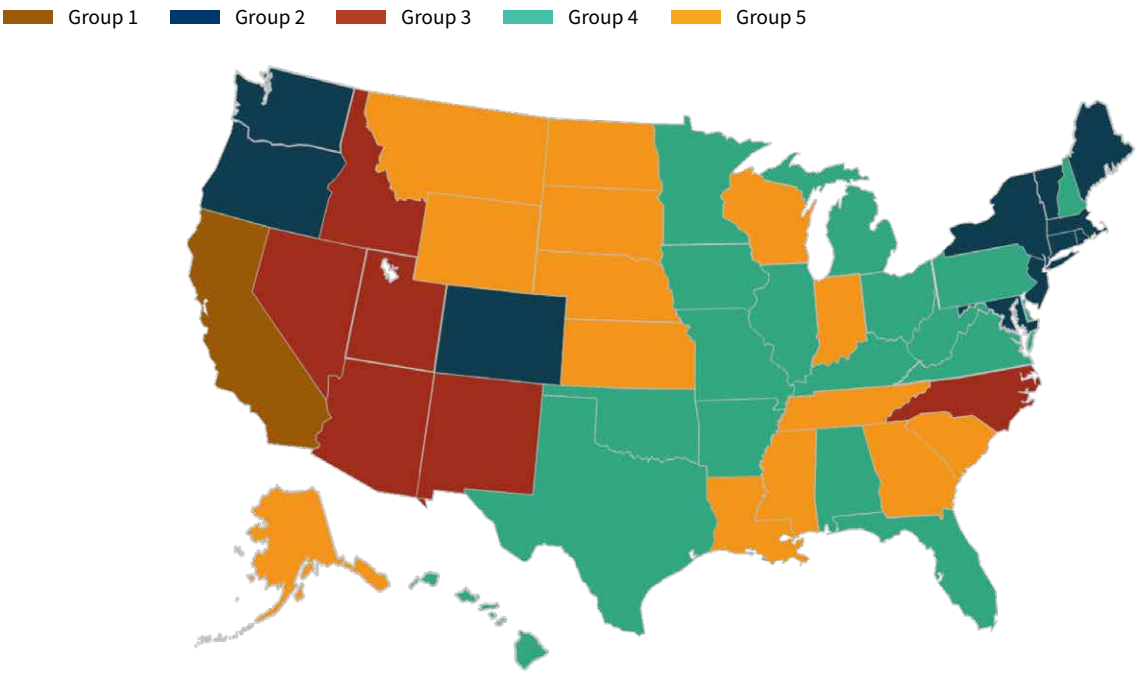
- **Group 1:** States that have implemented a **comprehensive regulatory regime or suite of policies** addressing both installation and operation requirements that pertain to public charging. Only California currently has such a regime.
- **Group 2:** These states are implementing **ZEV mandates** and/or other targets and have developed and implemented **multiple policies** on installation or operation public charging.
- **Group 3:** There is an **electrification target** and at least **two relevant policies** on installation or operation of EVSE pertinent to public charging.
- **Group 4:** There is **no mandate or electrification target,** but there is at least **one relevant policy** on regulations on installation or operation of EVSE pertinent to public charging.
- **Group 5:** There is **no mandate or electrification target,** and there are **no relevant policies** on installation or operation of EVSE pertinent to public charging.

Table 1 and Figure 4 summarize these groupings. An analysis of relevant policies for these groups are viewed in the sections below.

TABLE 1: STATE GROUPINGS

GROUP	STATES	CRITERIA
1	California	States that have implemented a **comprehensive regulatory regime or suite of policies** addressing both installation and operation requirements that pertain to public charging. Only California currently has such a regime.
2	Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington	These states are implementing **ZEV mandates** and/or other targets and have developed and implemented **multiple policies** on installation or operation public charging.
3	Arizona, Idaho, Nevada, New Mexico, North Carolina, Utah	There is an **electrification target** and at least **two relevant policies** on installation or operation of EVSE pertinent to public charging.
4	Alabama, Arkansas, Delaware, District of Columbia, Florida, Hawaii, Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, New Hampshire, Ohio, Oklahoma, Pennsylvania, Texas, Virginia, West Virginia	There is **no mandate or electrification target**, but there is at least **one relevant policy on regulations** on installation or operation of EVSE pertinent to public charging.
5	Alaska, Georgia, Indiana, Kansas, Louisiana, Mississippi, Montana, Nebraska, North Dakota, South Carolina, South Dakota, Tennessee, Wisconsin, Wyoming	There is **no mandate or electrification target**, and there are **no relevant policies** on installation or operation of EVSE pertinent to public charging.

FIGURE 4: MAP OF STATE GROUPINGS

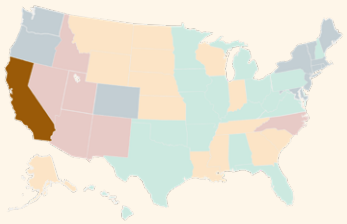


Source: Compiled by Transport Energy Strategies, October 2020

GROUP 1 STATES

Description: States that have implemented a comprehensive regulatory regime or suite of policies addressing both installation and operation requirements for EVSE that pertain to public charging.

States: California



To support California's ambitious ZEV deployment goals—5 million ZEVs in California by 2030—the state is prioritizing the development of EV charging and hydrogen fueling infrastructure.[15] The state also has established ambitious ZEV infrastructure and vehicle targets for the state—250,000 shared plug-in hybrid electric vehicle (PHEV) chargers, including 10,000 DCFC and 200 hydrogen stations by 2025.[16] Several laws and regulations impact the installation and operation of public charging (Table 2). A discussion of these laws and regulations follows in the subsections below.

TABLE 2: SUMMARY OF REGULATIONS AND RESPONSIBLE AUTHORITY

LAW/REGULATION	DESCRIPTION	RESPONSIBLE AUTHORITY
EV-charging regulations pertaining to utility involvement	Electricity rates and design, demand charges, and other programs	California Public Utilities Commission (CPUC)
EV expedited and streamlined permitting	Requires localities to implement ordinances providing for expedited and streamlined EVSE permitting	Set by legislation, implemented in California localities
EV-charging accessibility	Requires EV charging to be accessible to users regardless of membership in an EV service provider (EVSP) network; covers fees, interoperability, reporting requirements	California Air Resources Board
ADA requirements	Through the building code, provides direct guidance to localities on ADA requirements as they pertain to EV charging	California Building Standards Commission, Division of the State Architect
CALGreen	EV-capable parking spaces are required in new construction and major building alterations	California Building Standards Commission
Low Carbon Fuel Standard (LCFS)	Decreases the carbon intensity of fuels on an annual basis to reach 20% reduction in greenhouse gas emissions in the transportation fuel pool by 2030	CARB
National Institute of Standards and Technology (NIST) Handbook, Section 3.40 Regulation – Tentative	Requires EVSE to be type certified and field verified to ensure that a kWh dispensed equals a kWh received	Department of Food and Agriculture, Division of Measurement Standards
Coastal Development Permit (CDP)	May be required to expand or install EVCS located in coastal zones	Coastal Commission

Source: Compiled by Transport Energy Strategies, June 2020

15 California Air Resources Board, *California's 2017 Climate Change Scoping Plan*, November 2017, https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

16 California Executive Order B-62-18 (January 4, 2019). Available at https://www.ca.gov/archive/gov39/2019/01/04/executive-order-b-62-18/index.html.

CALIFORNIA PUBLIC UTILITIES COMMISSION RATES AND DEMAND CHARGES

California legislation requires that its investor-owned utilities (IOUs) support the widespread adoption of transportation electrification under the oversight of CPUC.[17] CPUC is developing a transportation electrification framework (TEF) establishing a new process for California's IOUs to develop 10-year strategic investment plans to support infrastructure. A draft framework released in February 2020 will, among other things, require IOUs to develop TEPs that support the state's ZEV targets.[18]

SB 676 enacted in 2019 requires the CPUC by December 31, 2020 to establish strategies and metrics to maximize the use of plug-in electric vehicle (PEV) grid integration for a 10-year plan.[19] It must also consider how to limit cost increases for all ratepayers. Utilities and community choice aggregators that serve more than 700 gigawatt-hours of annual electrical demand must provide CPUC with information relating to PEV-integration strategies.[20] Additional terms and conditions apply.

In addition, CPUC has approved various rates and non-demand charges for public charging offered by IOUs. Liberty Utilities, Southern California Edison, and Bear Valley Electric Service have approved rates for nonresidential commercial EV charging for on-peak, off-peak, and super-off-peak charging for the winter and summer months.[21] Demand charges are established as well. For example, Pacific Gas & Electric (PG&E) offers two EV rate plans for business customers:

- **Business Low-Use EV Rate—BEV1:** For EV-charging installations with a connected load up to and including 100 kilowatts (kW), which PG&E notes is best suited for smaller workplaces and MUDs
- **Business High-Use EV Rate—BEV2:** For EV-charging installations with a connected load of 100 kW and above, which PG&E notes is best suited for sites with fleets and fast-charging stations[22]

The customer chooses a subscription level based on the maximum monthly EV-charging kW consumption, which can be adjusted throughout the month as often as needed until the last day of each billing cycle to avoid overage fees. At the end of the billing cycle, if the actual consumption (in kW) exceeds the subscription level, the customer is charged an overage fee of two times the cost of one kW for each kW over the subscription level. The customer is provided a grace period with no overage fees for three billing cycles upon enrollment or if the customer adds more EV-charging installations. If the customer incurs overage fees on the third and final grace period billing cycle, the subscription level will be automatically adjusted to cover the overage amount. In addition to the monthly subscription charge, the customer is charged a volumetric rate (in kWh) based on how much energy is used and when it is used.

17 California SB-350 Clean Energy and Pollution Reduction Act of 2015 (adopted October 7, 2015). Available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

18 California Public Utilities Commission, *Transportation Electrification Framework: Energy Division Staff Proposal*, R.18-12-006, February 2020, https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463904.

19 California SB-676 Transportation Electrification: Electric Vehicles: Grid Integration (adopted October 2, 2019). Available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB676.

20 Community choice aggregators are governmental entities formed by cities and counties to procure electricity for their residents, businesses, and municipal facilities.

21 California Public Utilities Commission, *Summary of CPUC Actions to Support Zero Emission Vehicle Adoption*, January 2019, https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442459998.

22 "Business Electric Vehicle (EV) Rate Plans," Pacific Gas & Electric, accessed October 1, 2020, https://www.pge.com/en_US/small-medium-business/energy-alternatives/clean-vehicles/ev-charge-network/electric-vehicle-rate-plans.page.

AB-1236: CALIFORNIA'S EXPEDITED AND STREAMLINED PERMITTING LAW

California's EVCS permit streamlining law was enacted to address mutual frustration: EVCS providers wanted to speed the permitting process, and cities and counties often needed better information from applicants.[23] To help address these frustrations, AB-1236 establishes permitting processes and communication requirements for cities and counties.[24] To further assist localities and EV site hosts, the Governor's Office has developed a permitting guidebook for both site developers and local authorities.[25] AB-1236 requires the following:

- **Localities must enact ordinances creating an expedited, streamlined permitting process for EVCS including Level 2 (L2) and DCFC.** (Note: Several cities featured in this report have done this, such as Riverside, Chula Vista, San Diego, San Diego County, Santa Ana, Irvine, and Los Angeles County.)
- **A checklist of all requirements needed for expedited review must be posted on each locality's website.**
- **EVCS projects that meet expedited checklist are administratively approved through a building or similar nondiscretionary permit.**
- **EVCS projects are reviewed with a focus on health and safety.**
- **Localities are required to allow for electronic submission of application packets for PEV charging stations through email, internet, and/or fax and allow for electronic signatures on all forms.**
- **The locality accepts electronic signatures on permit applications.**
- **The locality commits to issuing one complete written correction notice detailing all deficiencies in an incomplete application and any additional information needed to be eligible for expedited permit issuance.26**

Any project that meets all the requirements in the checklist, as determined by the locality, shall qualify for expedited review. In the majority of cases, this means that no discretionary-use permit will be required, which can be the most time-consuming aspect of permit approvals.[27] A discretionary permit can only be required if the building official makes a finding, based on substantial evidence, that the EVCS could have a specific, adverse impact upon public health or safety.

The health and safety review a locality conducts under AB-1236 uses objective measures and allows building officials to assess if a "specific, adverse impact" may result due to the installation of EVCS or EVSE equipment. For example, health and safety concerns can lead to the need for project revisions when the building official believes that added EV-charging loads may affect existing electrical infrastructure or when the project might create a visual hazard.[28] It should be noted that a visual hazard is different than a visual impairment. A visual hazard may compromise fire safety while a visual impairment can be mitigated to not adversely impact safety.[29]

In California, EVCS permit applications are supposed to be approved through a truncated permitting process. EVCS permit applications will usually be

23 California AB-1236; California Office of Business and Economic Development, *EVCS Permitting Guidebook*, July 2019, https://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf.

24 California AB-1236

25 *EVCS Permitting Guidebook*

26 California AB-1236; *EVCS Permitting Guidebook*, 18.

27 *EVCS Permitting Guidebook*, 21.

28 *EVCS Permitting Guidebook*

29 *EVCS Permitting Guidebook*

reviewed for compliance with building, electrical, accessibility, and fire safety regulations. The permit applications may also receive public safety, structural, and engineering review based on the processes and organizational structure of the locality. If possible, these reviews are done concurrently.[30]

Additionally, the law establishes that local ordinances cannot create unreasonable barriers to station installation, including subjecting applications to aesthetic review or other processes that require unnecessarily long timelines.[31] After permits are issued and installation of the charger is complete, final inspection is required to receive final approval to operate the station.

CALIFORNIA AIR RESOURCES BOARD ELECTRIC VEHICLE SUPPLY EQUIPMENT STANDARDS REGULATION

CARB adopted regulations in May 2020 that require EV charging to be accessible to drivers regardless of membership in an EVSP network. Other requirements include:

- **EVSPs must operate credit card readers and mobile payment device options on L2 and DCFC EVSE** allowing payment by members and non-members at EVSE locations that require payment.
- **The credit card reader device must accept, at a minimum, the Euro MasterCard Visa chip and, at a minimum, one of the following credit card types:** Visa, Mastercard, or American Express.
- **The EVSP shall provide and display a toll-free number on each EVSE or kiosk used to service that EVSE** that provides the user with the option to initiate a charging session and submit payment at any time that the EVSE is operational and publicly available.
- **EVSE must have a sticker informing drivers of voltage and amperage capabilities of the unit.**
- **All fees associated with a charging session must be posted.** The fees may include, but are not limited to, the kWh or megajoule (MJ) cost of electricity, credit card fees, parking fees, nonmember plug-in fees, increased charges after plug-in session ends, and any other fees chargeable to the PEV user. Fees must be displayed at the point of sale to ensure the fee structure is transparent to the driver. Consumers paying for a charging session must be billed for electricity by $/kWh or $/MJ.
- **The interoperable billing standard Open Charge Point Interface must be installed on each EVSE.**
- **EVSPs must report new, current, and decommissioned EVSE locations and access information** to the National Renewable Energy Laboratory's Alternative Fuels Data Center and CARB to ensure accurate and up-to-date data is available to consumers.[32]

New DCFC installations must be fully compliant starting January 1, 2022; for new L2 EVSE installations, compliance begins July 1, 2023. Existing DCFC and L2 EVSE must meet necessary hardware and software requirements upon replacement but no later than July 1, 2033.

GREEN BUILDING CODE REGULATION

The 2019 California Green Building Standards Code (CALGreen) requires that new construction and major alterations include adding EV-capable parking spaces that have electrical panel capacity, a dedicated branch circuit, and a raceway to the EV parking spot to support future installation of charging stations.[33]

30 *EVCS Permitting Guidebook*, 19.

31 *EVCS Permitting Guidebook*

32 The California Air Resource Board, EVSE Standards Regulation is available at https://ww2.arb.ca.gov/our-work/programs/electric-vehicle-supply-equipment-evse-standards. Attachment A, Final Regulation Order, was published in June 2020, available at https://ww2.arb.ca.gov/sites/default/files/2020-06/evse_fro_ac.pdf. This regulation implements AB454, Chapter 418, Statutes of 2013 (see also California Health and Safety Code 44268 and 44268.2), available at http://leginfo.legislature.ca.gov/faces/billStatusClient.xhtml?bill_id=201320140SB454.

33 The 2019 California Green Building Standards Code, Title 24, Part 11 is available at https://codes.iccsafe.org/content/CAGBSC2019 and https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen (along with other related resources).

TABLE 3: REQUIREMENTS PERTAINING TO SITE HOSTS UNDER THE CALGREEN CODE

TOTAL NUMBER OF PARKING SPACES	REQUIRED NUMBER OF PARKING SPACES TO BE EV CAPABLE	OPTIONAL TIER 1 NUMBER OF PARKING SPACES TO BE EV CAPABLE	OPTIONAL TIER 2 NUMBER OF PARKING SPACES TO BE EV CAPABLE
0-9	0	1	1
10-25	1	2	2
26-50	2	3	4
51-75	4	5	6
76-100	5	7	9
101-150	7	10	12
151-200	10	14	17
201+	6% of total	8% of total	10% of total

Source: CALGreen, 2019

The 2019 CALGreen Code became effective January 1, 2020. Table 3 summarizes requirements pertaining to public charging hosts.

AMERICANS WITH DISABILITIES ACT REQUIREMENTS AND EV CHARGING

California is the first state in the nation to develop EVCS accessibility regulations to define compliance with the broad responsibility under the federal ADA. The regulations also provide certainty for cities, charging station providers, and property owners to help balance co-equal goals of deploying infrastructure and ensuring broad access to services.[34]

California's requirements for EVCS accessibility at public housing, public accommodations, commercial facilities, and public buildings are found in the current edition of the California Building Code (CBC).[35] The CBC is typically used in three parts: definitions, scoping provisions (what type of spaces and how many are required), and technical requirements (where the spaces are and how to make them accessible).[36]

Scoping provisions broadly determine how many charging spaces must be accessible (the number is based on the total number of charging spaces provided) and what kind of spaces those must be (standard accessible, van accessible, ambulatory, or drive through). California's scoping provisions are consistent with three key determinations made by the U.S. Access Board:

1. **EV charging is a service provided by the facility owner or public entity** and therefore must be accessible to individuals with disabilities.
2. **An EV may not need to charge every time it is parked,** so public and common-use charging stations are charging spaces, not parking spaces.
3. **While an EV needs to be parked to charge, charging (not parking) is the primary purpose of a charging station.**[37]

Because parking and charging are separate and the two functions have separate scoping requirements, they are also located in different sections of the code.[38]

34 *EVCS Permitting Guidebook*, VII.

35 *California Code of Regulations*, Title 24, Part 2.

36 *EVCS Permitting Guidebook*, 33. For definitions, see the California Building Code Chapter 2, Section 202; Scoping, Chapter 11B, Division 2, Section 11B-228.3 EVCS; Technical, Chapter 11B, Division 8, Section 11B-812 EVCS.

37 *EVCS Permitting Guidebook*, 33.

38 Scoping provisions for parking generally are located in the California Building Code Chapter 11B, Section 11B-208.

TABLE 4: ACCESSIBLE SPACES REQUIRED AND TYPE

EVCS AT A FACILITY[1]	MINIMUM NUMBER (BY TYPE) OF EVCS REQUIRED TO COMPLY WITH SECTION 11B-812:1 **VAN ACCESSIBLE**[38]	MINIMUM NUMBER (BY TYPE) OF EVCS REQUIRED TO COMPLY WITH SECTION 11B-812:1 **STANDARD ACCESSIBLE**[39]	MINIMUM NUMBER (BY TYPE) OF EVCS REQUIRED TO COMPLY WITH SECTION 11B-812:1 **AMBULATORY**[40]
1–4	1	0	0
5–25	1	1	0
26–50	1	1	1
51–75	1	2	2
76–100	1	3	3
101+	1, plus 1 for each 200, or fraction thereof, over 100	3, plus 1 for each 60, or fraction thereof, over 100	3, plus 1 for each 50, or fraction thereof, over 100

Source: Table 11B-228.3.2.1 from the 2016 California Building Code, Chapter 11B, Section 11B-228.3

Note: (1) Where an EV charger can simultaneously charge more than one vehicle, the number of EVCS provided shall be considered equivalent to the number of electric vehicles that can be simultaneously charged.

For scoping provisions related to charging spaces, the number and type of accessible charging spaces required at a site is determined by the total number of charging spaces at a facility (Table 4).

All four types of accessible EV spaces must be 18 feet (216 inches) minimum in length and marked with letters that are at least 12 inches high that say "EV CHARGING ONLY." Vertical clearance of at least 98 inches (8'-2") must be provided, and overhead cable management systems cannot obstruct required vertical clearance. There are two exceptions under Section 11B-812.6:

- **Where the long dimension of vehicle spaces is parallel to the traffic flow in the adjacent vehicular way, the length of vehicle spaces shall be 240 inches** (6,096 mm) minimum.
- **Vehicle spaces at drive-up EVCS shall be 240 inches (6,096 mm) long minimum** and shall not be required to be marked to define their width.

39 These spaces must be reserved for vehicles with the International Symbol of Accessibility (ISA) placard when there are five or more EVCS at a facility.

40 Standard accessible spaces must be reserved for vehicles with an ISA placard where a facility has 26 or more chargers. When there are four or fewer charging spaces provided, no chargers need to be reserved for drivers with an ISA sign. With 25 or fewer chargers, the standard accessible space does not require an ISA sign and the space can be used by any EV vehicle driver, but the van accessible space would need to be reserved for vehicles with an ISA placard.

41 Ambulatory spaces can be used by any driver.

TABLE 5: SUMMARY OF REQUIREMENTS FOR ACCESSIBLE PARKING SPACES BY TYPE

	VAN ACCESSIBLE	STANDARD ACCESSIBLE	AMBULATORY	DRIVE-UP
Purpose	Wider charging space with access aisle to accommodate van with ramp or lift	Charging space with access aisle	Slightly wider charging space	Similar to a gas station—drive in and drive out, moving forward
Width	12 ft. (144 in.)	9 ft. (108 in.)	10 ft. (120 in.)	17 ft. (204 in.)
Access Aisle	Yes, on passenger side, markings required	Yes, on either side, markings required	No	Yes, but not marked
Identify with the International Symbol of Accessibility?	When 5-25 charging stations, identify one; when 26+, identify all	When 26+ charging stations, identify all	No	No

Source: California Governor's Office, July 2019

Table 5 summarizes the requirements for accessible parking spaces by type. Public charging sites may be subject to "path of travel" improvements if facilities are not compliant to current code and are limited to 20% of the cost of the work directly associated with the installation of the charging stations.[42]

If it is technically infeasible to install charging that meets accessibility standards on a site, charging stations can often still be installed. The key is providing the maximum feasible accessibility with a clear code path that supports the building official's decision and recording the determination in the files of the enforcing agency.[43]

LOW CARBON FUELS STANDARD

California's LCFS originally was established by executive order in 2007 and now requires a 20% reduction in the carbon intensity (CI) of transportation fuels by 2030.[44] CI under the regulations is measured on a lifecycle basis expressed as grams of carbon dioxide equivalent per unit energy of fuel, or gCO2e/MJ. The LCFS has been implemented using credits and deficits, with each credit denoting one metric ton of CO2 reduction based on the lifecycle CI of the fuel. Compliance is achieved by offsetting deficits against credits; credits can be banked and traded.[45] The credits do not expire and can be used anytime for compliance. Lifecycle CIs for a range of different fuels or pathways have been developed and approved by CARB over the last few years, including for electricity. The LCFS allows public charging station providers to generate credits under the program; the revenue from these credit sales can go toward building more charging stations or defraying charging costs for customers.[46] Any unused credits, also known as holdback credits, must be invested by utilities in projects that advance transportation electrification, such as electric school or transit buses, charging infrastructure, used EV rebates, and public outreach and education.

42 *EVCS Permitting Guidebook*, 40.

43 *EVCS Permitting Guidebook*, 42.

44 California Code of Regulations, Title 17, CCR, sections 95480-95503, available at http://oal.ca.gov/publications/ccr/.

45 For more information about the LCFS program, see Fuels Institute, *Market Reactions to Low Carbon Fuels Standard Programs*, February 22, 2019, https://www.fuelsinstitute.org/Research/Reports/Market-Reactions-to-Low-Carbon-Fuel-Standard-Progr.

46 "LCFS Electricity and Hydrogen Provisions," California Air Resources Board, https://ww2.arb.ca.gov/resources/documents/lcfs-electricity-and-hydrogen-provisions.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY HANDBOOK 44, SECTION 3.40—TENTATIVE

The California Department of Food and Agriculture, Division of Measurement Standards (DMS) is responsible for the enforcement of California weights and measures law. In the context of EV charging, DMS' programs are organized to ensure that a kWh dispensed in a commercial retail environment equals a kWh received. A new regulation requiring EVSE to be type certified and field verified was adopted in December 2019, which essentially implements a national standard still being considered by the NIST, Handbook 44 Section 3.40—Tentative.[47] Notably, the code is still being developed within NIST. Provisions of the regulation include the following:

- **An EVSE must indicate on each face the unit price** at which the EVSE is set to compute or to dispense at any point in time during a transaction.
- **A computing EVSE shall display the unit price in whole cents (e.g., $0.12) or tenths of one cent (e.g., $0.119)** on the basis of price per MJ or kWh.
- **In cases where the electrical energy is unlimited or free of charge, this fact shall be clearly indicated** in place of the unit price.
- **An EVSE shall be able to conspicuously display on each face the maximum rate of energy transfer** (i.e., maximum power) and the type of current associated with each unit price offered.
- **EVSEs must be accurate and correct over the temperature range of −40°C to 85°C (−40°F to 185°F).**
- **Each EVSE must have the following information conspicuously, legibly, and indelibly marked:** (a) voltage rating, (b) maximum current deliverable, (c) type of current (alternating current (AC) or direct current (DC) or, if capable of both, both shall be listed), (d) minimum measured quantity, and (e) temperature limits, if narrower than and within −40°C to 85°C (−40°F to 185°F).

Key dates under the regulation include:

- **January 1, 2021:** All new commercial AC EVSE installed on or after January 1, 2021, will be fully subject to the regulation.
- **January 1, 2023:** All new commercial DCFC EVSE installed on or after January 1, 2023, will be fully subject to the regulation.
- **January 1, 2031:** All commercial AC EVSE installed prior to January 1, 2021, may continue in operation, as is, but must comply with the regulation by January 1, 2031.
- **January 1, 2033:** All commercial DCFC EVSE installed prior to January 1, 2023, may continue in operation, as is, but must comply with the regulation by January 1, 2033.

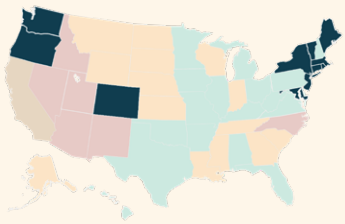
COASTAL DEVELOPMENT PERMITS

A CDP may be required to expand or install EVCS located in the coastal zone.[48] Local governments in the coastal zone with certified Local Coastal Programs are responsible for determining whether a CDP is required for proposed development within their respective jurisdictions, but some local CDP decisions can be appealed to the California Coastal Commission. In areas where there is no certified Local Coastal Program, the California Coastal Commission is responsible for determining whether a CDP is required for proposed development.

47 CCR Title 4, §§ 4001 and 4002.11 (2020); "Zero Emission Vehicle Projects," California Department of Food and Agriculture, https://www.cdfa.ca.gov/dms/programs/zevfuels/.

48 *EVCS Permitting Guidebook*, 24.

GROUP 2 STATES



Description: These states are implementing ZEV mandates and/or other targets and have developed and implemented multiple policies on installation or operation public charging.

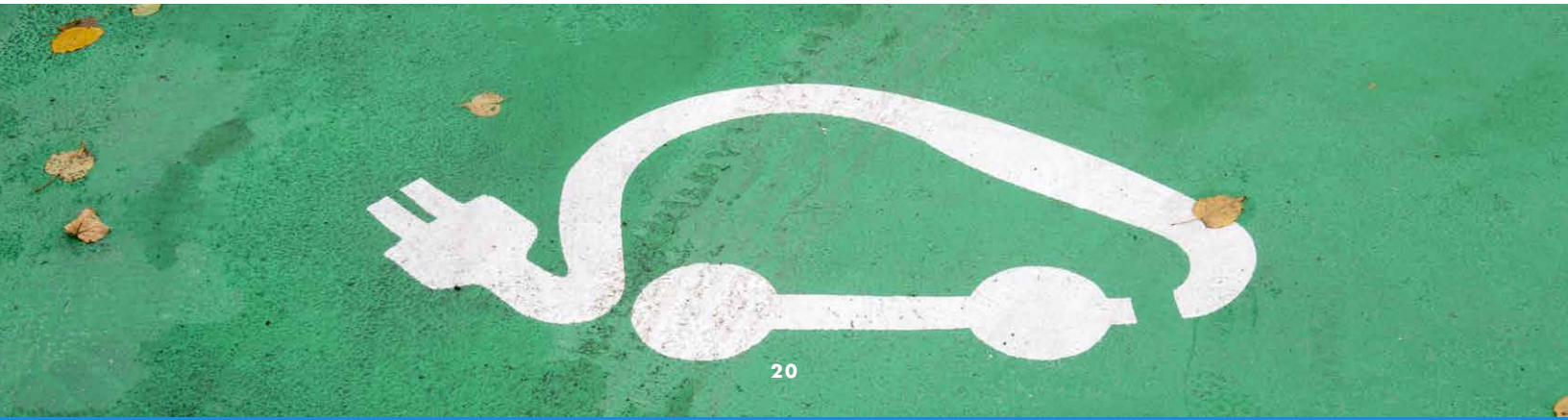
States: Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington

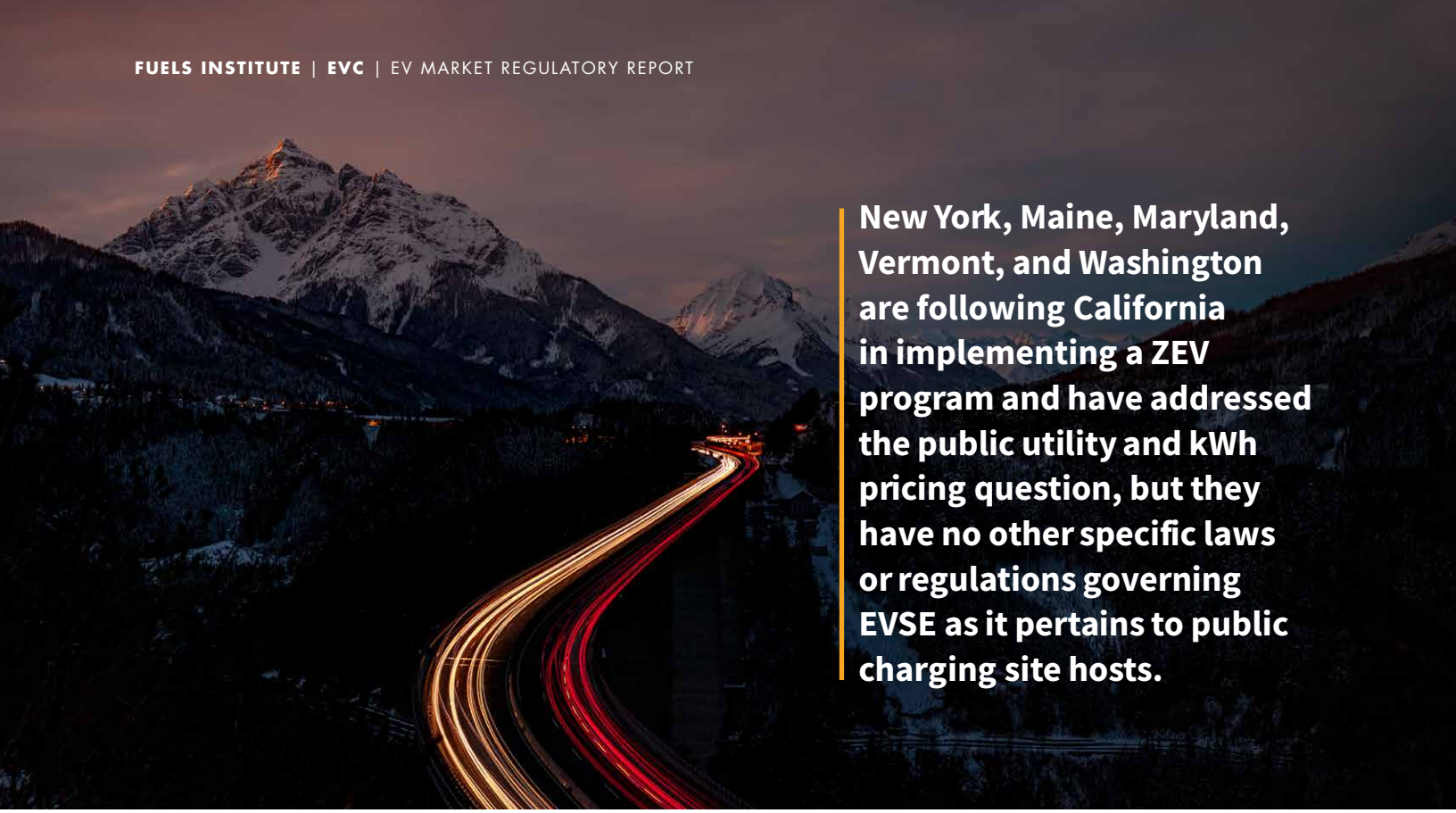
Group 2 states are implementing or plan to implement California's ZEV program, and several have additional electrification targets, including Colorado, New Jersey, Oregon, and Washington. These states have addressed the public utility definition and allow kWh pricing for EV charging. Several have set additional policies at the state level governing installation and operation of EVSE. Table 6 summarizes Group 2 state requirements.

TABLE 6: SUMMARY OF GROUP 2 STATE REQUIREMENTS PERTINENT TO PUBLIC CHARGING

STATE	ZEV PROGRAM?	OTHER EV TARGET OR PLAN?	INSTALLATION POLICIES?	ADDRESSES PUBLIC UTILITY DEFINITION?	ALLOWS KWH PRICING?	OTHER OPERATION POLICIES?
Colorado	⊕	⊕	⊕	⊕	⊕	⊕
Connecticut	⊕	⊗	⊗	⊕	⊕	⊕
Maine	⊕	⊗	⊗	⊕	⊕	⊗
Maryland	⊕	⊗	⊗	⊕	⊕	⊗
Massachusetts	⊕	⊗	⊕	⊕	⊕	⊕
New Jersey	⊕	⊕	⊗	⊕	⊕	⊕
New York	⊕	⊗	⊗	⊕	⊕	⊗
Oregon	⊕	⊕	⊕	⊕	⊕	⊗
Rhode Island	⊕	⊗	⊗	⊕	⊕	⊗
Vermont	⊕	⊗	⊗	⊕	⊕	⊗
Washington	⊕	⊕	⊕	⊕	⊕	⊗

Source: Transport Energy Strategies, June 2020





New York, Maine, Maryland, Vermont, and Washington are following California in implementing a ZEV program and have addressed the public utility and kWh pricing question, but they have no other specific laws or regulations governing EVSE as it pertains to public charging site hosts.

COLORADO

In addition to implementing California's ZEV program, Colorado is also a member of REV West (discussed further in the next section) and has developed an Electric Vehicle Plan[49], which includes the following targets:

1. **Increasing the number of light-duty EVs to 940,000 by 2030**
2. **Developing plans for transitioning medium-duty vehicles, heavy-duty vehicles, and transit vehicles to ZEVs**
3. **Developing an EV infrastructure goal by undertaking a gap analysis to identify the type and number of charging stations needed across the state** to meet 2030 light-duty vehicle (LDV), medium-duty vehicle, and heavy-duty vehicle goals (this analysis is expected to be completed by 2022)[50]
4. **State government agencies meeting directives and goals related to EVs from the updated Greening State Government Executive Order**
5. **Developing a roadmap to full electrification of the LDV fleet in Colorado**

Under the plan, and as it pertains to public charging, the Colorado Energy Office (CEO) will develop an Advanced Building Code Adoption toolkit that includes EV infrastructure requirements for new construction, which will make it easier for localities to adopt EV-ready building codes. Other relevant policies not mentioned include licensure as a requirement for installing EVSE and cost recovery for utilities, an issue that will be covered in more detail in the section on utility engagement.

49 State of Colorado, *Colorado Electric Vehicle Plan*, April 2020, https://drive.google.com/file/d/1-z-lNQMU0pymcTQEH8OvnemgTbwQnFhq/view. The first plan was completed in January 2018.

50 *Colorado Electric Vehicle Plan*, 17.

NEW JERSEY

In addition to implementing the California ZEV program, New Jersey has a specific EVSE target of 400 DCFC and 1,000 L2 EVSE installed and available for public use at a minimum of 200 locations by December 31, 2025.[51] At least 75 locations must include at least two DCFC installed along travel corridors, while 100 locations must include at least two DCFC in community locations. The state also has developed an Energy Master Plan that will guide the state to achieve its goal of decarbonization by 2050. For transportation electrification the plan:

- **Supports the deployment of 330,000 light-duty EVs by 2025**
- **Deploys EVSE throughout the state**
- **Creates incentives for EVSE**
- **Educates consumers and fleet owners on EVs**
- **Transitions state fleet vehicles to EVs**
- **Partners with industry to develop incentives for medium- and heavy-duty battery electric or fuel-cell vehicles**
- **Explores policies that accelerate the adoption of alternative fuels**[52]

The plan recognizes the lack of public EVSE infrastructure in the state, noting that it ranked 45th in the nation in EVCS per EV in 2018.[53] The state plans a range of actions for changing this, including revamping electricity rate structures, adopting a shared responsibility model for developing EVSE between utilities and private investors, and addressing barriers that exist in building codes and zoning ordinances.

Specifically, the plan commits to:

- **Produce model municipal zoning ordinances to (a) require EV-charging infrastructure in new or redeveloped parking areas** for residential and nonresidential development (including allowing EV parking to count toward minimum parking requirements); **(b) permit EV-charging infrastructure as an accessory use** in select or all zoning districts; and **(c) restrict the use of those designated parking spaces for EVs only;**
- **Encourage municipalities to update zoning ordinances, master plans, and redevelopment plans to include EV-charging infrastructure,** and to apply for state grants to install EV-charging infrastructure in public parking lots and parking garages;
- **Draft model permitting guidelines for municipalities** regarding when construction permits and inspections are required and regarding ways to expedite the permitting process; and
- **Update building codes as permitted to encourage EV readiness in new construction, and major renovations.**

51 New Jersey Senate No. 2252, (introduced March 5, 2018). Available at https://www.njleg.state.nj.us/2018/Bills/S2500/2252_I1.HTM.

52 State of New Jersey, *2019 New Jersey Energy Master Plan: Pathway to 2050*, January 27, 2020, https://www.nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf; New Jersey Governor Executive Order 100 (EO-100) January 27, 2020, available at https://nj.gov/infobank/eo/056murphy/pdf/EO-100.pdf.

53 *2019 New Jersey Energy Master Plan*, 65.

OREGON

In addition to implementing the California ZEV program, Oregon also has adopted goals for EV registrations and purchases through 2030 (Table 7).[54]

TABLE 7: OREGON EV REGISTRATION AND PURCHASE GOALS

YEAR	REGISTERED EVS IN THE STATE	NEW EV PURCHASES
2020	50,000	-
2025	250,000	50%
2030	25% of all vehicles registered	90%

Source: Oregon Revised Statutes 283.327 and 283.398[53]

The state has developed an EV-readiness regulation requiring that 5% of open parking spaces must be available for future installation of EVSE in new construction of parking facilities with 50 or more open spaces.[55] And, it has developed statewide EVSE permit and inspection protocol regulations.[56] The EVSE permit covers the installation of all electrical components dedicated to the operation of an EV-charging system, and no other state building code permit is required.

Building officials and inspectors must permit and allow installation of an EV-charging system that has a Building Codes Division special deputy certification label without further testing or certification. However, EVSE installers must obtain a permit from the inspecting jurisdiction for the EVSE. Inspection of an EVSE installation is limited to determining compliance with certain Oregon Electrical Specialty Code provisions. Oregon also amended its building code in 2017 to approve the use of a demand factor table for calculating EV-charging equipment services and feeders.[57]

NEW YORK, MAINE, MARYLAND, VERMONT, AND WASHINGTON

New York,[58] Maine, Maryland, Vermont, and Washington[59] are following California in implementing a ZEV program and have addressed the public utility and kWh pricing question, but they have no other specific laws or regulations governing EVSE as it pertains to public charging site hosts. Washington exempts installation of EVSE from its Environmental Policy Act.[60] Another ZEV state, Rhode Island, has addressed the kWh question but not the public utility definition. Connecticut requires utility companies to evaluate if it is appropriate to implement PEV time-of-day rates for residential and commercial customers.[61] In addition, owners and operators of public EVSE that require payment must allow multiple payment options that allow access by the public. Payment should not require users to pay a subscription fee or obtain a membership of any kind, however payment required may be based on price schedules for such memberships. Owners and operators can impose restrictions on the amount of time a vehicle can use the EVSE.[62] Massachusetts has a similar law respecting payment.[63]

54 The Oregon Department of Energy is also subject to state fleet requirement and reporting requirements.

55 Oregon Rule 918-020-0380: Electric Vehicle Ready Parking (effective October 1, 2017). There are other requirements, such as including that the conduit system must be, at a minimum, capable of supporting the installation of electrical wiring for the future installation of EVCS rated "L2" (40 amp/3.3 – 6.6 kW) or larger, as specified by the owner. Any conduit installed for future EVCS must be labeled "For Future EV Charging Stations." Both ends of the conduit must be labeled for the environment for which it is located.

56 Oregon Rule 918-311-0065: Electric Vehicle Charging Systems Statewide Permit and Inspection Protocol, https://oregon.public.law/rules/oar_918-311-0065.

57 State of Oregon, Building Codes Division, *No. 09-01 Use of a Demand Factor Table for Calculating Electrical Vehicle Charging Equipment Services and Feeders* (Ref.: ORS 455.060), October 2017, https://www.oregon.gov/bcd/codes-stand/Documents/sam-09-01-calcelectricalvehiclecharg.pdf.

58 The NYSERDA has developed a best practice guide for commercial site hosts. See New York State Energy Research and Development Authority, *Site Owners of EVCS on Commercial Properties: Best Practices Guide*, December 2015, https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Transportation/ChargeNY-Site-Owners-EV-Charge-Stations-Commercial-Best-Practices.pdf.

59 Washington Senate Bill 5811, Chapter 143, Laws of 2020 (adopted March 9, 2020).

60 Revised Code of Washington 79.13.100 and 43.21C.410.

61 A time-of-day rate for PEVs is designed to reflect the cost of electricity to the consumer at different times of the day. See Connecticut General Statutes 16-19f.

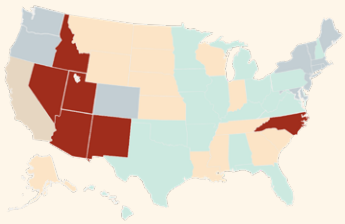
62 Connecticut General Statutes § 16-19ggg.

63 Massachusetts General Laws Chapter 25A, Section 16B-16E.

GROUP 3 STATES

Description: There is an electrification target and at least two relevant policies on installation or operation of EVSE pertinent to public charging.

States: Arizona, Idaho, Nevada, New Mexico, North Carolina, Utah



All Group 3 states have an electrification target and all states except North Carolina are part of the REV West MOU. North Carolina has set an electrification target as well to increase the number ZEVs in the state to 80,000 by 2025.[64] Among other strategies under its electrification target plan, the state intends to develop a guidance document addressing EVSE installation and management.[65] Every state in Group 3 has addressed the public utility definition and nearly all have addressed kWh pricing, except Arizona. Table 8 summarizes state requirements pertinent to fuel retail site hosts.

TABLE 8: SUMMARY OF GROUP 3 STATE REQUIREMENTS PERTINENT TO PUBLIC CHARGING

STATE	OTHER EV TARGET OR PLAN?	INSTALLATION POLICIES?	ADDRESSES PUBLIC UTILITY DEFINITION?	ALLOWS KWH PRICING?	OTHER OPERATION POLICIES?
Arizona	⊕	⊗	⊕	⊗	⊗
Idaho	⊕	⊗	⊕	⊕	⊗
Nevada	⊕	⊗	⊕	⊕	⊗
New Mexico	⊕	⊗	⊕	⊕	⊗
North Carolina	⊕	⊗	⊕	⊕	⊗
Utah	⊕	⊗	⊕	⊕	⊗

Source: Transport Energy Strategies, June 2020

64 State of North Carolina, *North Carolina ZEV Plan: A Strategic Plan for Accelerating Electric Vehicle Adoption in North Carolina*, October 1, 2019, https://www.ncdot.gov/initiatives-policies/environmental/climate-change/Documents/nc-zev-plan.pdf.

65 *North Carolina ZEV Plan*, 20.

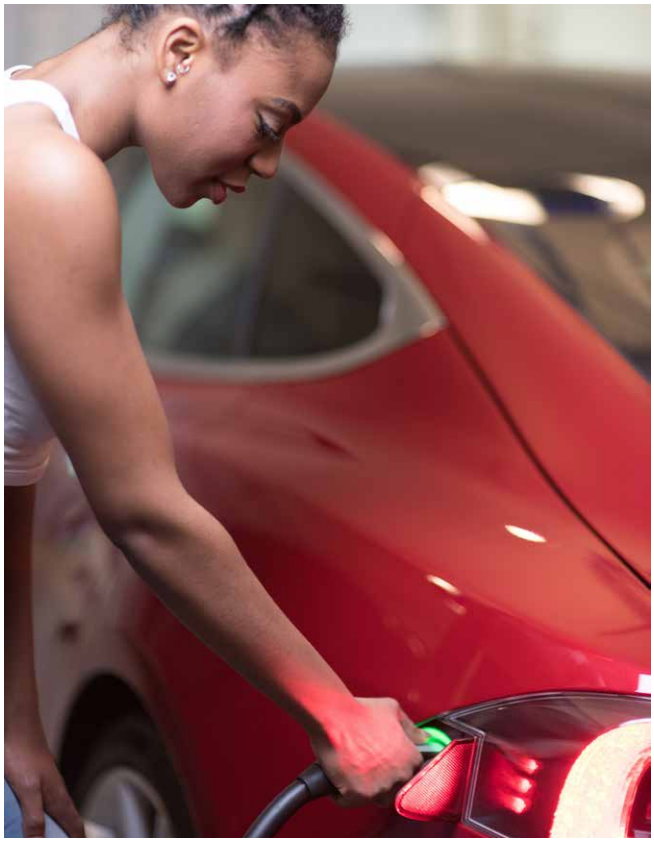
Under the 2019 REV West MOU, which is not legally binding or enforceable, signatory states agreed among other things to:

1. **Coordinate on EVCS locations** to avoid redundancy and to ensure stations are sited at a frequency and locations to optimize utilization and have a consistent user experience between charging infrastructure in each state
2. **Use and, where appropriate, promote the REV West Voluntary Minimum Standards** (see below) for EVCS, released in 2019, and explore opportunities for championing and implementing the standards in the signatory states; identify opportunities for signatory states to adopt and where appropriate; promote the stretch, tiered standards included within the Voluntary Minimum Standards, and go above and beyond the tiered standards, if of interest
3. **Identify and develop opportunities to incorporate EVCS infrastructure into planning and development processes,** such as building codes, metering policies, and renewable energy generation projects
4. **Support the expeditious buildout of DCFC stations along the corridors** identified in the vision and purpose of the memorandum through direct state investment, partnerships with utilities, partnerships with local governments, public-private partnerships, or other mechanisms that are appropriate for the individual states

Released with the revised 2019 MOU were voluntary minimum standards (noted above) for EVSE that cover siting, location, technical, and signage:

Siting:

- **Public access 24 hours a day,** each day of the year.
- **ADA compliance** with wheelchair accessibility.
- **Access to drinking fountains, bathrooms, and food or vending.**



- **Security cameras, adequate lighting, and an emergency shelter.**
- **Within walking distance of full-service amenities** such as local restaurants, retail shopping, or tourist attractions.

Location:

- **EVCS should be located within 50-100 miles of the next station in either direction.** For distances above 50 miles, consider elevation changes or driving conditions under extreme weather to ensure standard EV batteries can make the trip on a single charge.
- **EVCS should be located within one mile of a highway interchange or exit,** or within 0.5 miles from a highway interchange or exit to maximize driver convenience.
- **EVCS should be located in areas that provide dedicated parking** for the maximum number of vehicles that can be charged simultaneously.

Technical:

- **Charging power output of at least 50 kW is encouraged** as is charging power output of 150 kW to meet the charging needs of future EVs.
- **There should be dual protocols**—at least one Charge de Move fast charger and one Society of Automotive Engineers (SAE) Combined Charging System fast charger, and there should be two or more DCFC stations at each site.
- **EVCS should be designed for safety, durability, and all anticipated operating conditions,** and third-party certified by Underwriters Laboratories, National Electrical Manufacturers Association, etc.
- **EVCS should be connected to a network.** Networking protocols should be open, non-proprietary, and capable of collecting and reporting on data related to station usage.
- **Cell service or free Wi-Fi** should be made available to customers.
- **EVCS should support multiple payment options,** including but not limited to, ability to pay with a credit card, app-based mobile payments, subscription services, chip and pin, or vehicle-based payments.

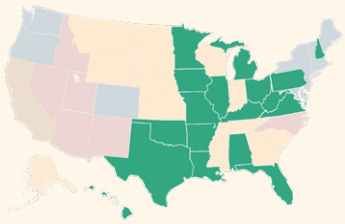
Signage:

- **Highway signs** indicating their location should be used.
- **Parking spaces should be marked** with "EV Charging Only" signs.

There are stretch standards as well that include:

- **Uptime requirement for station owners/hosts of at least 97%**
- **Customer support service that is accessible 24/7** with either an on-site station operator or a toll-free telephone number clearly posted near the charging equipment that is available to EV drivers accessing the charging equipment
- **Customer support service capable of providing or dispatching service** to address customer concerns at the charging station including rebooting the system if necessary
- **Proactive station health monitoring** that enables charging station service providers to repair faulty equipment before a customer submits a complaint
- **"Future-proofing" measures** such as including (1) larger or additional concrete pads, transformers and other utility-related equipment, and larger and/or additional conduit to avoid having additional construction and conduit costs in the future; (2) sufficient real estate for the addition of future DCFC stations, ideally enough space to double the initial installed capacity; (3) placed in locations where they can be expanded to accommodate increasing demand in the future.

GROUP 4 STATES



Description: There is no ZEV mandate or electrification target, but there is at least one relevant policy on regulations on installation or operation of EVSE pertinent to public charging.

States: Alabama, Arkansas, Delaware, District of Columbia, Florida, Hawaii, Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, New Hampshire, Oklahoma, Pennsylvania, Texas, Virginia, West Virginia

Table 9 summarizes requirements in the Group 4 states. Alabama, Arkansas, Delaware, the District of Columbia, Florida, Hawaii, Kentucky, Pennsylvania, Texas, and Virginia have addressed the public utility definition and permit kWh pricing for charging but set no other installation or operation requirements. West Virginia only permits kWh pricing, and Missouri and Ohio, as of July 2020, have addressed the public utility definition issue.

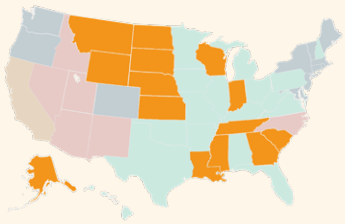
Illinois has set several requirements respecting installation: Installers must comply with certification requirements, certain recordkeeping requirements, and notification requirements to utilities. EVSE installed in Minnesota must: 1) be able to be used by any make, model, or type of PEV; 2) comply with state safety standards and standards set by the SAE; and 3) be capable of bi-directional charging once electrical utilities achieve a cost-effective ability to draw electricity from PEVs connected to the utility grid. Oklahoma also requires that installers be certified.

TABLE 9: SUMMARY OF GROUP 4 STATE REQUIREMENTS PERTINENT TO PUBLIC CHARGING

STATE	INSTALLATION POLICIES?	ADDRESSES PUBLIC UTILITY DEFINITION?	ALLOWS KWH PRICING?	OTHER OPERATION POLICIES?
Alabama	✗	+	+	✗
Arkansas	✗	+	+	✗
Delaware	✗	+	+	✗
District of Columbia	✗	+	+	✗
Florida	✗	+	+	✗
Hawaii	✗	+	+	✗
Illinois	+	✗	✗	✗
Iowa	✗	+	+	+
Kentucky	✗	+	+	✗
Michigan	✗	✗	+	✗
Minnesota	+	✗	✗	✗
Missouri	✗	+	✗	✗
New Hampshire	✗	✗	✗	+
Ohio	✗	+	+	✗
Oklahoma	+	✗	✗	✗
Penn-sylvania	✗	+	+	✗
Texas	✗	+	+	✗
Virginia	✗	+	+	✗
West Virginia	✗	✗	+	✗

Source: Transport Energy Strategies, June 2020

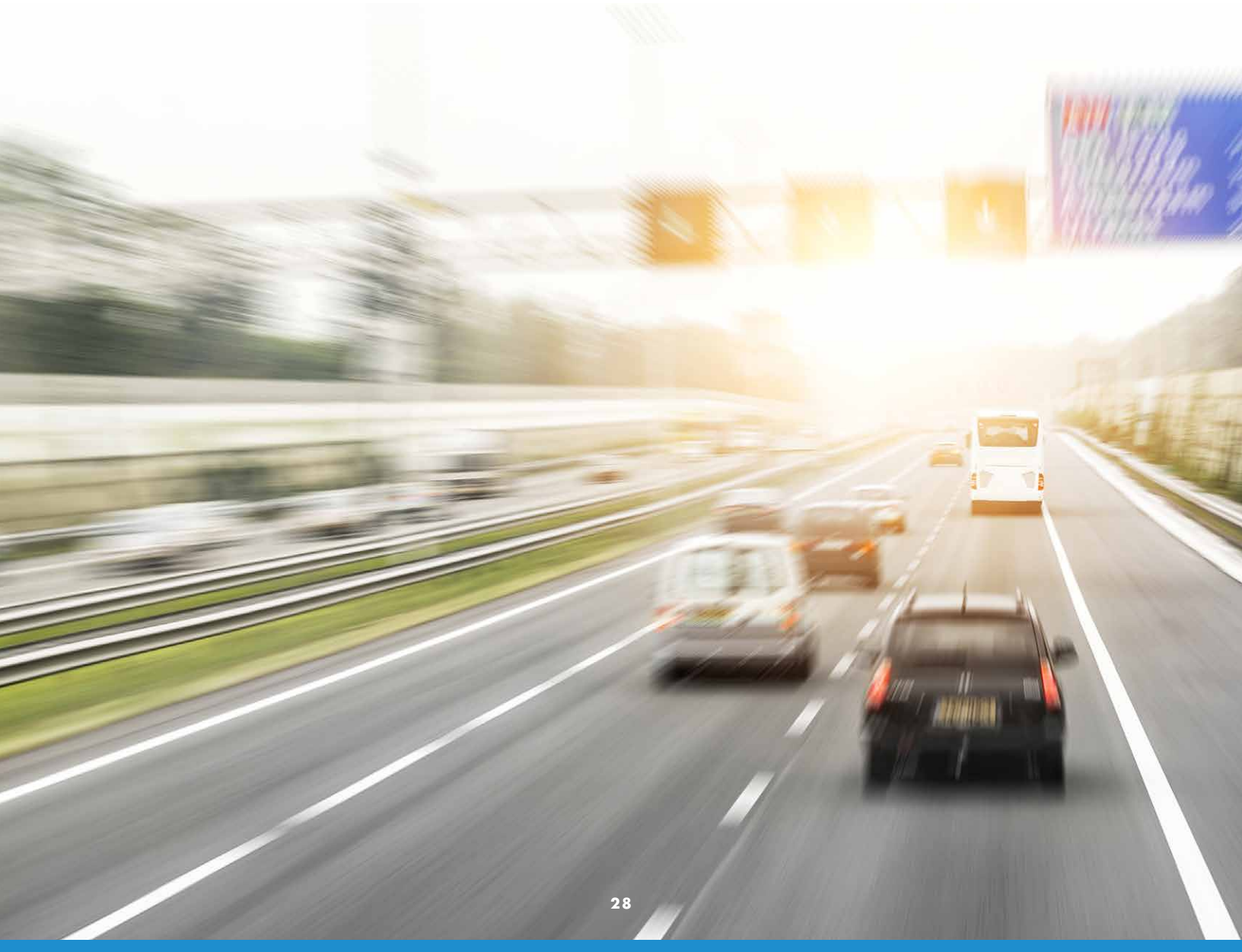
GROUP 5 STATES



Description: There is no mandate or electrification target, and there are no relevant policies on installation or operation of EVSE pertinent to public charging.

States: Alaska, Georgia, Indiana, Kansas, Louisiana, Mississippi, Montana, Nebraska, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Wisconsin, Wyoming

These states have no such requirements in place, except for Wyoming and Montana, which are members of the REV West initiative but have set no other relevant policies at this time.



THE ROLE OF INVESTOR-OWNED UTILITIES

In addition to policies governing the installation and operation of EV-charging infrastructure generally, and as they pertain to public charging, states have also set policies respecting utility engagement in charging (Table 10). This does not include PUC decisions, which will be covered in more detail below. Summaries of both relevant legislation and PUC decisions are included in Appendix B.

The most common public charging issues state legislatures are addressing pertain to setting rates, requiring utilities to submit TEPs that detail how they will help the state achieve its electrification goals, and addressing the role of utilities in charging. With respect to the latter, several states have and continue to consider whether utilities can own and operate charging stations. In 2019, policymakers and regulators in more than half of U.S. states considered plans to expand customer access to EVCS through the direct deployment of charging infrastructure.[66]

Regulators showed a strong interest in infrastructure deployment during 2019, granting approval to 20 utility plans across 10 states plus the District of Columbia, totaling at least $329 million.[67]

With respect to rates, states are preparing for new, dispersed load growth and expanded peak demand that may strain the electric grid as the EV market continues to grow.[68] States also are looking for how to design utility rates to support charging behaviors that enhance, not threaten, grid reliability and costs, namely inducing chargers (particularly homeowners) not to charge during peak demand periods.[69] Utilities are also considering special rate structures for DCFC that reduce or eliminate demand charges, which can often be a barrier to the development of these chargers. On the other hand, states are also recognizing that EVs may benefit the grid as flexible loads, charging during lower demand periods and potentially providing energy back to the grid during peak demand periods through the use of vehicle-to-grid (VGI) technology.[70]

TABLE 10: SUMMARY OF STATES THAT HAVE ENACTED LEGISLATION ON UTILITY ENGAGEMENT IN EV CHARGING

STATE	TYPE OF LEGISLATION
California	EVSE ownership
Colorado	Cost recovery
Connecticut	Rate design
Minnesota	Tariff filing guidance
Montana	Cost recovery
New Hampshire	Time-of-use rates
New Mexico	Transportation electrification plan
Oregon	Cost recovery, transportation electrification plan
South Carolina	Cost recovery
Utah	Transportation electrification plan
Washington	EVSE ownership, cost recovery, transportation electrification plan

Source: Transport Energy Strategies, June 2020

66 *50 States of Electric Vehicles Annual Report and Q4 2019 Update*, 30.

67 *50 States of Electric Vehicles Annual Report and Q4 2019 Update*, 37.

68 Matthew Rogotzke, Garrett Eucalitto, Sue Gander, *Transportation Electrification: States Rev Up* (Washington, D.C.: National Governors Association Center for Best Practices: 2019), https://www.nga.org/wp-content/uploads/2019/09/2019-09-15-NGA-White-Paper-Transportation-Electrification-States-Rev-Up.pdf.

69 *Transportation Electrification: States Rev Up*, 15.

70 *Transportation Electrification: States Rev Up*, 15.

Colorado, Montana, Oregon, South Carolina, and Washington have enacted laws that allow for cost recovery to help fund infrastructure expansion and investments without unduly burdening other customers. Connecticut and Minnesota laws allow utilities to charge time-of-day rates to encourage customers to charge in off-peak times, and New Hampshire law permits time-of-use rates (TOU) specifically for EVs (EV-only TOU) to promote energy conservation while reducing impacts to other utility customers. Table 11 summarizes these policies.

TABLE 11: SUMMARY OF RATE-RELATED STATE LEGISLATION

STATE (GROUP)	TOPIC	SUMMARY OF RELEVANT PROVISION
Colorado (2)	Cost recovery	"Public electric utilities may provide electricity to charge PEVs as unregulated or regulated services and may recover the costs of distribution system and infrastructure investments to accommodate PEV charging. The Colorado Public Utilities Commission should consider revenues from charging PEVs in the utilities service territory in evaluating the retail rate impact from the development of EVSE, which cannot exceed 0.005% of the total annual revenue requirements of the utility." (Senate Bill 19, 077, 2019, and Colorado Revised Statutes 41-1-103.3, 41-3-116, and 40-5-107)
Connecticut (2)	Time-of-day rates	"Utility companies must evaluate if it is appropriate to implement PEV time-of-day rates for residential and commercial customers. A time-of-day rate is a rate for PEVs that is designed to reflect the cost of electricity to the consumer at different times of the day. Utilities that have already made this determination prior to July 1, 2017, are not required to do so again." (Connecticut General Statutes 16-19f)
Minnesota (4)	Time-of-day rate	"Each public utility selling electricity for retail must file a tariff with the Minnesota Public Utilities Commission to allow a customer to purchase electricity solely for the purpose of charging a PEV, neighborhood EV, or medium-speed EV. The tariff must: (1) Contain either a time-of-day or off-peak electricity rate; (2) Allow the customer to purchase electricity from the utility's current mix of energy supply sources or from entirely renewable energy sources; and (3) Be available to the residential customer class." (Minnesota Statutes 216B.1614)
Montana (5)	Cost recovery	"A public utility may provide electric service to an EVSE under a rate approved by the commission, which must be designed to fully recover the cost of providing the service from the EVSE customer." (House Bill 456, 2019)
New Hampshire (4)	TOU rate	"Public utilities must consider whether to implement PEV time-of-use rates for residential and commercial customers. In their determination, they must consider whether implementing these rates would encourage energy conservation, optimal use of facilities and resources by an electric company, and equitable rates for customers." (New Hampshire Revise Statutes 236:131)
South Carolina (5)	Cost recovery	"A public electric utility may seek recovery of the costs associated with programs and resources related to distributed energy resources and load management technologies, including PEV charging, as part of a rate case filing through the South Carolina Public Service Commission." (South Carolina Code of Laws 58-39-120 and 58-39-130)
Washington (2)	Cost recovery	"Utilities may petition the Washington Utilities and Transportation Commission for a rate of return on EVSE installed for the benefit of ratepayers through December 31, 2030. The [Utilities and Transportation Commission] may approve an additional 2% to the standard rate of return if the utility installs EVSE on a fully regulated basis similar to other capital investments behind a customer's meter, and the expenditures do not increase ratepayer costs more than 0.25%. EVSE are subject to a depreciation schedule and may be gifted to the customer when fully depreciated." (Revised Code of Washington 80.28.360)

Source: Compiled by Transport Energy Strategies, June 2020

Much of the action and engagement with respect to charging generally is happening at the regulatory level in respective states' PUCs, which have considered nearly 200 filings in the last seven years from utilities on a range of EV-related issues, from charging, different types of incentives, rates, and others. And, 67% of these filings have occurred in the last three years alone. Table 12 summarizes select examples of utility rate designs that have been approved by PUCs in several states.

TABLE 12: SELECT EXAMPLES OF PUC ACTIONS APPROVING RATE DESIGNS RELATED TO COMMERCIAL CHARGING

STATE (GROUP)	UTILITY	SUMMARY OF PUC ACTION
Arizona (3)	Tucson Electric Power	TEP was approved on February 20, 2019 to invest in certain elements of their Energy Efficiency Implementation Plan. Approved programs include the Distributed Energy Resource, REV West implementation, and Smart City EV Buildout Plan. These programs include elements seeking to enhance VGI efforts including smart charging and incentives for charging infrastructure.
Delaware (4)	Delmarva Power & Light	On June 4, 2019, the commission approved portions of Delmarva Power's Voluntary Program for Plug-in Electric Vehicle Charging (PIV) Program to invest in a range of programs targeting transportation electrification. This includes four utility-owned public chargers (two DCFC and two L2) that will be supplied by 100% renewable energy. In addition, the commission approved an EV TOU rate for EVSEs on a second meter.
Hawaii (4)	Maui Electric Company (MECO)	MECO's Revised Schedule EV-MAUI Tariff Filing includes reduced rates, with decreases ranging from 35-42% across all time periods, with the greatest reduction in rates during the mid-day period. Among other actions, new rates were approved that will offer low-cost charging during off-peak daytime hours when solar energy generation is abundant. The utility will replace the existing infrastructure at these sites to allow more types of EVs to access them.
Maine (2)	Central Maine Power Company	A new program offers rate relief in the form of a two-part demand rate to customers who install DCFC.
New York (2)	Consolidated Edison Company	Con Edison proposes to expand its Business Incentive Rate Program to include an EV Quick Charging Station Program under which a seven-year rate discount for new publicly accessible EV quick charging stations in its service territory would be implemented.

Source: Data from Atlas Public Policy's EV Hub, Electric Utility Filings Dashboard, June 2020

TABLE 13: SUMMARY OF SELECT STATE TEP LEGISLATION

STATE (GROUP)	SUMMARY
New Mexico (3)	By January 1, 2021, and upon request by the New Mexico Public Regulation Commission thereafter, public utilities must file an application to the commission to expand transportation electrification. Applications may include, but are not limited to, incentives to facilitate the installation of PEV charging infrastructure, electrification of public fleet vehicles, PEV charging rates, and customer outreach and education programs. The commission may approve applications based on whether the proposed projects can be reasonably expected to improve the electrical system efficiency of the public utility, to increase access to electricity as a transportation fuel, including in low-income and underserved communities, to reduce air pollution and greenhouse gas emissions, and to encourage consumer adoption of PEVs. (House Bill 521, 2019, and New Mexico Statutes 62-3)
Oregon (2)	The Oregon PUC must direct electric utilities to file applications for programs to accelerate transportation electrification. Eligible programs include investments in or customer rebates for EVSE. Among other criteria, programs must stimulate innovation, competition, and customer choice in EVSE and plug-in EV charging. Additionally, the Oregon Department of Energy must engage with publicly and IOUs on how to improve TEPs and increase plug-in EV adoption in their service territories. The department must also provide the utilities with technical assistance on how to accommodate increased electric system loads from PEVs. (Executive Order 17-21, 2017, and Oregon Revised Statues 757.357)
Utah (3)	The Utah Public Service Commission is authorized to establish a large-scale EVSE program, with a maximum cost of $50,000,000. The program may include utility-owned EVSE, a new EVSE rate structure, and a public education plan. Utilities implementing EVSE programs must submit annual progress reports by June 1 for the previous calendar year. (Utah House Bill 396, 2020, and Utah Code 54-4-41)
Washington (2)	The governing authority or commission of an electric utility may adopt an electric transportation plan that proves that utility outreach and investment in the electrification of transportation infrastructure does not increase net costs to ratepayers in excess of 0.025%. The governing authority or commission may consider items such as the impact of electrification on the utilities load, demand response and load management opportunities, system reliability and distribution system efficiencies, and interoperability concerns. Upon making this determination, electric utilities may offer incentive programs for customers. (Revised Code of Washington 35.92.450)

Source: Data from Atlas Public Policy's EV Hub, Electric Utility Filings Dashboard, June 2020

Several states in legislation have directed utilities to develop, or PUCs to oversee, the development of TEPs, including New Mexico, Oregon, Utah, and Washington. Several of these states have defined criteria that utilities must consider in creating their respective TEPs, such as system efficiency, equity (particularly for underserved communities), innovation, competition, and interoperability. They have also provided a degree of guidance about what could be included in TEPs, such as rebate and other incentive programs, public education and outreach, and new rate structures. Table 13 summarizes this state legislation.

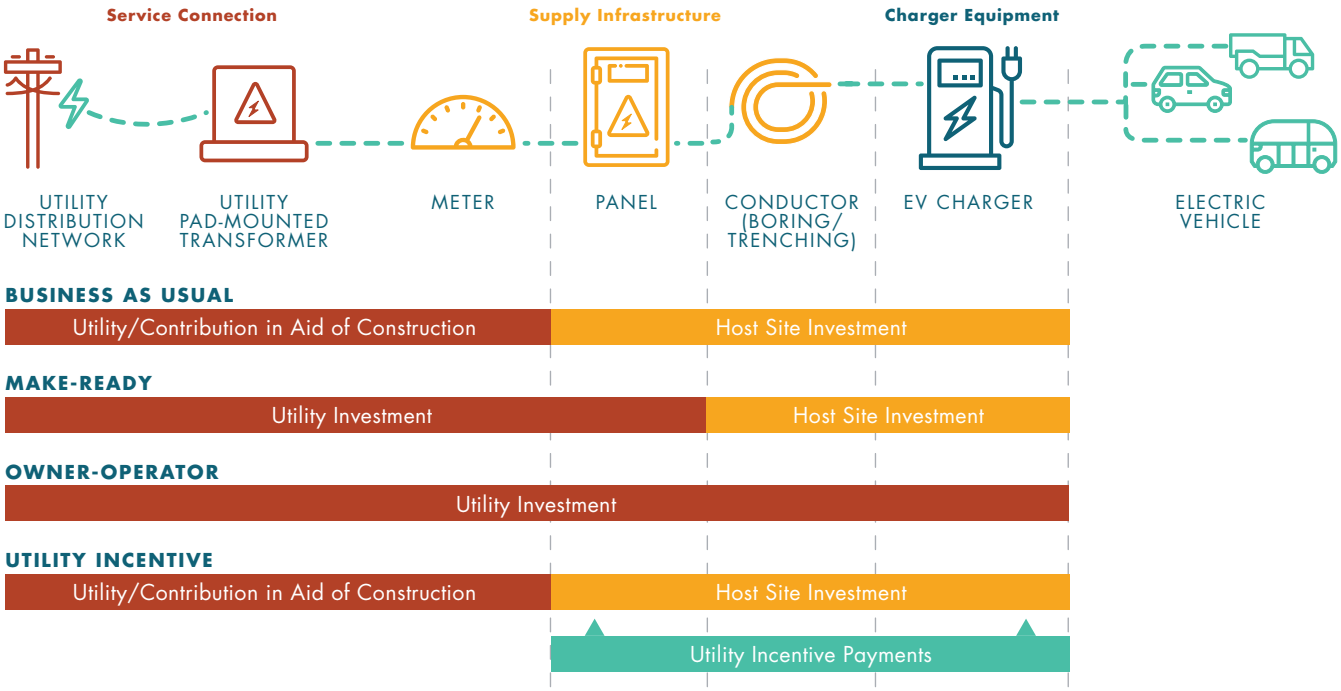
In addition, the California PUC released its draft TEF in February 2020 (noted in the above section on California). The Arizona Corporation Commission required utilities to file a statewide TEP by the end of 2019.[71]

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE MODELS FOR UTILITIES AND PUBLIC CHARGING

State policymakers are also considering the important issue of choosing the optimal model of utility investment in EVs and charging infrastructure, including deciding whether utilities can own and

71 *50 States of Electric Vehicles Annual Report and Q4 2019 Update*, 19.

FIGURE 5: CHARGING INFRASTRUCTURE UTILITY MODELS



Source: Smart Electric Power Alliance (SEPA), citing M.J. Bradley & Associates, 2019

operate charging stations. States already have considered and approved several models that include allowing utilities to (1) deploy "make-ready" installations that enable infrastructure up to the point of installing a charger, (2) owning and operating installations outright, or (3) providing financial incentives to host sites (Figure 5).[72]

States such as California have refrained from the ownership model or allow it on a case-by-case basis so that competition is promoted within a state. Make-ready installations appear to be a more favored approach than ownership at this time, allowing the utility to construct electrical infrastructure, such as trenching and conduits, that enables charging readiness for site hosts.[73] Such a solution may address upfront cost barriers and make charging infrastructure cost-competitive for public charging market participants.[74]

New York is the most recent example of this approach. In July 2020, its public service commission approved a $701 million EV Make-Ready program that will run through 2025 and be funded by IOUs.[75] The funding is expected to support the development of 50,000 L2 and 1,500 DCFC charging stations in the state. The EV Make-Ready program will be funded by IOUs in New York state and creates a cost-sharing program that incentivizes utilities and charging station developers to site EV charging infrastructure in places that will provide a maximal benefit to consumers. The public service commission order caps the total budget at $701 million and will run through 2025.

72 *Transportation Electrification: States Rev Up, 13.*

73 *Transportation Electrification: States Rev Up, 14.*

74 *Transportation Electrification: States Rev Up, 14.*

75 New York State Governor's Office, "Governor Cuomo Announces Nation-Leading Initiatives to Expand Electric Vehicle Use to Combat Climate Change," July 16, 2020, https://www.governor.ny.gov/news/governor-cuomo-announces-nation-leading-initiatives-expand-electric-vehicle-use-combat-climate.

Another approach allows utilities to provide incentives to third parties to own the infrastructure. Utilities in 21 states offer incentives for EVSE that may be applicable to commercial site hosts, including public charging (Table 14). A full summary of utility incentives for each state is included in Appendix E.

TABLE 14: SELECT UTILITY INFRASTRUCTURE INCENTIVES APPLICABLE TO COMMERCIAL SITE HOSTS

STATE (GROUP)	UTILITY INFRASTRUCTURE INCENTIVES
Arizona (3)	Salt River Project offers a rebate of $1,500 per port for commercial, workplace, and multi-family customers who install networked L2 EVSE. EVSE must be installed between May 1, 2020, and April 30, 2021. Funds will be awarded on a first-come, first-served basis. TEP offers rebates and technical support to businesses, multi-family dwellings, and non-profit customers that purchase and install between two to five EVSE ports. TEP will evaluate the electrical capacity and support EVSE infrastructure at locations that install six or more ports on a case-by-case basis. Higher rebates are available for commercial customers located in lower-income areas. Low-income areas are defined as U.S. Census tracts where the average household income does not exceed 80% of the median Arizona household income. Retailers may be eligible for DCFC funding of $24,000 per port; up to 75% of project cost.
California (1)	• Burbank Water and Power residential and commercial customers who install a L2 (240V) EV charger are eligible for a rebate of $2,000 from the utility. • Glendale Water & Power offers rebates of up to $2,000 for commercial or multi-family customers. • The Los Angeles Department of Water & Power's Commercial EV Charger Rebate Program offers a rebate of up to $5,000 per qualified L2 (240V) single-port charger, with up to an additional $750 per extra charge port. • Pasadena Water & Power's Commercial Charger Incentive Program offers a $3,000 rebate for installation of smart L2 (240V) charging stations for commercial, workplace, MUD, and fleet customers. • The City of Rancho Cucamonga Municipal Utility's EV Commercial Charger Rebate Program provides an incentive of up to $4,000 per L2 (240V) charging station to its commercial customers who install a workplace or public EV charger. • The Charge Ready Program is designed for nonresidential Southern California Edison customers to support deployment of a minimum of 10 charging stations at participating locations. The program includes qualified Level 1 (120 V) and L2 (240 V) charging stations, covers all electric infrastructure costs related to installation of the new circuit, and offers a rebate to offset some or all of the costs for the charging stations and their installation. • AMP provides rebates of up to $800 to residential customers and up to $5,000 to commercial customers toward the purchase of L2 EVSE. • PG&E EV Fast Charge Program offers competitive incentives to facilitate the installation of DCFC EVSE. PG&E will cover the cost to make-ready a site for DCFC. Projects must involve the purchase of a DCFC from the approved vendor list. To qualify, sites must receive electric service from PG&E and the DCFC must be available to the public 24 hours a day, 7 days a week.
Florida (4)	Duke Energy offers free L2 and DCFC EVSE, installation, warranty, and network connection services to its customers through the Park & Plug pilot program. Eligible entities include MUDs, workplaces, businesses, and areas along high-traffic corridors. Site hosts are responsible for electricity costs and must agree to participate in the pilot program through December 2022.
Michigan (4)	The Consumers Energy PowerMIDrive program offers rebates to residential and commercial customers who install L2 or DCFC EVSE. Commercial customers installing qualified, publicly accessible EVSE are eligible for rebates up to $5,000 per L2 and up to $70,000 per DCFC EVSE installed.

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STATE (GROUP)	UTILITY INFRASTRUCTURE INCENTIVES
New York (2)	ConEdison offers an electric rate reduction ranging from 34% to 39% for businesses in New York City and Westchester County that install a publicly accessible DCFC. To qualify, the charger must have a power output of at least 100 kilowatts. Additional terms apply, and the rate reduction is available through April 2025. Station owners can charge for use per hour, per session, or per unit of electricity: • Per hour: There is a set cost for any vehicle whether it is charging or not, and different vehicles receive electricity at different rates, so the cost of energy may vary widely by charging session. • Per session: This is usually more appropriate for workplace charging or charging stations that have short, regular sessions. • Per unit of energy (kWh): This accurately accounts for the true cost of electricity for the charging station owner but does not give an incentive for a car that is fully charged to leave the space. Central Hudson Gas & Electric offers a per-plug incentive for up to 100 publicly available DCFCs. The starting incentive proposed would be $11,000 per plug for plugs rated at 75 kW or greater, regardless of the year of participation, and would decline ratably over a maximum payment period of five years. New York State Electric & Gas offers a per-plug incentive for up to 160 publicly available DCFC stations. The purpose of the incentive payment is to support the deployment of DCFC stations while utilization is relatively low by offsetting electric delivery cost. The starting incentive would be $8,000 per plug for plugs rated at 75 kW or greater and would decline ratably over a maximum payment period of seven years. Orange & Rockland Utilities offers a per-plug incentive for up to 40 publicly available DCFC stations. The starting incentive would be $11,000 per plug for plugs rated at 75 kW or greater, regardless of the year of participation, and would decline ratably over a maximum payment period of seven years. Rochester Gas & Electric offers a per-plug incentive for up to 74 publicly available DCFC stations. The purpose of the incentive payment is to support the deployment of DCFC stations while utilization is relatively low by offsetting electric delivery cost. The starting incentive would be $17,000 per plug for plugs rated at 75 kW or greater and would decline ratably each year. National Grid offers a per-plug incentive for up to 300 publicly available DCFC stations and will conduct a study to determine the magnitude of any necessary system upgrades after an application is received. The starting incentive would be $7,500 per plug for plugs with simultaneous charging capability rated at 75 kW or greater and would decline consistently each year. Funding for the program is coming from the New York State Energy Research and Development Authority's (NYSERDA) System Benefits Charge, which already has been collected.
Ohio (5)	American Electric Power Ohio offers financial incentives for the hardware, network services, and installation of EVSE for up to 300 L2 and 75 DCFC stations. Incentives in varying amounts are available to all nonresidential customers that have a valid American Electric Power Ohio account. EVSE must be installed at a workplace, government facility, MUD, or other publicly available charging location served by the company. The following incentives are currently offered: • Incentives for L2 – max 6 ports/customer: Lesser of $50,000, 80% eligible project costs, or $10,000 per port • Incentives for DCFC – max 2 stations/customer: Lesser of $100,000, 80% eligible project costs, or $50,000 per station
Pennsylvania (4)	Duquesne Light Company offers rebates to commercial customers for the installation of publicly available L2 EVSE. Rebates are available for up to 100% of make-ready installation costs, up to $5,000 per plug, and up to $100,000 per site. Eligible projects must include a minimum of two L2-networked EVSE plugs.
Utah (3)	Incentives of up to $7,000 available for multiport L2 charging stations and $63,000 for DCFC to be deployed at both nonresidential and MUDs available from Rocky Mountain Power and approved by Utah Public Service Commission with $10 million allocated.

Source: Compiled by Transport Energy Strategies citing information from the U.S. Department of Energy's Alternative Fuels Data Center, June 2020

Table 15 summarizes approved investments in these three categories as they pertain to IOUs, which serve 70% of the electricity in the U.S.

Table 16 provides examples from select state PUC actions addressing charging infrastructure utility models that may impact public charging market participants to provide a better sense of how PUCs are addressing these issues.

TABLE 15: APPROVED INVESTMENTS FOR IOUS IN THE THREE MODELS[75]

STATE (GROUP)	MAKE-READY INFRASTRUCTURE	OWNERSHIP	INCENTIVES
Arizona (3)	⊕		⊕
California (1)	⊕	⊕	⊕
District of Columbia (4)	⊕		
Delaware (4)		⊕	⊕
Florida (4)		⊕	
Georgia (5)		⊕	
Hawaii (4)		⊕	
Indiana (5)	⊕		⊕
Kansas (5)		⊕	
Kentucky (4)		⊕	
Massachusetts (2)	⊕		⊕
Maryland (2)		⊕	⊕
Michigan (4)	⊕		⊕
Minnesota (4)	⊕	⊕	
Missouri (4)		⊕	⊕
Nevada (3)			⊕
New York (2)	⊕		⊕
Ohio (5)			⊕
Oregon (2)	⊕	⊕	⊕
Pennsylvania (4)	⊕	⊕	⊕
Rhode Island (2)	⊕		⊕
Utah (3)	⊕		⊕
Washington (2)		⊕	
Wisconsin (5)		⊕	

Source: Edison Electric Institute, June 2020

76 Edison Electric Institute, *Electric Transportation Biannual State Regulatory Update*, June 2020 at https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_ET%20Biannual%20State%20Regulatory%20Update_Dec%202019.pdf.

TABLE 16: SELECT STATE PUC ACTIONS ADDRESSING CHARGING INFRASTRUCTURE UTILITY MODELS

STATE (GROUP)	MODEL	UTILITY COMPANY	SUMMARY OF PUC ACTION
California (1)	Make-ready	Southern California Edison	Southern California Edison was approved on January 25, 2019 to invest in the Charge Ready Program. Valued at more than $20 million, the program will support make-ready investment for more than 1,500 L2 charging stations. The program includes an education and outreach campaign and will designate a fixed amount of investment to advance EV adoption in disadvantaged communities.
Delaware (4)	Ownership	Delmarva Power	On June 4, 2019, the PUC approved portions of Delmarva Power's Delmarva Power's Voluntary Program for Plug-in Electric Vehicle Charging Program to invest in a range of programs targeting transportation electrification. This includes four utility-owned public chargers (two DCFC and two L2) that will be supplied by 100% renewable energy. In addition, the commission approved an EV TOU rate for EVSE on a second meter.
District of Columbia (4)	Make-ready	Potomac Electric Power Company	The utility was approved to invest in make-ready system upgrades to support the competitive market, including for public DCFC and L2 charging.
Florida (4)	Ownership	Duke Energy	Duke Energy was approved to invest in an $8 million charging infrastructure pilot for utility owned, L2 smart chargers for 5 years only. The program also supports 75 public L2 charging stations and 30 DCFC stations.
Maine (2)	Make-ready/ incentives	Central Maine Power	The commission approved a program in which Central Maine Power would provide a subsidy for make-ready costs for 60 L2 chargers. Central Maine Power will perform the make-ready work up to the point of the meter or charger itself (at the customer's discretion), essentially providing a turn-key solution. The customer would be responsible for installing the charger. The commission will approve a subsidy of no more than $4,000 per individual customer site.
Massachusetts (2)	Ownership	Eversource	The utility was permitted to install and own make-ready infrastructure for nearly 4,000 L2 charging stations at long-dwell locations and 72 DCFC stations at travel locations.
Michigan (4)	Make-ready	DTE Energy Company	On May 2, 2019, the commission approved, among other things, a make-ready program for public DCFC along highway corridors and at downtown showcases.
Minnesota (4)	Make-ready	Xcel Energy	On July 17, 2019, the commission approved a Fleet EV Service and Public Charging Pilot to enable make-ready investment for up to 700 charging ports serving fleet vehicles and infrastructure to support an estimated 350 DCFC stations on corridors and at community mobility hubs..
New York (2)	Make-ready	Consolidated Edison Company	This approved publicly accessible DCFC make-ready program will provide $10 million for each rate year to assist charging station developers by offsetting up to $1.2 million per site for expected company interconnection and excess distribution facility costs for which the customer/developer would normally be responsible, subject to a decreasing share of the company's contribution in each rate year.
South Carolina	Ownership	Duke Energy	Under the DC Fast Charging Station Program, the Duke Energy will install, own, and operate up to 20 DCFC across its service territory.

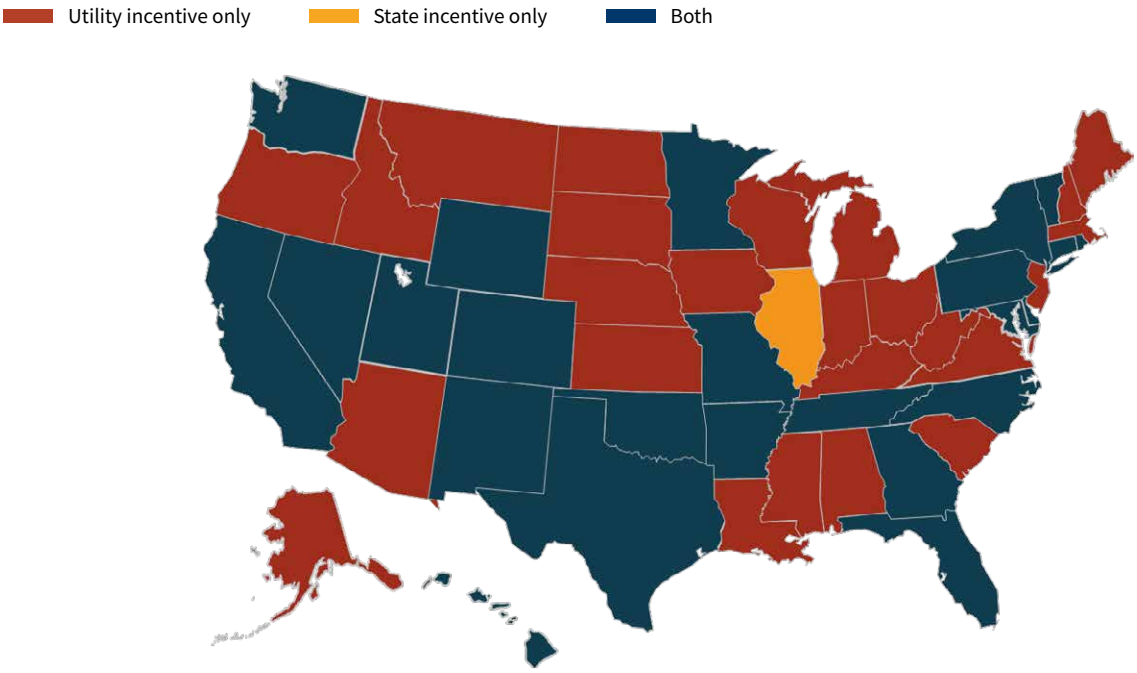
Source: Data from Atlas Public Policy's EV Hub, Electric Utility Filings Dashboard, June 2020

OTHER STATE INCENTIVES

Twenty-four states offer incentives for expanding EV charging that may be applicable to public charging. These incentives are in addition to what is offered by utilities and through the VW settlement (see next section). Figure 6 summarizes these states and includes both utility and other state incentives to provide a sense of how they fit together. A full summary of what is available in each state is provided in Appendix D.

Table 17 provides a summary of incentives available in select states.

FIGURE 6: SUMMARY OF STATES OFFERING INCENTIVES FOR EV CHARGING THAT MAY BE APPLICABLE TO RETAILERS



Source: Compiled by Transport Energy Strategies, June 2020

TABLE 17: SUMMARY OF INCENTIVES IN SELECT STATES THAT MAY BE AVAILABLE FOR PUBLIC CHARGING

STATE (GROUP)	OTHER INCENTIVES
Arkansas (4)	The Arkansas Energy Office of the Division of Environmental Quality may offer a rebate for each approved private EVCS, public EVCS, compressed natural gas refueling station, liquefied natural gas refueling station, and liquefied petroleum gas refueling station that is: • Not more than 75% of the qualifying costs of the station, not to exceed $400,000; • Not more than 50% of the eligible equipment purchase and installation cost of the private EVCS, not to $900; or • Not more than 50% of the eligible equipment purchase and installation cost of the public EVCS, not to exceed $5,000. (A.C.A. § 15-10-903)
California (1)	• The San Joaquin Valley Air Pollution Control District's Charge Up! Program provides incentives for the purchase and installation of EV chargers in the San Joaquin Valley. Charge Up! offers up to $6,000 for L2 EV chargers and up to $25,000 for Level 3 DCFCs. • The Fresno County Incentive Project, funded by the California Energy Commission, offers rebates of up to $4,000 for single-port EVSE and up to $7,000 for dual-port EVSE toward the purchase and installation of the unit. Eligible applicants include businesses, non-profit organizations, or government entities based in California or with a California-based affiliate, as well as property owners or entities with property owner authorization to install EVSE. • The Southern California Incentive Project, funded by the California Energy Commission as part of the California Electric Vehicle Infrastructure Project, offers rebates of up to $70,000 per DCFC for installations at new sites and 75% of total project costs, up to $40,000, per DCFC for installations at replacement or make-ready sites. • Funding may be available from Sacramento County for L2 chargers (up to $5,000).
Colorado (2)	CEO, the Regional Air Quality Council, and the Colorado Department of Transportation have partnered to provide grants through the ALT Fuels Colorado program for new, publicly accessible compressed natural gas (CNG) fueling equipment; co-located EV-charging and propane station equipment at funded CNG stations; and CNG, propane, and EVs. CEO will administer the station grants to advance infrastructure development along major statewide transportation corridors. Up to 80% of the cost of a charging station up to the following set maximums are funded under the program: • L2, fleet-only charging stations: $6,000 • L2, dual-port station: $9,000 • Level 3, multiple-connection standard station: $30,000
Delaware (4)	The state offers a rebate for commercial public-access points of 75% of the cost up to a maximum of $3,500 for a single-port station and $7,000 for a dual-port station.
Missouri (4)	Beginning January 1, 2020, nonresidential customers are eligible to apply for incentives to install EVSE along highway corridors. Each station-site must have two DCFC and two L2 chargers. Each site is eligible for incentives up to $240,000; sites with planned DCFCs with a capacity of 100 kilowatts or greater are eligible for incentives up to $360,000. Applications for incentives will be accepted until December 31, 2023, or until funding is exhausted, whichever is earlier.
New Mexico (3)	The New Mexico Environment Department provides funding for eligible mitigation projects for nitrogen oxides (NOx) emissions and will fund up to $20,000 per eligible dual-port L2 EVSE installation and up to 75% of the cost of a DCFC installation. Additional requirements may apply.
Oklahoma (4)	Beginning January 1, 2020, nonresidential customers are eligible to apply for incentives to install EVSE along highway corridors. Each station-site must have two DCFC and two L2 chargers. Each site is eligible for incentives up to $240,000; sites with planned DCFCs with a capacity of 100 kilowatts or greater are eligible for incentives up to $360,000. Applications for incentives will be accepted until December 31, 2023, or until funding is exhausted, whichever is earlier.

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STATE (GROUP)	OTHER INCENTIVES
Utah (3)	• The San Joaquin Valley Air Pollution Control District's Charge Up! Program provides incentives for the purchase and installation of EV chargers in the San Joaquin Valley. Charge Up! offers up to $6,000 for L2 EV chargers and up to $25,000 for Level 3 DCFCs. • The Fresno County Incentive Project, funded by the California Energy Commission, offers rebates of up to $4,000 for single-port EVSE and up to $7,000 for dual-port EVSE toward the purchase and installation of the unit. Eligible applicants include businesses, non-profit organizations, or government entities based in California or with a California-based affiliate, as well as property owners or entities with property owner authorization to install EVSE. • The Southern California Incentive Project, funded by the California Energy Commission as part of the California Electric Vehicle Infrastructure Project, offers rebates of up to $70,000 per DCFC for installations at new sites and 75% of total project costs, up to $40,000, per DCFC for installations at replacement or make-ready sites. • Funding may be available from Sacramento County for L2 chargers (up to $5,000).
Vermont (2)	CEO, the Regional Air Quality Council, and the Colorado Department of Transportation have partnered to provide grants through the ALT Fuels Colorado program for new, publicly accessible compressed natural gas (CNG) fueling equipment; co-located EV-charging and propane station equipment at funded CNG stations; and CNG, propane, and EVs. CEO will administer the station grants to advance infrastructure development along major statewide transportation corridors. Up to 80% of the cost of a charging station up to the following set maximums are funded under the program: • L2, fleet-only charging stations: $6,000 • L2, dual-port station: $9,000 • Level 3, multiple-connection standard station: $30,000
Washington (2)	State tax credits for qualified alternative fueling infrastructure are for up to 50% of the cost to purchase and install the infrastructure. (Revised Code of Washington 82.16.0496 and 82.04.4496) The Washington State Department of Transportation (WSDOT) will establish a green transportation capital grant program to fund projects to reduce the CI of the Washington transportation system, including fleet electrification, modification or replacement of facilities to facilitate fleet electrification and hydrogen fueling, upgrades to electrical transmission and distribution systems, and construction of charging and fueling infrastructure. To receive funding for a project, a transit authority must provide matching funding for that project that is at least equal to 20% of the total cost of the project. (Revised Code of Washington 47.66.120) WSDOT offers competitive grants to strengthen and expand the West Coast Electric Highway network by deploying EVSE with L2 and DCFC and hydrogen fueling infrastructure along highway corridors in Washington. Eligible project costs include siting, equipment purchases, electrical upgrades, installation, operations, and maintenance. (Revised Code of Washington 47.04.350)

Source: Compiled by Transport Energy Strategies citing information from the U.S. Department of Energy's Alternative Fuels Data Center, June 2020

INCENTIVES AND THE ROLE OF THE VOLKSWAGEN SETTLEMENT

In June 2016, the U.S. Department of Justice issued a partial consent decree settling claims by the U.S. Environmental Protection Agency and the Federal Trade Commission against VW.[77] The civil complaint filed against VW claimed that the automaker installed software in its 2.0 liter diesel engine vehicles to disable emission controls under normal use and to turn on emission controls only when the vehicle was being emission tested. This "defeat device" resulted in better real-world fuel mileage and driving performance but also resulted in the release of thousands of tons of NOx emissions over regulated limits.[78]

VW agreed to spend $14.7 billion to settle allegations of cheating emissions. The settlement is divided into three distinct parts addressing a diesel vehicle buyback program for consumers ($10 billion), the creation of Electrify America ($2 billion) and the creation of an environmental mitigation trust to mitigate damages under the Clean Air Act (approximately $2.9 billion).[79] Under the trust, states, tribes, Puerto Rico, and the District of Columbia have been allocated a portion of the trust (based on the number of affected vehicles in their jurisdiction) and were required to file as beneficiaries to receive their funding allocations, which all states have done.

Beneficiaries were required to submit a beneficiary mitigation plan that provides a high-level summary of how they intend to spend their allocated funds, and all states have now completed this process. Eligible mitigation actions include projects to reduce NOx from heavy-duty diesel sources.[80] Eligible projects include the replacement or repower of medium- and heavy-duty trucks and school and transit buses. Other eligible mitigation actions include engine repower for freight switcher locomotives, ferries, tugs, forklifts, and port cargo handling equipment. Beneficiaries may also install ocean-going vessel shorepower. Up to 15% of funds can also be used for expanding LDV EV charging.

Thirty-six states plan to use the full 15% allotment at a total of more than $283 million and several others do plan to fund EVSE but not at the full 15% allocation (Figure 7). Only five states will not fund any EVSE at all. Arizona, Georgia, Louisiana, South Carolina, and Wyoming will focus on replacing diesel trucks, school buses, and transit buses. In addition, the District of Columbia is looking to leverage private funding to develop charging in the District and has highlighted the role it expects Electrify America to play in developing charging stations.[81]

Several states already have developed RFPs for charging projects. Public charging companies and site hosts may be eligible for these funds as many states are looking to expand EVSE infrastructure in government, work, and public places. Fuel retailers such as 7-Eleven have been successful in receiving funding to build out charging stations at their facilities.[82] Charging companies such as EVgo have been successful in a number of the state EVSE solicitations to date.[83]

Several states have already fully funded $20 million in EVSE projects under the settlement including Delaware, Iowa, New Mexico, North Dakota, and Virginia. Another 11 states have funded $100 million EVSE projects under Phase 1 of the settlement:

77 See the National Association of State Energy Officials and the National Association of Clean Air Agencies VW Settlement Clearinghouse at https://vwclearinghouse.org/.

78 "About the Settlement," VW Clearinghouse, https://vwclearinghouse.org/about-the-settlement/.

79 See the website for the Volkswagen Diesel Emissions Environmental Mitigation Trust at https://www.vwenvironmentalmitigationtrust.com/state-trust.

80 "Volkswagen Clean Air Act Civil Settlement," Environmental Protection Agency, https://www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement.

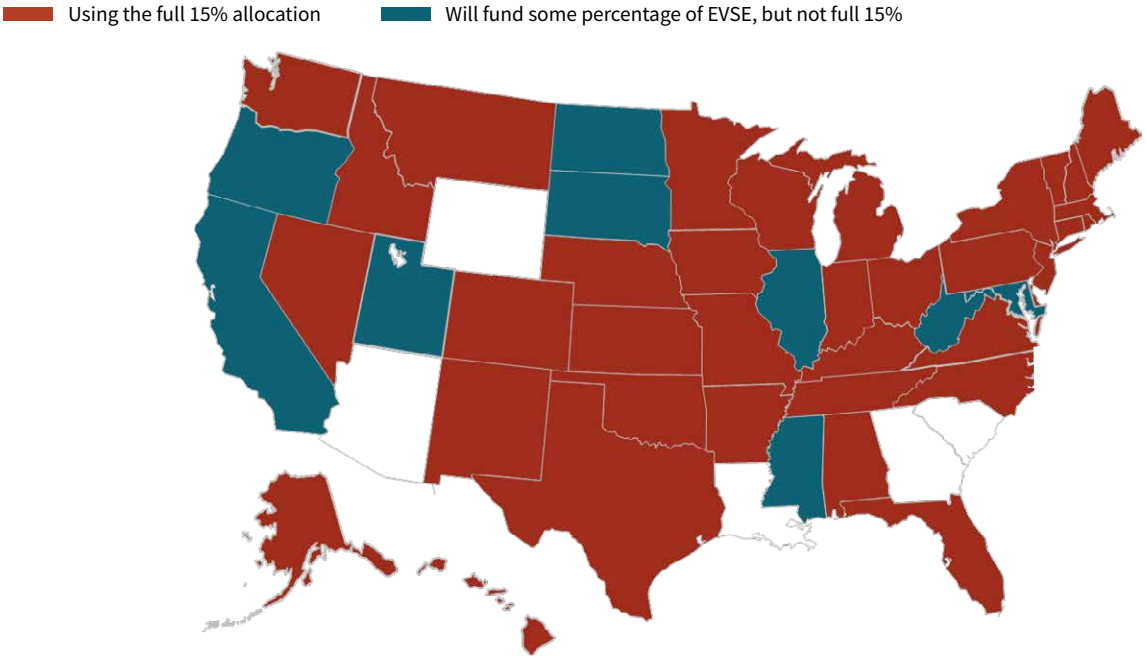
81 Department of Energy & Environment and Government of the District of Columbia, *The District of Columbia's Spending Plan For Volkswagen Settlement Funds (Beneficiary Mitigation Plan)*, July 6, 2018, https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/The%20District%20of%20Columbia%27s%20Spending%20Plan%20for%20Volkswagen%20Settlement%20Funds.pdf.

82 As an example: Florida Department of Environmental Protection, *Electric Vehicle Charging Infrastructure – Phase 1: Grant Awardee List by Segment*, July 2020, https://floridadep.gov/sites/default/files/EVCI%20Phase%201%20Table%20of%20Awarded%20Applicants.pdf. 7-Eleven received funding for seven sites and 14 chargers.

83 As an example: "Volkswagen Settlement Information," Virginia Department of Environmental Quality, https://www.deq.virginia.gov/Programs/Air/vwmitigation.aspx. EVgo was awarded a $14 million contract by the state to develop charging infrastructure across the state.

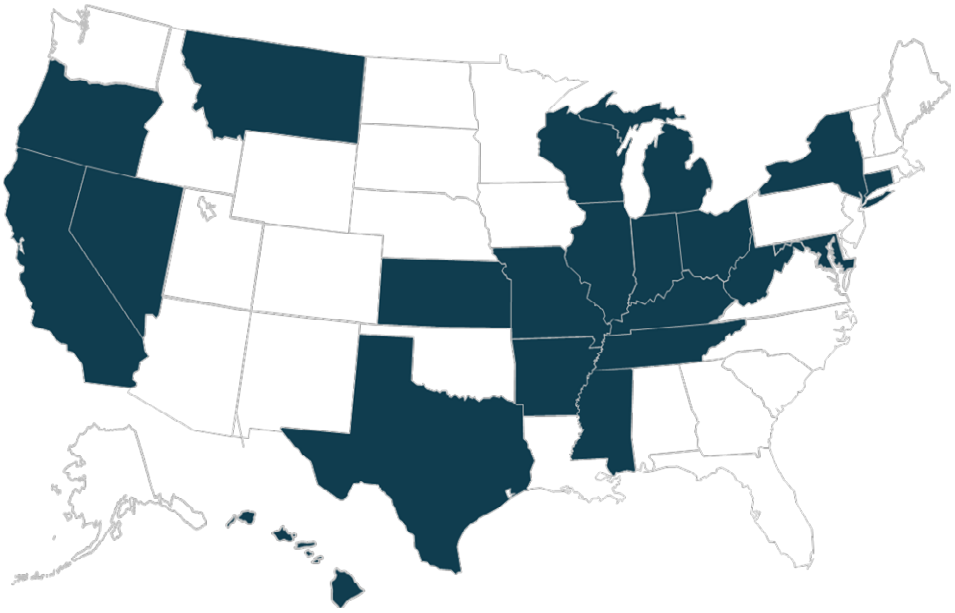
Up to 15% of the Volkswagen Settlement funds can also be used for expanding LDV EV charging. Thirty-six states plan to use the full 15% allotment at a total of more than $283 million.

FIGURE 7: STATES FUNDING EVSE, INCLUDING THOSE FUNDING AT THE FULL 15% ALLOCATION



Source: Transport Energy Strategies citing data from each state's beneficiary mitigation plans, October 2020

FIGURE 8: STATES THAT HAVE NOT YET FUNDED EVSE UNDER THE VW SETTLEMENT



Source: Transport Energy Strategies citing data from each state's beneficiary mitigation plans

Colorado, Florida, Idaho, Massachusetts, Minnesota, Nebraska, New Jersey, North Carolina, Oklahoma, Pennsylvania, Rhode Island, Vermont, and Washington. These states will be important to watch as they develop solicitations for Phases 2 and 3. Another 21 states have not begun the solicitation process for EVSE at all yet (Figure 8). These states represent $167 million in potential funding.

Table 18 summarizes each state's total settlement allocation, allocation (if any) for EVSE, amount spent (if applicable) for EVSE projects, and whether potential projects could be open to public charging market participants. A full summary of each state's status is included as Appendix F to this report.

TABLE 18: SUMMARY OF GROUP 3 STATE REQUIREMENTS PERTINENT TO PUBLIC CHARGING

STATE (GROUP)	TOTAL VW SETTLEMENT ALLOCATION (MILLION US$)	POTENTIAL 15% TOTAL ALLOCATION (MILLION US$)	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN (MILLION US$)	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?
Alabama (4)	25.48	3.82	3.82	✗	✗
Alaska (5)	8.13	1.22	1.22	✗	✗
Arizona (3)	56.66	8.50	–	✗	✗
Arkansas (4)	14.65	2.20	2.20	✗	Possibly
California (1)	422.64	63.40	10.00	✗	Possibly
Colorado (2)	68.74	10.31	10.31	Partially	Possibly
Connecticut (2)	55.72	8.36	8.36	✗	Possibly
Delaware (4)	9.68	1.45	1.45	✓	Possibly
District of Columbia (4)	8.13	1.22	–	✗	✗
Florida (4)	166.28	24.94	13.50	Partially	Possibly
Georgia (5)	63.62	9.54	–	✗	✗
Hawaii (4)	8.13	1.22	1.22	✗	Possibly
Idaho (3)	17.35	2.60	2.60	Partially	Possibly
Illinois (4)	108.68	16.30	10.87	✗	Possibly
Indiana (5)	40.94	6.14	6.15	✗	Possibly
Iowa (4)	21.20	3.18	1.10	✓	Possibly
Kansas (5)	15.66	2.35	2.35	✗	Possibly
Kentucky (4)	20.38	3.06	3.06	✗	Possibly
Louisiana (4)	19.85	2.98	–	✗	✗
Maine (2)	21.05	3.16	3.16	✗	✗
Maryland (2)	75.71	11.36	11.36	✗	Possibly
Massachusetts (2)	75.06	11.26	11.26	Partially	Possibly
Michigan (4)	64.81	9.72	9.72	✗	Possibly
Minnesota (4)	47.00	7.05	7.05	Partially	Possibly
Mississippi (5)	9.87	1.48	–	✗	Possibly
Missouri (5)	41.15	6.17	6.17	✗	Possibly
Montana (5)	12.60	1.89	1.89	✗	Possibly
Nebraska (5)	12.25	1.84	1.80	Partially	✓
Nevada (3)	24.87	3.73	3.73	✗	Possibly
New Hampshire (4)	30.91	4.64	4.64	✗	✗
New Jersey (2)	72.22	10.83	10.83	Partially	Possibly

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STATE (GROUP)	TOTAL VW SETTLEMENT ALLOCATION (MILLION US$)	POTENTIAL 15% TOTAL ALLOCATION (MILLION US$)	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN (MILLION US$)	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?
New Mexico (3)	17.98	2.70	2.70	⊕	⊗
New York (2)	127.70	19.16	19.20	⊗	Possibly
North Carolina (3)	92.05	13.81	13.81	Partially	Possibly
North Dakota (5)	8.13	1.22	1.19	⊗	⊗
Ohio (5)	75.30	11.30	11.30	⊗	⊕
Oklahoma (4)	20.92	3.14	3.14	Partially	Possibly
Oregon (2)	72.97	10.95	10.95	⊗	Possibly
Pennsylvania (4)	118.57	17.79	17.79	Partially	Possibly
Rhode Island (2)	14.37	2.16	2.16	Partially	Possibly
South Carolina (5)	33.90	5.08	–	⊗	⊗
South Dakota (5)	8.13	1.22	–	⊗	⊗
Tennessee (5)	45.76	6.86	6.86	⊗	Possibly
Texas (4)	209.32	31.40	31.40	⊗	Possibly
Utah (3)	35.18	5.28	–	Partially	⊗
Vermont (2)	18.69	2.80	2.80	Partially	Possibly
Virginia (4)	93.63	14.05	14.05	⊕	⊗
Washington (2)	112.75	16.91	16.91	Partially	
West Virginia (4)	12.13	1.82	–	⊗	Possibly
Wisconsin (5)	67.08	10.06	10.06	⊗	Possibly
Wyoming (5)	8.13	1.22	–	⊗	⊗
TOTAL	2,832.09	424.81	314.12		

Source: Compiled by Transport Energy Strategies, August 2020

CITY AND COUNTY REQUIREMENTS

Summary of City and County Installation and Operation Requirements for Public Charging

For this report, 27 MSAs were chosen for review and out of those, more than 100 of the top-populated cities and counties were selected to survey the status of their respective regulation of installation and operation of public EV charging (Table 19).[84]

TABLE 19: MSAS, CITIES, AND COUNTIES RESEARCHED

MSA RANK	MSA	MAJOR CITIES ADDRESSED	MAJOR COUNTIES ADDRESSED
1	New York-Newark-Jersey City, NY-NJ-PA	New York City, Newark, Hempstead, Brookhaven, Islip, Oyster Bay, Jersey City, New Haven, Bridgeport, North Hempstead, Babylon, Huntington, Yonkers	Kings, Queens, New York, Bronx, Richmond, Westchester
2	Los Angeles-Long Beach-Anaheim, CA	Los Angeles, Long Beach, Anaheim, Santa Ana, Irvine, Santa Clarita, Glendale, Huntington Beach	Los Angeles, Orange
3	Chicago-Naperville-Elgin, IL-IN-WI	Chicago, Aurora, Naperville, Elgin	Cook, Dekalb, DuPage, Lake (Illinois and Indiana), Kenosha
4	Dallas-Fort Worth-Arlington, TX	Dallas, Fort Worth, Arlington, Plano, Irving, Garland, Grand Prairie, McKenna, Frisco	Dallas, Tarrant, Collin, Denton, Ellis, Johnson
5	Houston-The Woodlands-Sugar Land, TX	Houston, The Woodlands, Sugar Land	Harris, Fort Bend, Montgomery, Brazoria, Galveston
6	Washington-Arlington-Alexandria, DC-VA-MD-WV	Washington, Arlington, Alexandria	Fairfax, Montgomery, Prince George's, Prince William, Loudon, Frederick, Arlington
7	Miami-Fort Lauderdale-Pompano Beach, FL	Miami, Fort Lauderdale, West Palm Beach, Hialeah	Miami-Dade, Broward, Palm

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84 Generally, cities and counties with more than 150,000 in population were included in the research.

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MSA RANK	MSA	MAJOR CITIES ADDRESSED	MAJOR COUNTIES ADDRESSED
8	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	Philadelphia, Reading, Camden, Wilmington	Montgomery, Bucks, Delaware, New Castle, Chester, Camden, Berks, Gloucester, Atlantic
9	Atlanta-Sandy Springs-Alpharetta, GA	Atlanta, South Fulton, Sandy Springs	Fulton, Gwinnett, Cobb, DeKalb, Clayton, Cherokee, Forsyth, Henry
10	Phoenix-Mesa-Chandler, AZ	Phoenix, Mesa, Chandler, Scottsdale, Glendale, Gilbert	Maricopa, Pinal
11	Boston-Cambridge-Newton, MA-NH	Boston, Worcester, Providence	Norfolk, Plymouth, Suffolk, Essex, Middlesex, Rockingham
12	San Francisco-Oakland-Berkeley, CA	San Francisco, Oakland, Berkeley	Alameda, Contra Costa, San Mateo, Marin, Santa Clara
13	Riverside-San Bernardino-Ontario, CA	Riverside, San Bernardino	Riverside, San Bernardino
14	Detroit-Warren-Dearborn, MI	Detroit, Warren, Dearborn	Wayne, Oakland, Macomb, Livingston
15	Seattle-Tacoma-Bellevue, WA	Seattle, Tacoma, Bellevue	King, Pierce, Snohomish
16	Minneapolis-St. Paul-Bloomington, MN-WI	Minneapolis, St. Paul	Hennepin, Ramsey, Dakota, Anoka, Washington
17	San Diego-Chula Vista-Carlsbad, CA	San Diego, Chula Vista	San Diego
18	Tampa-St. Petersburg-Clearwater, FL	Tampa, St. Petersburg, Clearwater	Hillsborough
19	Denver-Aurora-Lakewood, CO	Denver	Denver, Arapahoe, Jefferson, Adams, Douglas
20	St. Louis, MO-IL	St. Louis	St. Louis, St. Charles, St. Louis City, Madison, St. Clair, Jefferson
21	Baltimore-Columbia-Towson, MD	Baltimore, Towson, Columbia	Baltimore, Anne Arundel, Howard, Harford
22	Charlotte-Concord-Gastonia, NC-SC	Charlotte, Concord, Gastonia	Mecklenburg, York, Union, Gaston, Cabarrus, Iredell, Rowan
23	Orlando-Kissimmee-Sanford, FL	Orlando, Kissimmee, Sanford	Orange, Seminole, Osceola, Lake
24	San Antonio-New Braunfels, TX	San Antonio	Bexar, Guadalupe, Camal
25	Portland-Vancouver-Hillsboro, OR-WA	Portland, Hillsboro, Gresham, Beaverton	Multnomah, Washington, Clark, Clackamas
28	Las Vegas-Henderson-Paradise, NV	Las Vegas, North Las Vegas, Henderson	N/A
31	Kansas City, MO-KS	Kansas City, Overland Park, Olathe, Independence	Jackson, Johnson, Clay, Wyandotte, Platte, Cass

Source: Transport Energy Strategies, June 2020

In summary, 49 cities and counties policies have ordinances or other regulations in effect concerning public charging. Nearly half of those cities and counties—23 to be exact—are in California. Nearly all the 49 cities focus on aspects related to installation. There appear to be no ordinances or other regulations in these cities and counties respecting operation, except for in the city of Naperville, Illinois, which has set a usage fee for EV charging at $1.50 per 60-minute interval for a maximum 180 minutes, minimum 60 minutes.[85] Appendix C includes details and references to cities and counties with ordinances or other regulations in place.

ANALYSIS OF COMMONALITIES AND DIFFERENCES IN METROPOLITAN STATISTICAL AREAS

Most public EV-charging regulation appears to take place in cities, though there are a few counties that do regulate public charging as well: for example, Miami-Dade County in Florida and several counties in Georgia, in addition to several counties in California. Larger cities in MSAs may have regulations respecting installation, but smaller cities and counties within the MSA in most cases appear to have no ordinance or regulation at all. Examples of such cities include Kansas City, Mesa, Philadelphia, Houston, and Dallas. Miami-Dade County is an example of a county that has some regulation on public charging though the surrounding cities have none. Most of the cities and counties included in this survey—about 75%—do not address EVSE-specific installation or operation requirements at all.

More than 30 of the cities and counties included in this report have other specific installation or design-related policies in place. What kinds of installation-related requirements are cities and counties regulating?

They tend to fall into the following categories:

- **Permitting requirements specific to nonresidential EVSE sites**
- **Parking requirements specific to EVs**
- **Signage requirements**
- **Other specific design or installation requirements** that may address issues such as technical requirements (voltage, raceway, power supply), landscaping, fire and safety code compliance, and trip hazards, among other issues
- **EV-ready building code requirements**

Table 20[86] summarizes the 49 cities and counties with installation requirements in place that affect public charging.

Twenty-four cities/counties require a permit to install public charging EVSE, and others require a permit and may have other specific permitting requirements in place addressing issues, such as site plans (Detroit), compliance with applicable health and safety requirements (Boston, Los Angeles, Irvine, Huntington Beach, Atlanta, and Chicago) and liability insurance (Philadelphia). Recall from the earlier section on California that the state legislature has directed California cities to implement its expedited permitting legislation enacted in 2015 (California AB-1236). Several cities and counties included in this report have done so: Alameda County, Berkeley, Chula Vista, Glendale, Huntington Beach, Irvine, Riverside, San Diego County, Santa Ana, and Santa Clarita. Other cities are in the process of implementing the statute and do require permitting: Anaheim, Contra Costa County, Long Beach, Los Angeles County, Riverside County, and San Bernardino City and County.

85 Naperville Municipal Code, Electric Vehicle Charging Stations, Section 11-2A-23-4, Sept. 30, 2020 available at https://library.municode.com/il/naperville/codes/code_of_ordinances?nodeId=TIT11MOVETR_CH2PA_ARTAPARU_11-2A-23ELVECHST.

86 "Metropolitan and Micropolitan Statistical Areas Population Totals and Components of Change: 2010-2019," United States Census Bureau, Population Division, April 2019, last accessed October 4, 2020, https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-metro-and-micro-statistical-areas.html.

TABLE 20: SUMMARY OF CITIES AND COUNTIES THAT HAVE INSTALLATION AND OPERATION REQUIREMENTS IN PLACE

CITY OR COUNTY	MSA-MSA RANK[85]	STATE	STATE GROUP	POLICIES IN PLACE FOR PUBLIC CHARGING					
				PERMITTING	PARKING	SIGNAGE	OTHER SPECIFIC SITE DESIGN OR INSTALL	EV-READY BUILDING CODE	OPERATION
Alameda County	San Francisco-12	California	1	⊕	⊗	⊗	⊗	⊗	⊗
Anaheim	Los Angeles-2	California	1	⊕	⊕	⊕	⊕	⊗	⊗
Atlanta	Atlanta-9	Georgia	5	⊕	⊕	⊕	⊕	⊕	⊗
Berkeley	San Francisco-12	California	1	⊕	⊗	⊗	⊗	⊕	⊗
Boston	Boston-11	Massachusetts	2	⊕	⊕	⊕	⊕	⊗	⊗
Chicago	Chicago-3	Illinois	4	⊕	⊗	⊗	⊕	⊕	⊗
Chula Vista	San Diego-18	California	1	⊕	⊗	⊗	⊕	⊗	⊗
Clayton County	Atlanta-9	Georgia	5	⊗	⊕	⊕	⊕	⊕	⊗
Contra Costa County	San Francisco-12	California	1	⊕	⊕	⊕	⊕	⊕	⊗
Cook County	Chicago-3	Illinois	4	⊗	⊗	⊗	⊕	⊗	⊗
Dallas	Dallas-4	Texas	4	⊗	⊕	⊗	⊕	⊗	⊗
Denver and Denver County	Denver-19	Colorado	2	⊗	⊕	⊗	⊕	⊗	⊗
Glendale	Los Angeles-2	California	1	⊕	⊗	⊗	⊗	⊕	⊗
Gwinnett County	Atlanta-9	Georgia	5	⊗	⊕	⊗	⊕	⊗	⊗
Houston	Houston-5	Texas	4	⊗	⊗	⊗	⊕	⊗	⊗
Huntington Beach	Los Angeles-2	California	1	⊕	⊗	⊗	⊕	⊕	⊗
Irvine	Los Angeles-2	California	1	⊕	⊕	⊗	⊕	⊗	⊗
Jersey City	New York-1	New Jersey	2	⊗	⊗	⊕	⊗	⊗	⊗
Kansas City	Kansas City-31	Kansas	5	⊗	⊗	⊕	⊕	⊗	⊗
Long Beach	Los Angeles-2	California	1	⊕	⊕	⊕	⊕	⊗	⊗
Los Angeles	Los Angeles-2	California	1	⊗	⊕	⊗	⊕	⊕	⊗
Los Angeles County	Los Angeles-2	California	1	⊕	⊕	⊕	⊕	⊕	⊗
Marin County	San Francisco-12	California	1	⊗	⊕	⊕	⊕	⊕	⊗
Mesa	Phoenix-10	Arizona	3	⊗	⊕	⊗	⊕	⊗	⊗

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CITY OR COUNTY	MSA-MSA RANK[58]	STATE	STATE GROUP	POLICIES IN PLACE FOR PUBLIC CHARGING					
				PERMITTING	PARKING	SIGNAGE	OTHER SPECIFIC SITE DESIGN OR INSTALL	EV-READY BUILDING CODE	OPERATION
Miami-Dade County	Miami-7	Florida	4	✗	✗	+	+	✗	+
Montgomery County	Washington, DC-6	Maryland	2	✗	+	✗	+	✗	✗
Naperville	Chicago-3	Illinois	4	✗	+	+	+	✗	+
New York City	New York-1	New York	2	✗	+	✗	+	✗	✗
North Hempstead	New York-1	New York	2	+	+	✗	+	✗	✗
Oakland	San Francisco-12	California	1	✗	✗	✗	+	+	✗
Orange County	Los Angeles-2	California	1	✗	✗	✗	+	✗	✗
Philadelphia	Philadelphia-8	Pennsylvania	4	+	✗	✗	✗	✗	✗
Pierce County	Seattle-15	Washington	2	✗	✗	✗	+	✗	✗
Riverside	Riverside-13	California	1	+	✗	✗	+	✗	✗
Riverside County	Riverside-13	California	1	+	+	+	+	✗	✗
San Bernardino County	Riverside-13	California	1	+	✗	✗	✗	✗	✗
San Diego	San Diego-17	California	1	+	✗	✗	+	✗	✗
San Diego County	San Diego-19	California	1	+	✗	✗	✗	✗	✗
San Francisco	San Francisco-12	California	1	✗	+	✗	+	✗	✗
San Mateo County	San Francisco-12	California	1	✗	✗	✗	✗	+	✗
Sandy Springs	Atlanta-9	Georgia	5	✗	+	✗	+	✗	✗
Santa Ana	Los Angeles-2	California	1	+	✗	✗	+	+	✗
Santa Clarita	Los Angeles-2	California	1	+	✗	✗	+	✗	✗
Seattle	Seattle-15	Washington	2	+	+	✗	+	✗	+
Snohomish County	Seattle-15	Washington	2	✗	✗	✗	✗	✗	✗
Tacoma	Seattle-15	Washington	2	✗	✗	+	+	+	✗
Warren	Detroit-14	Michigan	4	+	+	✗	✗	✗	✗
Washington County	Portland-25	Oregon	2	✗	✗	+	+	✗	✗
Washington, DC	Washington, DC-6	District of Columbia	3	✗	✗	✗	✗	✗	+

Source: Compiled by Transport Energy Strategies, July 2020

TABLE 21: SUMMARY OF DENVER'S GREEN BUILDING CODE REQUIREMENTS FOR EV PARKING AND EVSE

NUMBER OF SPACES	NUMBER OF EV-READY SPACES	NUMBER OF EV-CAPABLE SPACES	NUMBER OF EVSE-INSTALLED SPACES
1	1	None	None
2-9	1	1	None
10 or more	10% of spaces	10% of spaces	5% of spaces

Source: Denver Green Building Code, July 2020[89]

As Table 20 shows, 23 cities have parking-related requirements for public charging that includes:

- **Ratios of EV parking spaces to non-EV parking spaces:** Atlanta, Clayton County (Georgia), Dallas, Marin County, Mesa
- **EV-charging space requirements:** Gwinnett County (Georgia), Long Beach, Los Angeles, Montgomery County (Maryland), New York City, North Hempstead (New York), Riverside County, San Francisco, Sandy Springs (Georgia)
- **Usage limits:** Naperville
- **Electricity demand factors:** Seattle

Several cities and counties included in this report are beginning to put in place requirements to require EV capability or EV readiness that applies to new construction of facilities that could include public charging sites. These cities include Atlanta, Chicago, Clayton County, Denver, and Seattle. Following are some examples of policies set in these cities:

- **Chicago:** This section shall apply to building permit applications for a new construction project that provides on-site parking as described in this section submitted after July 31, 2020. New construction providing 50 or more on-site parking spaces to serve nonresidential uses shall specify the installation of EVSE infrastructure to support the installation or future installation of EVSE for at least two parking spaces. Applies to building permit applications submitted after October 31, 2020.[87]
- **Clayton County, Georgia:** All new commercial, office, industrial, and mixed-use developments, as regulated by the International Building Code, are required to provide EVSE infrastructure to accommodate the future installation of EVSE.[88]
- **Seattle:** 10% of spaces must be EV-ready in new buildings.[89]

In addition, Denver's new Green Building Code, which took effect July 30, 2020, requires certain commercial sites that could include public charging sites to have EV-ready, EV-capable, and EVSE installed in spaces (Table 21).[90]

87 Chicago City Ordinance SO2019-8025 (April 24, 2020). Available at http://library.amlegal.com/nxt/gateway.dll/Illinois/chicago_il/municipalcodeofchicago?f=templates$fn=default.htm$3.0$vid=amlegal:chicago_il.

88 Clayton County Code of Ordinances 17-10-1011 Electric Vehicle Equipment. Available at https://library.municode.com/ga/clayton_county/codes/code_of_ordinances?nodeId=PTIICOCLCOGE_APXAZO_ART4SPDI_S4.87PUIM.

89 Seattle Municipal Code 23.54.030 — Parking space and access standards. Available at https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT23LAUSCO_SUBTITLE_IIILAUSRE_CH23.54QUDESTACOREnvironmental Protection AgencySOWAST_23.54.030PASPACST.

90 City of Denver, *Draft Green Building Code*, https://www.denvergov.org/content/dam/denvergov/Portals/696/documents/Denver_Building_Code/2019-code-update/2019_Denver_Green_Code.pdf (last accessed July 13, 2020); Denver Community Planning and Development, "City and County of Denver Courtesy Briefing on 2019 Building and Fire Code Amendments" (presentation), available at https://www.denvergov.org/content/dam/denvergov/Portals/696/documents/Denver_Building_Code/2019-code-update/2019_Code_Amendment_Presentation.pdf. The new building code applies to "Group A, B, E, I, M and S-2 occupancies" which means churches, schools, restaurants, shopping centers, workplaces and fueling stations.

San Antonio is also considering a similar policy.[91] Finally, as noted above in the section on California, the state's cities are subject to the state's Green Building Standards Code, which took effect in January 2020, and has been implemented by California's cities, including Berkeley, Contra Costa County, Glendale, Huntington Beach, Los Angeles, Los Angeles County, Marin County Oakland, San Mateo County, and Santa Ana. Several other cities and counties have developed EV-readiness or EV-capability policies and include Atlanta, Berkeley, Chicago, Clayton County, Contra Costa County, Denver and Denver County, Glendale, Huntington Beach, Los Angeles, Los Angeles County, Marin County, Miami-Dade County, Oakland, San Mateo County, Santa Ana, and Seattle.

Finally, there appears to be some alignment in EVSE public charging policies within the Atlanta MSA among Clayton County, Gwinnett County, Atlanta, and Sandy Springs. For example, respective ordinances similarly address:

- **EVSE requirements:** In Clayton County, a minimum of one EVCS must be provided for all new commercial developments that have 100 parking spaces or more. For Gwinnett County, commercial sites that exceed 50 parking spaces must provide at least one EVCS for each 50 parking spaces. Compliance is required for redevelopment projects where site work and/or repaving of existing parking areas and driveways (greater than 50 parking spaces) exceeds 50% of the existing impervious surface area.[92]
- **EV-readiness or EV-capability:** Sandy Springs requires 5% of spaces to be EV ready; Clayton County and Atlanta requires general EV readiness.[93]
- **Parking ratios:** Atlanta and Clayton County require the ratio of EV parking spaces to non-EV parking spaces to be 1:5, only applying to the total new parking spaces.[94]
- **References ADA compliance:** Atlanta and Clayton County.
- **Technical requirements:** Addressed by Atlanta, Clayton County, and Gwinnett County and includes issues such as voltage and raceways.

91 City of San Antonio, *Electric Vehicle Fleet Conversion and City-Wide Electric Vehicle Infrastructure Study*, https://www.sanantonio.gov/Portals/0/Files/Sustainability/ElectricVehicles/EVFleetConversion-EVInfrastructureStudy.pdf: "Through the American Cities Climate Challenge, the City is considering developing 'EV Ready' construction requirements for new residential and commercial buildings, as well as for certain retrofits or rehabilitations. As it creates these new requirements, the City will balance the goal of expanding access to EV charging with the need to maintain equity and housing affordability." While not included in the MSA research, there are a number of other cities and counties that have EV-ready policies in place including: Summit County, Colorado; Boulder, Colorado; Honolulu, Hawaii; Lakewood, Colorado; Tucson, Arizona; Flagstaff, Arizona; Salt Lake City, Utah; Sedona, Arizona; Golden, Colorado; San Jose, California; Fort Collins, Colorado; Aspen, Colorado; Palo Alto, California; Boulder County, Colorado. See "EV Infrastructure Building Codes: Adoption Toolkit," Southwest Energy Efficiency Project, https://www.swenergy.org/transportatoin/electric-vehicles/building-codes.

92 Clayton County Code of Ordinances, Sec. 4.87 — Public Improvements. Available at https://library.municode.com/ga/clayton_county/codes/code_of_ordinances?nodeId=PTIICOCLCOGE_APXAZO_ART4SPDI_S4.87PUIM.

93 Sandy Springs Development Code, Sec. 8.1.8. — Parking Lot Layout and Design. Available at https://library.municode.com/ga/sandy_springs/codes/development_code?nodeId=ART8SIDE_DIV._8.1PA_S8.1.8PALOLADE.

94 Atlanta City Ordinance, 17-O-1654. Available at http://atlantacityga.iqm2.com/Citizens/Detail_LegiFile.aspx?MeetingID=2068&ID=13626&.

Moreover, Clayton County's policy addressing commercial installation of EVSE is one of the most comprehensive of the cities and counties included in the survey. The policy is detailed about what it requires for EVSE installation at public charging. Following are a few examples of its requirements:

- **The EVSE infrastructure shall be installed per the requirements of the current edition of the National Electrical Code** (National Fire Protection Association 70).
- **The ratio of EV parking spaces to non-electrical vehicle parking spaces** shall be 1:5 and only applies to the total new parking spaces.
- **Designated dual-port EVSE** may be dual-usage for ADA-accessible EV-charging spaces and non-ADA-accessible EV-charging spaces with ADA-compliant hardware.
- **The EVSE infrastructure shall include a raceway,** which is continuous from the branch circuit/feeder panel location to the future PHEV/EV parking space. The raceway shall be sized and installed per the National Electrical Code; however, in no case shall the EVSE infrastructure raceway be less than 1″ in size. The EVSE infrastructure raceway shall include a pull rope or line installed for future conductor installation, with the raceway sealed and labeled for future use.
- **During construction of the electrical equipment room,** all raceways installed for the EVSE infrastructure shall terminate at the space dedicated for the future EVSE installation.
- **Prior to the final electrical inspection approval,** the space dedicated within the electrical equipment room for the future EVSE installation shall have the wall stenciled or marked legibly with the following text: "FUTURE ELECTRIC VEHICLE CHARGING EQUIPMENT AND PANELS."
- **The proposed placement and installation of EVSE infrastructure** or equipment shall not allow for any violation of the ADA.
- **The placement of EVSE shall not create a trip hazard** or violation of the accessible path of travel when the cord is connected to an EV or PHEV.
- **Installation of EVSE** shall meet National Electric Code.
- **EVSE must be mounted on the wall or on a structure at the end of the space provided** and shall be placed at least 4.5′ above the parking surface of the space. No charging devices may be placed within the dimensions of a space on the sides or entrance to a space.
- **EVSE mounted on structures such as pedestals, lighting posts, bollards, or other device** shall be located as to not impede pedestrian travel or create trip hazards.
- **Way-finding signs,** if installed, shall be placed to effectively guide the motorists to the EV parking space and/or charging station. Private regulatory signage shall be placed in a manner that shall not interfere with any parking space, drive lane, or exit.
- **Each EVCS and parking spaces** for which any parking incentive was granted shall be reserved for use as an EVCS or as EV-reserved parking.
- **EVSE must be operational at all times.**
- **A phone number or other contact information shall be provided** when the station is not functioning in a manner that allows electric vehicles to be charged.
- **Minimum landscaping requirements** for surface EV parking and charging station lots.[95]

95 Clayton County Ord. No. 2018-125, § 1, 12-18-18.

CANADIAN REQUIREMENTS

Summary of Canadian Requirements on the Installation and Operation of Electric Vehicle Supply Equipment for Public Charging

While this work focuses largely on installation and operation policies impacting public charging in the U.S., given the integration of the vehicle market between the U.S. and Canada, the fact that the federal government has made electrification a priority particularly through its ZEV target policy and because of that country's potential to scale up the ZEV vehicle market, a shorter survey was undertaken for Canada.

Only select provinces and the major cities within them were included:

- British Columbia and Vancouver
- Ontario and Toronto
- Québec and Montréal

In summary, a similar trend was observed for Canada as in the U.S. Installation and operation policies tend to be spotty, addressing certain

aspects but leaving out others. British Columbia and particularly Vancouver have arguably done the most in terms of setting policies that provide clarity and regulatory certainty that impact public charging. Table 22 summarizes installation and operation policies pertinent to public charging. Included in the installation policy assessment is a federal policy (described further below) under the country's electrical code with detailed requirements for EVSE installation. Federal, provincial, and city policies are summarized in the sections below and include relevant incentives. A summary of policies is provided in Appendix F.

TABLE 22: SUMMARY OF CITIES AND COUNTIES THAT HAVE INSTALLATION AND OPERATION REQUIREMENTS IN PLACE

AREA	GROUP	PROVINCIAL OR CITY ELECTRIFICATION TARGET/ZEV MANDATE?	INSTALLATION POLICIES?	ADDRESSES PUBLIC UTILITY DEFINITION?	ALLOWS KWH PRICING?	OTHER OPERATION POLICIES?
British Columbia	2	⊕	⊕	⊕	⊗	⊗
Vancouver	2	⊕	⊕	⊕	⊗	⊕
Ontario	5	⊗	⊕	⊗	⊗	⊗
Toronto	3	⊕	⊕	⊗	⊗	⊗
Québec	3	⊕	⊕	⊗	⊗	⊕
Montréal	3	⊕	⊕	⊗	⊗	⊕

Source: Transport Energy Strategies, August 2020

FEDERAL POLICY

At the federal level in Canada, there are three policies relevant to public charging: (1) the country's ZEV target, (2) its multi-year EV infrastructure deployment program, and (3) a national building code provision with technical requirements relevant to installing EVSE. The following nationwide ZEV target must be achieved over the 2025-2040 timeframe:

- **2025:** 10%
- **2030:** 30%
- **2040:** 100%

Qualifying ZEVs include battery EVs, PHEVs, and fuel-cell vehicles.[96] To support the achievement of these targets, federal budgets 2016 and 2017 provided CAN$96.4 million (US$73 million) over six years (April 2016 to March 2022) to the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative to establish a coast-to-coast network of fast-charging stations along the national highway systems (as well as natural gas refueling stations along key freight corridors and hydrogen refueling stations in major metropolitan areas).[97] As of March 2020, the program has selected 837 EV fast chargers. Budget 2019 provided an additional CAN$130 million (US$98.6 million) over five years (April 2019 to March 2024) to support the country's ZEV target. Funding focuses on EV L2 charging at workplaces, commercial and multi-unit residential buildings, public places, on-street and projects for fleets (e.g. taxis, car-sharing), mass transit, and inner city delivery.[98]

Currently, there is one policy governing public charging and applicable to the installation of EVSE in Canada, the Canadian Electrical Code.[99] Relevant provisions under the code include the following:

- **Voltages of EVSE** must not exceed 750 volts.
- **A sign is required** that warns against the operation of the EVSE without sufficient ventilation, where the manufacturer's installation instructions require it.

96 "Zero Emission Vehicles," Transport Canada, last modified January 31, 2020, https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles.

97 "Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative," Natural Resources Canada, last modified July 24, 2020, https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/electric-alternative-fuel-infras/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352.

98 "Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative"

99 Canadian Electrical Code, Part 86, Electric Vehicle Charging Systems, available at https://store.csagroup.org/ccrz__CCPage?pagekey=content&contentkey=2018CanadianElectric_en&cclcl=en_US; William Burr, "Guide to the Canadian Electrical Code, Part I—Instalment 42," *Electrical Industry Newsweek*, October 4, 2018, https://www.electricalindustry.ca/latest-news/4778-guide-to-the-canadian-electrical-code-part-i-instalment-42.

- **EVSE must be supplied by a separate branch circuit** that supplies no other loads except associated ventilation equipment, or from a branch circuit supplying another load or loads, provided that an EV energy management system is installed in accordance with other provisions in the code.
- **The connected load of a circuit supplying EVSE and associated ventilation equipment** must be considered as continuous.
- **Each installation of EVSE rated at 60 A or more, or more than 150 volts-to-ground,** must be provided with a separate disconnecting means (1) on the supply side of the point of connection of the EVSE, (2) located within sight of and accessible to the EVSE, (3) capable of being locked in the open position.
- **Each receptacle for EV charging must be a single receptacle of Canadian Standards Association configuration 5-20R supplied from a 125 V branch circuit rated not less than 20 A,** protected by a Class A ground fault circuit interrupter if installed outdoors, within 2.5 meters of finished grade (1) of the appropriate Canadian Standards Association configuration in accordance with Diagram 1 or 2 when supplied from a branch circuit rated at more than 125 V or more than 20 A and (2) labeled in a conspicuous, legible, and permanent manner, identifying it as an EVSE receptacle.
- **Where an EVSE and other parts of a system, either on board or off board the vehicle** are identified for and intended to be (1) interconnected to a vehicle and serve as an optional standby system, or (2) an electric power production source, or (3) provide for bi-directional power feed, and (4) be marked accordingly and meet the requirements of relevant provisions of the code.
- **The code addresses indoor charging sites and permits them to include** (1) integral, attached, and detached residential garages; (2) enclosed or underground parking structures; (3) repair and non-repair commercial garages, agricultural buildings, and similar rooms; or (4) other locations where the EV connector can couple to the EV.
- **Requires where the EVSE requires ventilation,** that (1) adequate ventilation be provided in each indoor charging site as specified in the code, (2) the EVSE be electrically interlocked with the ventilation equipment so that the ventilation equipment operates with the EVSE, (3) if the supply to the ventilation equipment is interrupted, the EVSE be made inoperable.
- **Addresses outdoor charging sites and permits them to include:** (1) residential carports and driveways, (2) curbsides, (3) open parking structures, (4) parking lots, (5) commercial charging facilities, (6) similar locations.

BRITISH COLUMBIA AND VANCOUVER

British Columbia passed the Zero-Emission Vehicles Act on May 30, 2019, requiring automakers to meet an escalating annual percentage of new light-duty ZEV sales and leases, reaching: 10% of LDV sales by 2025, 30% by 2030, and 100% by 2040, codifying the national target.[100] The province also has enacted a Low Carbon Fuels Standard to which electricity for transportation is subject.[101] Under the Province's Part 3 Agreement program for the standard, RFPs were released in June 2020 for projects that include expanding public charging to promote greenhouse gas reduction under the LCFS program.[102] Though the 2020 RFP process is already underway, public charging market participants should watch for 2021. It also has a carbon tax with the highest price on carbon emissions in Canada at CAN$30/tonne.[103] The province has also clarified that a site host is not a public utility.[104]

Vancouver has both installation and operation requirements impacting public charging. Under its parking bylaw, the city requires commercial buildings to have one EV parking space with an energized outlet to support L2 charging or higher for every 10 spaces; for less than 10 parking spaces, at least one such EV parking space.[105] Under its building bylaw, the city requires EVSE to align with the requirements of SAE AC L2 charging requirements, whether in applying load-managed solutions or separate branch circuits for each charging point.[106] The city also has an extensive bylaw affecting operation of EVSE that pertains to public charging covering how payments are to be accepted and setting prices for L2 and DCFC stations.[107]

Example provisions on payments include:

- **In the case of an EVCS designed to accept payments via a network subscription,** tap the appropriate radio frequency identification (RFID) EV network card on the appropriate part of the EVCS and connect the EV to the EVCS via conductive or inductive means to initiate a charging session;
- **In the case of an EVCS designed to accept payments via a smartphone application,** use the smartphone application appropriate to the EVCS and connect the EV to the EVCS via conductive or inductive means to initiate a charging session;
- **In the case of an EVCS designed to accept payments via an RFID-enabled credit card,** tap the credit card on the appropriate part of the EVCS and connect the EV to EVCS via conductive or inductive means to initiate a charging session; or
- **In the case of an EVCS designed to accept credit card payments by phone,** call the phone number printed on the EVCS and provide the appropriate details to initiate a session, and connect the electric vehicle to the EVCS via conductive or inductive means to initiate a charging session.

Example provisions on prices include:

- **The initial metered rates for all L2 charging stations in an existing meter zone** shall be the metered rate for that block plus an additional $2.00 per hour.
- **The initial metered rates for all L2 charging stations not in an existing meter zone** shall be CAN$2.00 per hour.

100 Zero-Emission Vehicle Act, SBC 2019, Chapter 29, assented May 30, 2019. Available at https://www.bclaws.ca/civix/document/id/complete/statreg/19029; Zero Emission Vehicles Regulation, Order in Council 448, approved July 30, 2020. Available at https://www.bclaws.ca/civix/document/id/oic/oic_cur/0448_2020.

101 Renewable and Low Carbon Fuel Requirements Regulation, B.C. Reg. 394/2008, deposited Dec. 9, 2008. Available at https://www.bclaws.ca/civix/document/id/complete/statreg/394_2008.

102 "Applying for a Part 3 Agreement," Part 3 Agreements, Government of British Columbia, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/renewable-low-carbon-fuels/part-3-agreements/applications.

103 Greenhouse Gas Reduction Act, SBC 2008, CHAPTER 16, assented to May 1, 2008. Available at https://www.bclaws.ca/civix/document/id/complete/statreg/08016_01.

104 Utilities Commission Act, Ministerial Order M104/2019.

105 Parking By-Law 6059, By-Law No. 12156/2018.

106 Building By-Law No. 12511 Sec. 10.3/2019. The city also requires EVSE to meet national electrical code requirements.

107 By-Law NO. 11866, A By-Law to Amend Parking Meter By-Law No. 2952 Regarding EVCS, enacted July 25, 2017.

- **The initial metered rates for all DCFC stations with a nominal power output of 50 kW in an existing meter zone** shall be the metered rate for that block plus an additional CAN$16.00 per hour.
- **The initial metered rates for all DCFC stations with a nominal power output of 50 kW not in an existing meter zone,** prior to adjustment in accordance with provisions under the policy, be CAN$16.00 per hour.

ONTARIO AND TORONTO

There appear to be no provincial-level policies governing installation and operation of public charging EVSE at this time. However, Toronto does have a ZEV target under its TransformTO program that applies to new registered personal vehicles:

- **2025:** 5% EVs
- **2030:** 20% EVs
- **2040:** 80% EVs

Moreover, the city also has an EV-capability/EV-readiness policy. The Toronto Green Standard outlines sustainable design requirements for new private and city-owned developments. The Toronto Green Standard includes mandatory (Tier 1) and voluntary (Tiers 2-4) guidelines that govern for the installation of charging infrastructure and EV-capable parking spots in new developments. Tier 1 performance measures are mandatory and require charging units in 20% of parking spaces in mid- to high-rise and commercial buildings, and 100% of parking spaces must be designed EV capable.[108] Under its EV strategy, the city plans to develop incentives that may apply to public charging, and it is seeking to identify high-priority areas for public charging and developing a preferred approach to rolling out this infrastructure.[109]

QUÉBEC AND MONTRÉAL

Québec also has a ZEV mandate.[110] Manufacturers were required to earn credits starting with model year 2018. For that year, the government has set 3.5% as the percentage in credits for new LDV sales and leases required of individual automakers. Targets will increase gradually each year to reach 22% in 2025 and later years. It is important to note that starting in 2020, large automakers are required to earn a minimum percentage of their credits exclusively from the sales or leases of ZEVs. The minimum earned credits requirement that year for intermediate and large automakers will be 9.5%, with 6% coming exclusively from ZEV sales for large manufacturers.

The higher the fully electric range of a vehicle, the greater the number of credits received by the automaker. The province has also set rates for using public DCFC (CAN$10.25 per hour for the use of a 50 kW fast-charging station).[111] Québec appears to be the only province of the three surveyed with a policy respecting utility engagement. When fixing utility rates, the respective utility commission must consider the revenues required by the electric power distributor for the operation of the public DCFC.[112] Montréal had an electrification strategy for the years 2016-2020 that included a target to roll out 1,000 public charging stations;[113] as of November 2019, it had installed 686.[114]

108 "Toronto Green Standard: Overview," City of Toronto, https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/toronto-green-standard-overview/.

109 City of Toronto, *City of Toronto Electric Vehicle Strategy*, December 9, 2019, https://www.toronto.ca/legdocs/mmis/2020/ie/bgrd/backgroundfile-141449.pdf.

110 Chapter A-33.02, Act to Increase the Number of Zero-Emission Motor Vehicles in Québec in Order to Reduce Greenhouse Gas and Other Pollutant Emissions, 2016. Available at http://legisquebec.gouv.qc.ca/en/showdoc/cs/A-33.02.

111 Chapter H-5, r. 1 Regulation Respecting the Rates for Using the Public Fast-Charging Service for Electric Vehicles, Hydro-Québec Act, chapter H-5, s. 22.0.2, 2019. Available at http://legisquebec.gouv.qc.ca/en/showdoc/cr/H-5,%20r.%201.

112 Chapter R-6.01, Act Respecting the Régie de L'énergie, 2019. Available at http://legisquebec.gouv.qc.ca/en/showdoc/cs/R-6.01.

113 City of Montréal, *Electrifying Montréal: Transportation Electrification Strategy 2016-2020*, 2016, http://ville.montreal.qc.ca/pls/portal/docs/PAGE/PROJ_URBAINS_FR/MEDIA/DOCUMENTS/TRANSPORTATION_ELECTRIFICATION_STRATEGY_2016_2020_.PDF.

114 "Electric Vehicles: Charging Stations," City of Montréal, updated Nov. 20, 2019, http://www1.ville.montreal.qc.ca/banque311/affichage/11129.

CONCLUSION

This report addressed policies AHJs have developed and are implementing to facilitate public charging at different levels of government (Table 23).

One original objective for this project, in addition to identifying policies and their commonalities and differences, was to note policies that seem best suited to facilitating the expansion of public charging, in particular, those that reduce compliance complexity and cost. The fact is all of these policies can be potentially supportive in expanding public charging EVSE, but they may not necessarily reduce compliance complexity and cost. As the example provided from Electrify America on permitting at the outset of this report shows, supportive policies can increase cost and complexity. Streamlining permitting could be a policy that reduces compliance complexity and cost. EVgo has noted, "Costs can be reduced substantially if utilities and government authorities turn attention to streamlining the permitting processes...."[115] It may depend on how such a policy is implemented; many policies described in this project have only been set in the last few years and others are just being implemented now.

Green building codes that require EV readiness and EV capability in new construction-sites may reduce EVSE costs in the long-term, but they could also end up being overly prescriptive and force investments into infrastructure that may never be used.[116] Nevertheless, several U.S. cities and counties are beginning to address EV readiness and capability, as is the city of Toronto in Ontario. With the International Code Council including EV readiness provisions in its 2021 code, other cities and counties may set such policies in the near future.

Clarifying that site hosts are not considered public utilities and allowing charging by the kWh has removed two barriers to the expansion of EV charging across the country, and states continue to address these issues, most recently Missouri and Ohio.[117] State and utility incentives, as well

115 Jonathan Levy, Isabelle Riu, and Cathy Zoi, *The Costs of EV Fast Charging Infrastructure and Economic Benefits to Rapid Scale-Up* (EVgo, May 18, 2020), https://www.evgo.com/wp-content/uploads/2020/05/2020.05.18_EVgo-Whitepaper_DCFC-cost-and-policy.pdf.

116 Ed Pike, Jeffrey Steuben, and Evan Kamei, *Plug-In Electric Vehicle Infrastructure Cost-Effectiveness Report for San Francisco* (Energy Solutions and Pacific Gas & Electric, November 17, 2016), http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf.

117 Karen Uhlenhuth, "Selling Electricity Doesn't Make EVCS a Utility, Iowa Rules," *Energy News Network*, October 8, 2019, https://energynews.us/2019/10/08/midwest/selling-electricity-doesnt-make-ev-charging-stations-a-utility-iowa-rules/: "'This is a very good market signal,' said Justin Wilson, director of public policy for ChargePoint, one of the country's largest developers of EVCS. 'This is a big deal for us because it gives us a lot of freedom and flexibility to price charging services and meet the needs of different kinds of customers.'"

TABLE 23: SUMMARY OF POLICIES SET IN AHJS

AHJ	EXAMPLES OF TYPES OF POLICIES GENERALLY SET
State/Province	• ZEV mandate and/or electrification goals/targets • Developing statewide electrification strategies that includes developing public charging in designated corridors or other areas • Requiring licensure of EVSE installers • State directives requiring localities to implement expedited/streamlined permitting for EVSE • State directives requiring localities to implement green building codes • Incentives for EVSE expansion, including under the VW settlement • Clarifying issues such as the public utility definition • Setting parameters governing the operation of EVSE, such as allowing charging by the kWh, prohibiting subscriptions, and requiring multiple payment options at charging stations • Directing PUCs to consider the utility role in electrification
PUC	• Developing transportation electrification frameworks • Considering utility proposals respecting TEPs and rates, including issues such as cost recovery and demand charges; deploying make-ready infrastructure to support expansion of charging; utility ownership/operation of charging stations; utility incentive programs for charging
City/County	• Implementing statewide policies, or in the absence of such a policy, developing a local expedited/streamlined permitting and green building code policy • Enforcing existing zoning, building code, electrical code, and other such requirements that may apply to EVSE • Developing specific requirements to govern EVSE installation that may include siting, site design, parking, signage, and technical specifications related to EVSE

Source: Transport Energy Strategies, September 2020

as funds from the VW settlement, that help fund the expansion of public charging may be critical policies to support the expansion of public charging and reduce costs.[118] For utility engagement, PUC policies that require IOUs to provide make-ready infrastructure and address demand charges by reducing or eliminating them may be helpful in supporting the expansion of public charging while managing costs and complexity.[119]

Aside from actual policies, communication to public charging companies and site hosts could be improved in states and localities. One way to do that would be to develop EVSE web pages on locality and/or state websites that address what installation and operation requirements they have—or are even planning for—with appropriate guidance, relevant policies, local contacts, checklists, process timelines, and necessary forms available in one place that is readily accessible. Allowing the online submission of permit applications and other supporting materials may help expedite and simplify the permitting process and reduce costs for site hosts.

118 Levy et al., *The Costs of EV Fast Charging Infrastructure and Economic Benefits to Rapid Scale-Up*, 14.

119 Michael Nicholas and Dale Hall, *Lessons Learned on Early Electric Vehicle Fast-Charging Deployments* (International Council on Clean Transportation, July 2018), https://theicct.org/sites/default/files/publications/ZEV_fast_charging_white_paper_final.pdf: "Demand charges can present challenging economics to station operators and may not represent true system cost of the electricity use. Alternative rate structures that better reflect overall cost of electricity used have been proposed. The most straightforward alternative rate structure is to simply eliminate demand charges and charge a higher flat rate per kWh."

Clarifying that site hosts are not considered public utilities and allowing charging by the kWh has removed two barriers to the expansion of EV charging across the country.

FUTURE ISSUES

As EV charging continues to grow, states are beginning to address other issues to facilitate the expansion of charging such as managed charging, interoperability, and open access and payment issues. According to the National Renewable Energy Laboratory, grid-integrated smart charging, or VGI charging, can improve grid flexibility by more effectively utilizing energy, shaving peak electricity demand, and filling demand valleys while still meeting the needs of EV drivers.[120] California legislation requires CPUC to establish strategies by December 31, 2020, that will maximize the use of cost-effective and feasible VGI through 2030.[121]

States such as California are beginning to address the issue of interoperability, the ability of EVs to interact with a range of different chargers, for those chargers to interact with each other and with other charging management systems, and for payments to be processed between charging service providers operating different charging networks.[122] M.J. Bradley & Associates in an issue brief released last year notes these can be split into two categories:

1. **Consumer-facing interoperability, which is centered around the charger itself and refers to the compatibility of plugs and connectors with different vehicles as well as accessibility of charging infrastructure (which can be affected by constraints such as subscriptions, membership requirements, lack of certain payment methods, and gated off chargers).**

2. **Systems management interoperability, which encompasses the requirements of communication between vehicle and charger, between charger and the "cloud," compatibility across charging networks, and software and systems to manage and share data from vehicles and chargers.[123]**

120 "Electric Vehicle Smart Charging at Scale," National Renewable Energy Laboratory, accessed October 4, 2020, https://www.nrel.gov/transportation/managed-electric-vehicle-charging.html.

121 California SB-676, Chapter 484

122 M.J. Bradley & Associates, LLC, *Electric Vehicle Charging Interoperability*, May 13, 2019, https://mjbradley.com/sites/default/files/MJB%26A%20Interoperability%20Issue%20Brief%20May%202019.pdf.

123 M.J. Bradley & Associates, LLC

Most states/provinces, cities. and counties surveyed for this report (both the U.S. and Canada) generally are silent on the issue of standardization when it comes to policies respecting connectors. However, most L2 chargers use the SAE J-1772 connector that is widely compatible with different vehicles but there is more variation for DCFC: Nissan and Mitsubishi developed and use the Charge de Move connector while remaining Asian and all American and European manufacturers (i.e., General Motors, Mercedes-Benz, and VW) use SAE Combined Charging System, which features a double-plug that allows drivers to charge DCFC or a J-1772 plug.[124] Tesla uses its own proprietary connector.

Open access and payment are issues only California, Connecticut, Massachusetts, and New Hampshire have addressed in current policies. The Northeast States for Coordinated Air Use Management has developed a model state grant and procurement contract that addresses open access.[125] An emerging discussion is developing an open access standard that could allow any driver to use a charger without memberships or subscriptions, without having to enroll online, and possibly through a range of payment options, such as credit cards, toll-free phone numbers and call centers, mobile apps, or Apple Wallet and Android pay.[126] Multiple forms of payment could balance ease and comfort with ensuring that charging stations are accessible to all drivers.

These issues do matter for public charging companies and site hosts who are used to providing a seamless, efficient experience to their customers. These barriers also filter down to site hosts, which, among other things, must decide which network operator will reach the maximum number of customers and provide the seamless customer experience. Some experts have advocated for an open standards–based approach that includes both technical capabilities and contractual rights that allows site hosts to switch between network service providers without having to purchase new charging equipment and to install new charging stations without having to change network service providers. Experts note this can help stimulate competition in the marketplace and protect infrastructure investments against obsolescence. The Open Charge Point Protocol is an open networking standard that is widely used in Europe and is growing in acceptance in the U.S.[127]

124 M.J. Bradley & Associates, LLC, 2

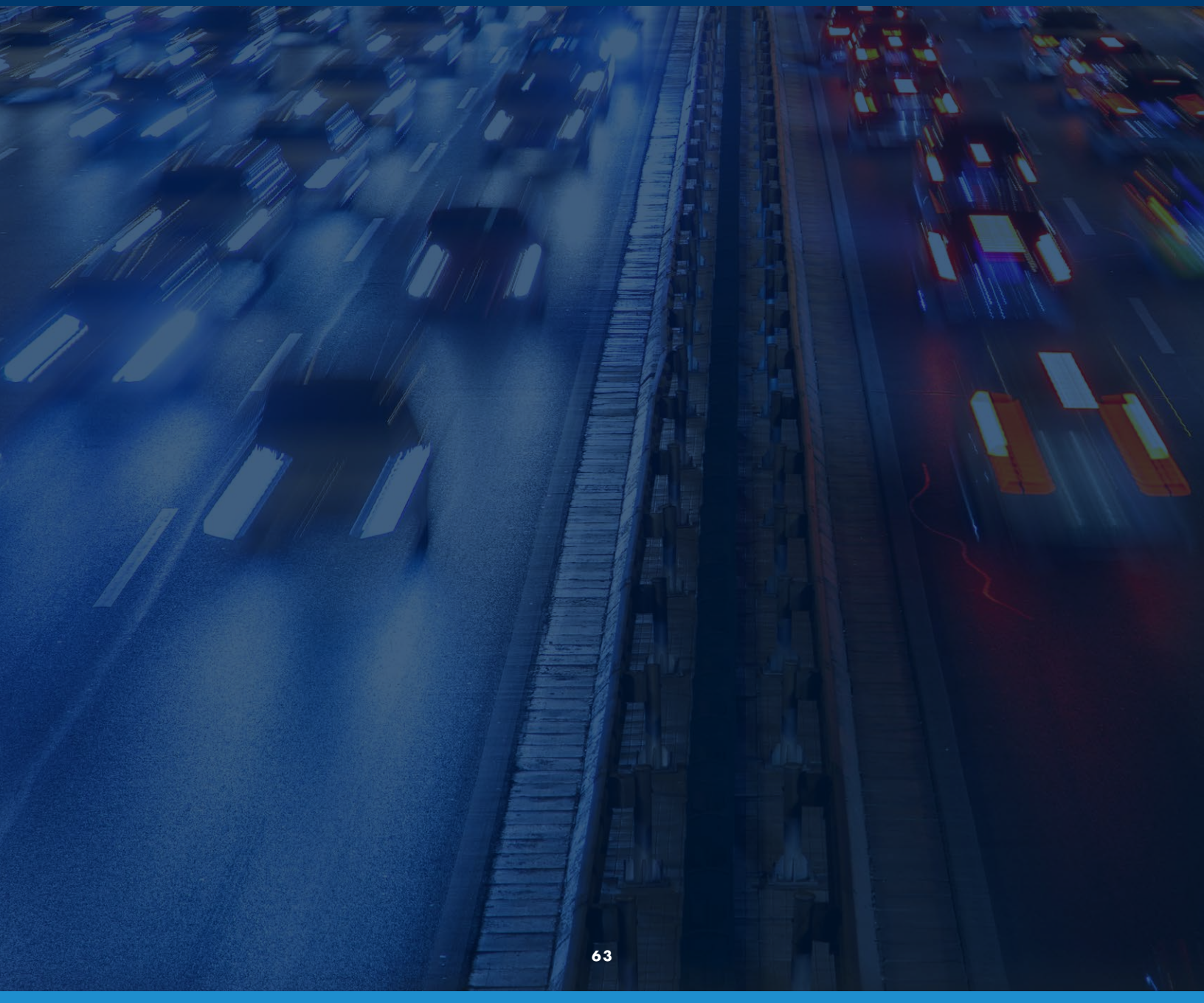
125 Kathy Kinsey, Elaine O'Grady, and Jesse Way, *Building Reliable EV Charging Networks: Model State Grant and Procurement Contract Provisions for Public EV Charging* (Northeast States for Coordinated Air Use Management, May 2019), available at http://www.nescaum.org/documents/model-contract-provisions-for-public-evse-5-24-19.pdf/view.

126 insey et al., Building Reliable EV Charging Networks, 3.

127 For example, Electric Power Research Institute, *Interoperability of Public Electric Vehicle Charging Infrastructure*, August 2019, available at https://www.epri.com/research/products/000000003002017164. The Electric Power Research Institute notes that "while current versions (Open Charge Point Protocol 1.5, 1.6, and 2.0) exhibit some gaps in functionality, their acceptance by most network providers and continued development are important to addressing network interoperability."

APPENDIX A

Summary of Policies by State



APPENDIX A: SUMMARY OF POLICIES BY STATE

STATE	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES	ALLOWS KWH PRICING FOR EV CHARGING?	HAS STATE CLARIFIED EVSE IS NOT A PUBLIC UTILITY?
Alabama	4			Yes	Yes
Alaska	5			No	No
Arizona	3			Yes	No
Arkansas	4			Yes	Yes
California	1	See section on Group 1 for a summary of California's installation requirements.	See section on Group 1 for a summary of California's operation requirements.	Yes	Yes
Colorado	2	EV infrastructure electrical work on the customer side of the utility meter, including the installation of the charging station apparatus and related hardware, must be performed by a licensed master electrician, licensed journeyman electrician, licensed residential wireman, or properly supervised electrical apprentice as each term is defined in relevant sections of the Colorado Code. (C.R.S. 40-5-107 2019)		Yes	Yes
Connecticut	2		Utility companies must evaluate if it is appropriate to implement PEV time-of-day rates for residential and commercial customers. A time-of-day rate for PEVs is designed to reflect the cost of electricity to the consumer at different times of the day. Utilities that have already made this determination prior to July 1, 2017, are not required to do so again. (Connecticut General Statutes 16-19f) Owners and operators of public EVSE that require payment must allow multiple payment options that allow access by the public. In addition, payment should not require users to pay a subscription fee or obtain a membership of any kind, however payment required may be based on price schedules for such memberships. Owners and operators can impose restrictions on the amount of time a vehicle can use the EVSE. In addition, owners and operators of a public EVSE must disclose the location and characteristics of each EVSE to the DOE's Alternative Fuels Data Center. Information that must be disclosed includes, but is not limited to, address, voltage, and timing restrictions. (Connecticut General Statutes 16-19ggg)	Yes	Yes

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Summary of Policies by State *(Continued from previous page)*

STATE	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES	ALLOWS KWH PRICING FOR EV CHARGING?	HAS STATE CLARIFIED EVSE IS NOT A PUBLIC UTILITY?
Delaware	4			Yes	Yes
Hawaii	4			Yes	Yes
Georgia	5			No	No
Hawaii	4			Yes	Yes
Idaho	3			Yes	Yes
Illinois	4	Vendors that install EVSE must comply with Illinois Commerce Commission certification requirements. (220 Illinois Compiled Statutes 5/3-105, 5/16-102, and 5/16-128A; see also IAC Section 469.50) The certificate holder shall agree to adopt and follow rules and procedures ensuring that documentation regarding installing, maintaining, and repairing EVCS are retained for a period of not less than three calendar years after the calendar year in which they were created. These records shall be made available by request to the commission or its staff on a confidential and proprietary basis. (IAC Section 469.100) Prior to installing an EVCS, the retail customer shall provide notice in writing to the servicing electric utility of plans to install an EVCS including the following: (1) the name, address, and electric utility account number of the retail customer who owns, uses, operates, or maintains the EVCS; (2) the location of the EVCS; (3) when an EVCS is to be installed by an EVCS installer, the business name, address, and phone number of the installer that is the certificate holder; (4) when an EVCS is to be installed by an EVCS installer, the commission docket number in which the installer obtained a certificate from the commission; (5) the load and technical specifications of the charging stations; (6) whether the charging station is for personal or commercial use. (Section 469.120 IAC)		Yes	Yes
Indiana	5			No	No

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Summary of Policies by State *(Continued from previous page)*

STATE	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES	ALLOWS KWH PRICING FOR EV CHARGING?	HAS STATE CLARIFIED EVSE IS NOT A PUBLIC UTILITY?
Iowa	4		A person may not sell or dispense electricity as a vehicle fuel at a location other than a residence or otherwise act as a licensed electricity fuel dealer or user unless the person holds a valid license issued by the Iowa Department of Revenue. To obtain a license, a person must file an application with the department. (House File 767, 2019, and Iowa Code 452A.42)	Yes	Yes
Kansas	5			No	No
Kentucky	4			Yes	Yes
Louisiana	4			No	No
Maine	2			Yes	Yes
Maryland	2			Yes	Yes
Mass-achusetts	2	The Massachusetts State Board of Building Regulations and Standards and the Massachusetts Department of Energy Resources will develop building and electric code requirements for residential and appropriate commercial buildings for EVSE. The regulations may vary, depending on whether an EVSE is already installed or will be installed. (Massachusetts General Laws Chapter 143, Section 94)	Owners and operators of public EVSE that require payment must provide payment options that allow access by the public. In addition, payment should not require users to pay a subscription fee or obtain a membership of any kind; however, required fees may be conditional on such memberships. (Massachusetts General Laws Chapter 25A, Section 16B-16E)	Yes	Yes
Minnesota	4	EVSE installed in Minnesota must: 1) be able to be used by any make, model, or type of PEV; 2) comply with state safety standards and standards set by SAE; and 3) be capable of bi-directional charging once electrical utilities achieve a cost-effective ability to draw electricity from PEVs connected to the utility grid. These requirements may not apply if the installations require significant upgrades. (Minnesota Statutes 325F.185 and 326B.35)		Yes	Yes
Mississippi	5			No	No
Missouri	4			Yes	Yes
Montana	5			No	Yes
Nebraska	5			No	No
Nevada	3			Yes	Yes

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Summary of Policies by State *(Continued from previous page)*

STATE	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES	ALLOWS KWH PRICING FOR EV CHARGING?	HAS STATE CLARIFIED EVSE IS NOT A PUBLIC UTILITY?
New Hampshire	4		If the owner or operator requires payment for use of the EVSE, they must accept multiple payment options. Also, they must not require users to pay a subscription fee or obtain a membership at any organization to use the equipment. (New Hampshire Revised Statutes 236:131)	Yes	Yes
New Jersey	2			Yes	Yes
New Mexico	3			Yes	Yes
New York	2			Yes	Yes
North Carolina	3			Yes	Yes
North Dakota	5			No	No
Ohio	5			Yes	Yes
Oklahoma	4	Installers must be certified (Oklahoma Statutes 40-142.3)		Yes	Yes
Oregon	2	Oregon has developed a statewide EVSE permit and inspection protocol regulation . The EVSE permit covers the installation of all electrical components dedicated to the operation of an EV-charging system and no other state building code permit is required. Building officials and inspectors shall permit and allow installation of an EV-charging system that has a Building Codes Division special deputy certification label without further testing or certification. However, EVSE installers must obtain a permit from the inspecting jurisdiction for the EVSE. Inspection of an EVSE installation is limited to determining compliance with certain Oregon Electrical Specialty Code provisions. (Oregon Administrative Code 918-311-0065) Oregon also amended its building code in 2017 to approve the use of a demand factor table for calculating EV-charging equipment services and feeders. (Oregon Revised Statutes 455.060)		Yes	Yes
Pennsylvania	4			Yes	Yes
Rhode Island	2			Yes	Yes

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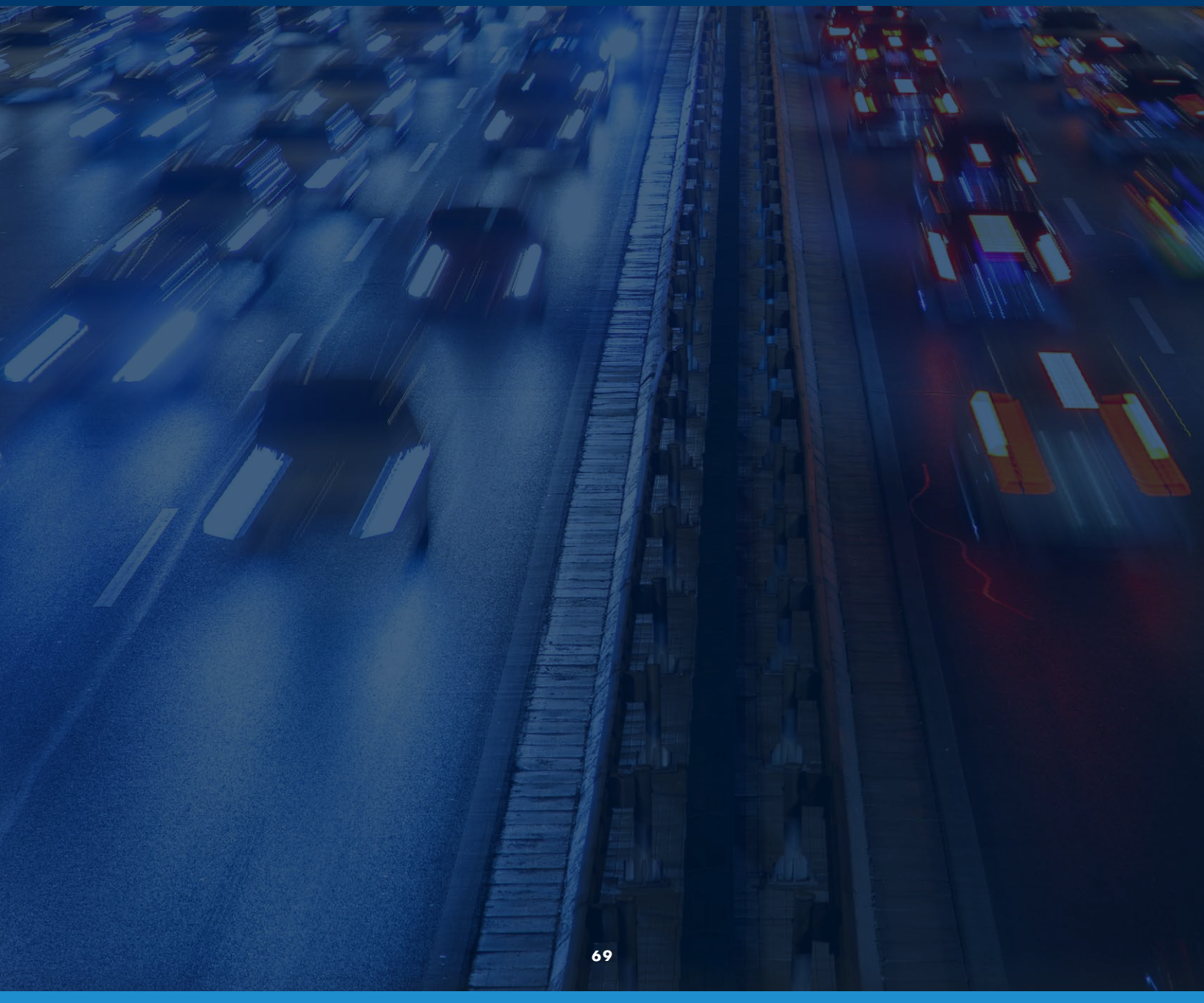
Summary of Policies by State *(Continued from previous page)*

STATE	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES	ALLOWS KWH PRICING FOR EV CHARGING?	HAS STATE CLARIFIED EVSE IS NOT A PUBLIC UTILITY?
South Carolina	5			No	No
South Dakota	5			No	No
Tennessee	5			No	No
Texas	4			No	Yes
Utah	3			Yes	Yes
Vermont	2			Yes	Yes
Virginia	4			Yes	Yes
Washington	2	The installation of battery charging and exchange stations is categorically exempt from the Washington State Environmental Policy Act. (Revised Code of Washington 79.13.100 and 43.21C.410) By July 1, 2021, the Washington State Building Code Council must adopt rules for EVSE installation at all new buildings that provide on-site parking. At least one parking space, or 10% of parking spaces rounded to the next whole number, must be made-ready for L2 EVSE. Electrical capacity must accommodate the potential to serve a minimum of 20% of the total parking spaces with L2 EVSE. For assembly, education, or mercantile buildings, the requirements apply only to employee parking spaces. Buildings classified as residential R-3, utility, or miscellaneous are exempt from these requirements. Additional terms and conditions apply. (Revised Code of Washington 19.27.540)		Yes	Yes
West Virginia	4			Yes	No
Wisconsin	5			No	No
Wyoming	5			No	No

Source: Compiled by Transport Energy Strategies citing each state's relevant policy and with benchmarking provided by the DOE's Alternative Fuels Data Center database, September 2020

APPENDIX B

Summary of Policies by City and County



APPENDIX B: SUMMARY OF POLICIES BY CITY AND COUNTY

CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Alameda County	California	San Francisco—12	Permit review requirements under Alameda County Muncipal Code, Section 15.08.200
Anaheim	California	Los Angeles—2	Ordinance implementing California Green Building Code standards state law: Permit required; any EVCS system erected, constructed, installed, altered, replaced, or to which additions are made shall comply with all of the provisions of all applicable health and safety standards and requirements of local, state, and federal law, including but not limited to, the Anaheim Municipal Code. EVCS shall also meet all applicable safety and performance standards established by Chapter 15.03 of the Anaheim Municipal Code, the SAE, the National Electrical Manufacturers Association, and accredited testing laboratories such as Underwriters Laboratories and the Electric Rates, Rules, and Regulations of the Public Utilities Department. (Anaheim Municipal Code, Chapter 15) Any permit approvals, which are granted pursuant to the provision of this chapter, shall not authorize an applicant to connect the EVCS to the electricity grid of the Public Utilities Department. Any such connection shall be governed by the Electric Rates, Rules, and Regulations of the Public Utilities Department. (Anaheim Municipal Code, Chapter 15) Setback and screening requirements for public utility equipment and EV chargers may be modified by the planning director and public utilities director or his or her designee for life safety and/or access reasons, or as otherwise established by guidelines adopted by the City. (Anaheim Municipal Code, Section 18.38.160.050) If a property owner replaces existing automobile parking spaces with a handicapped-accessible parking space designated for EV charging, the property owner will be credited with any parking spaces that are lost. (Anaheim Municipal Code, Section 18.42.070.050) For signage: Attached to each device providing air service, water service, recharging for EVs, and similar services. Such signs shall be decorative and coordinated with a common design theme that matches the building. (Anaheim Municipal Code, Section 18.44.120)
Atlanta	Georgia	Atlanta—9	Permit required for EVSE that must be wired directly to the electrical system for L2 charging and above. L2 Installations: According to the National Electrical Code®, installations above 125 V shall have the supply equipment wired permanently to the electrical supply circuit. The supply equipment may vary in design depending on the manufacturer and vehicle type. EVSE to be installed must meet specifications set forth in National Electrical Code Section 625. All new Group A, B, E, I, M, R-1, R-2, and S-2 occupancies, as regulated by the International Building Code, are required to provide EVSE infrastructure to accommodate the future installation of EVSE. The infrastructure shall be provided per this section. (1) The EVSE infrastructure shall be installed per the requirements of the current edition of the National Electrical Code (NFPA 70) as adopted and amended by the State of Georgia for enforcement by the City of Atlanta. (a) The off-road parking provided for buildings containing Group A, B, E, I, M, R-1, R-2, and S-2 occupancies shall have EVSE infrastructure installed at the parking spaces dedicated for the use of the building.

(Continued on next page)

Summary of Policies by City and County *(Continued from previous page)*

CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Atlanta *Continued*	Georgia	Atlanta—9	(b) The ratio of EV parking spaces to non-EV parking spaces shall be 1:5 and only applies to the total new parking spaces. (c) Designated dual-port EVSE may be dual-usage for ADA-accessible EV-charging spaces and non-ADA-accessible EV-charging spaces with ADA-compliant hardware. The use of the space for accessible parking takes precedence over the need to use this space for EV charging. Other criteria for signage, parking, landscaping, etc. that includes: (1) Installation of EVSE shall meet National Electric Code Article 625 as it may be from time to time amended (2) EVSE must be mounted on the wall or on a structure at the end of the space provided and shall be placed at least 4.5′ above the parking surface of the space. No charging devices may be placed within the dimensions of a space on the sides or entrance to a space. (3) EVSE mounted on structures such as pedestals, lighting posts, bollards, or other device shall be located as to not impede pedestrian travel or create trip hazards. (4) Way-finding signs, if installed, shall be placed to effectively guide the motorists to the EV parking space and/or charging station. Private regulatory signage shall be placed in a manner that shall not interfere with any parking space, drive lane, or exit. (5) Each EVCS and parking spaces for which any parking incentive was granted shall be reserved for use as an EVCS or as EV-reserved parking. If time limits or usage requirements for are to be enforced by vehicle immobilization or non-consensual towing, the posting of signage that complies with the requirements of the City Code applicable to vehicle immobilization or non-consensual towing shall be observed. Vehicle immobilization or non-consensual towing may be enforced for EVCS and parking spaces by the owner or operator of the parking spaces even which no parking incentive was granted. (6) EVCS and parking spaces for which any parking incentive was granted shall be operational at all times. When an EV parking station is not operational for 14 consecutive days, it shall be considered to have been removed from service. The failure to maintain the number of EVCS and parking spaces shall be cause to require the installation of the number of parking spaces required by the district regulations. (2) (7) A phone number or other contact information shall be provided when the station is not functioning in a manner that allows EVs to be charged. Atlanta Municipal Code, Sec. 16-28.017
Berkeley	California	San Francisco—12	The California Green Buildings Act implemented at the local level as under Berkeley Municipal Code, Section 19.37.040, Amendments to the California Green Building Standards Code. Permit review requirements under Berkeley Municipal Code, Section 19.15.040.

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Summary of Policies by City and County *(Continued from previous page)*

CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Clayton County	Georgia	Atlanta—9	A minimum of one EVCS shall be provided for all new developments that have 100 parking spaces or more. All new commercial, office, industrial, and mixed-use developments, as regulated by the International Building Code, are required to provide EVSE infrastructure to accommodate the future installation of EVSE. The ratio of EV parking spaces to non-EV parking spaces shall be 1:5 and only applies to the total new parking spaces. The EVSE infrastructure shall include a raceway, which is continuous from the branch circuit/feeder panel location to the future PHEV/EV parking space. The raceway shall be sized and installed per the National Electrical Code; however, in no case shall the EVSE infrastructure raceway be less than 1" in size. The EVSE infrastructure raceway shall include a pull rope or line installed for future conductor installation, with the raceway sealed and labeled for future use. (Clayton County Municipal Code, Section 4.87)
Gwinnett County	Georgia	Atlanta—9	Commercial buildings, multi-family residential buildings, and single-family residential units shall have electrical panels installed with space reserved for the installation of a two-pole single-phase circuit that can be used for an EVCS. (Gwinnett County Code of Ordinances, Section 115.1) Commercial and multi-family developments which exceed 50 parking spaces shall provide at least one EVCS (pedestal) for each 50 parking spaces. (Gwinnett County Code of Ordinances, Section 240-140.1). Compliance with this subsection is required for redevelopment projects where site work and/or repaving of existing parking areas and driveways (greater than 50 parking spaces) exceeds 50% of the existing impervious surface area. (Gwinnett County Code of Ordinances, Section 204-140.2)
Chula Vista	California	San Diego—18	• Requires expedited permitting for charging stations • Must be handicap accessible • Site plan must be submitted with permitting application (Chula Vista Municipal Code, Section 15.29.030)
Sandy Springs	Georgia	Atlanta—9	In the Perimeter Center and City Springs districts, and in any parking structure constructed in any other district, 5% of all parking spaces must be EV ready, with a minimum of two EV-ready spaces for all parking lots over 20 spaces. EV ready means conduit or other means to connect power to each space is installed in advance. (Reference Sandy Springs Development Code, Section 8.1.8.D)
Contra Costa County	California	San Francisco—12	A building permit is required to install an EVCS. (Contra Costa County Code Section 718-14) Contra Costa County Code Section Section 74-4.006 implements California Green Building Code: Each EV-charging space provided in a parking area counts as one space toward the minimum number of parking spaces required by this chapter. The following requirements apply to each EV-charging space: (1) Each EV-charging space must be accessible to persons with disabilities. (2) Each EV-charging space must include a posted sign and painted curb, or ground markings, indicating that the space is exclusively for EV-charging purposes. (3) EV-charging equipment must be located so that pedestrians are not required to cross between the EV-charging space and the EV-charging equipment. The EV-charging equipment may not obstruct any ADA-compliant sidewalk, entrance, curb-cut, or ramp, while in use or otherwise.

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CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Contra Costa County *Continued*	California	San Francisco—12	(4) EV-charging equipment must be illuminated by lighting to enable the equipment to be used at night. (5) Concrete-filled steel bollards or other similar barriers must be installed between EV-charging equipment and an EV-charging space under certain conditions outlined in the code provision. (6) An EV may occupy an EV-charging space only while charging is in progress. Parking in an EV-charging space when charging is not in progress is prohibited. (3) (7) EV-charging equipment must be maintained in working order at all times. The name and telephone number of the party responsible for maintaining and repairing the equipment must be posted on the equipment and updated as necessary.
Boston	Massa-chusetts	Boston—11	Installation of an EVCS in the city of Boston shall be subject to the following: (i) the EVCS shall be installed at the owner's expense; (ii) the EVCS shall be installed by a licensed contractor or electrician; (iii) an EVCS shall conform to: (A) all applicable health and safety standards and requirements imposed by national, state, and local authorities; and (B) all other applicable zoning, land use, or other ordinances or land-use permits. (Masschusetts Legislature, Chapter 370 (2018) Under City of Boston's Electric Vehicle Readiness Policy there are signage requirements for EVCS installation. Also, an electrical permit is required to install EVSE for existing developments. However, installation of a charging station associated with a new development project of a new residential or nonresidential property can be processed in association with the underlying permit(s). The policy also makes suggestions for specific site types (e.g., shopping centers, condos). Shopping center recommendations may be useful guide for public charging.
Chicago	Illinois	Chicago—3	The provisions of Article 625 of the National Electrical Code (NFPA 70) are adopted by reference without modification. (Municipal Code of Chicago, Section 14E-6-625) This section shall apply to building permit applications for a new construction project that provides on-site parking as described in this section submitted after July 31, 2020. New construction providing 50 or more on-site parking spaces to serve nonresidential uses shall specify the installation of EVSE infrastructure to support the installation or future installation of EVSE for at least two parking spaces. (Municipal Code of Chicago, Section 17-10-1011-B) New construction of a nonresidential building with 30 or more spaces must install equipment so that at least 20% of the parking spaces are either EVSE ready or EVSE installed. Applies to building permit applications submitted after October 31, 2020. (Chicago City Council Ordinance SO2019-8025)
Denver	Colorado	Denver—19	Denver's new Green Building Code, which takes effect July 30, 2020, requires certain commercial cities that could include fuel retailing sites to have EV-ready, EV-capable, and EVSE installed in spaces. (C405.10)
Glendale	California	Los Angeles—2	Ordinance implementing California Green Building Code standards; expedited permitting process in place. (Glendale Building and Safety Code, Section IA-2)
Cook County	Illinois	Chicago—3	An outlet(s) installed for the purpose of charging EVs shall be supplied by a separate branch circuit. This circuit shall have no other outlets. Unless other voltages are specified, the nominal AC system voltages of 120, 120/240, 208Y/120, 240, 480Y/277, 480, 600Y/347, and 600 V shall be used to supply equipment covered by this article. (625.4)

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CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Naperville	Illinois	Chicago—3	The use of an EV parking space shall be limited to EVs for no more than three hours of continuous charging per day. The location of EVCS and EV parking spaces are subject to approval by the city engineer. EV parking spaces shall be posted with signage indicating the space is to be used exclusively for EV-charging purposes and that violators are subject to a fine and tow of the offending vehicle. EV parking spaces shall be posted with signage indicating the maintenance number for the equipment. EV parking spaces shall be posted with the following information: (a) voltage and amperage levels, (b) time limitation, (c) usage fee, (d) user instructions related to the EV-charging station, (e) disclaimer that the City of Naperville is not liable or responsible for the failure to operate or for any damage caused by an EV-charging station. (Naperville Municipal Code, Section 11-2A-23)
Huntington Beach	California	Los Angeles—2	Permit required; expedited permitting process. EVCS shall comply with all city, state, and federal laws and regulations including, but not limited to, all applicable safety and performance standards established by the California Electrical Code, the SAE, the National Electrical Manufacturers Association, and accredited testing laboratories such as Underwriters Laboratories and, where applicable, rules of the Public Utilities Commission regarding safety and reliability. (Huntington Beach Code, Chapter 17.62)
Irvine	California	Los Angeles—2	Applications for EVCS may be processed utilizing the City of Irvine EVCS Expedited/Streamlined Process. (Irvine Code of Ordinances, Section 5-9-206) As applicable to Orange County Great Park: To the extent feasible, the applicant shall install EVCS at the commercial retail components of the project in District 1 North and District 4. The parking spaces in these centers will include EV-charging devices. (Irvine Code of Ordinances, Section 9-51-6.M) EVSE must comply with the fire code. (Irvine Code of Ordinances, Section 5-9-408K)
Jersey City	New Jersey	New York—1	At the direction of the municipal engineer, appropriate signs and markings shall be placed in and around EVCS, indicating prominently thereon the parking regulations. The signs shall identify the voltage and amperage levels; define time limits, fees, and hours of operation, as applicable; and state that the charging station space is reserved for charging purposes only, which is to be defined as occurring when a vehicle is connected to the EVSE for electric charging purposes. (Jersey City Code of Ordinances, Section 332 -28.1)
Dallas	Texas	Dallas—4	Up to 10% of parking counted as required parking for a main use on the property may be EV-charging spaces. A charging cord may not cross over a sidewalk or pedestrian walkway. (The Dallas City Code, Section 51A-4.217)
Long Beach	California	Los Angeles—2	EVCS shall not be installed or used without first having obtained a permit (Long Beach Municipal Code, Section 18.76) EV parking spaces required for nonresidential buildings based on total number of spaces: 25% of parking spaces dedicated to EVs; 5% to EVSE. A listed raceway to accommodate a dedicated 208/240 V branch circuit shall be installed. The raceway shall not be less than trade size 1 (nominal 1" inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box, or other enclosure in close proximity to the proposed location of the EV charger(s) or EV space(s). Raceways are required to be continuous at enclosed, inaccessible, or concealed areas and spaces. The service panel and/or subpanel shall provide capacity to install a 40 A minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

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CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Long Beach *Continued*	California	Los Angeles—2	Construction documents shall indicate the raceway termination point and proposed location of future EV spaces and EV chargers. Construction documents shall also provide information on amperage of future EVSE, raceway method(s), wiring schematics, and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rated amperage of the EVSE. Plan design shall be based upon a 40 A minimum branch circuit. Raceways and related components that are planned to be installed underground, enclosed, inaccessible, or in concealed areas and spaces shall be installed at the time of original construction. The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as "EV capable." The raceway termination location shall be permanently and visibly marked as "EV capable" in accordance with the California Energy Commission. In hotel and nonresidential projects, EV space shall be a minimum length of 18" and width of 8.5". EVCS vehicle spaces shall provide surface marking stating "EV charging only" in letters 12" high minimum. The centerline of the text shall be a maximum of 6" from the centerline of the vehicle space and its lower corner at, or lower side aligned with, the end of the parking space length. • Accessible route: EVCS that serve a particular building or facility shall be located on an accessible route to an entrance complying with California Building Code Section 11B-206.4. • Operable parts: EVCS operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The maximum height of operable parts shall be 48" above the finished floor. • Clear floor space: A 30" x 48" minimum clear floor space shall be positioned for either forward or parallel approach to the EV charger. One full-unobstructed side of clear floor space shall adjoin an accessible route. • Access aisle: Access aisles shall be 60′ minimum wide extending the full required length of the vehicle space they serve and shall adjoin an accessible route. • Identification signs: Where five to 25 total EVCS are provided, one van-accessible EVCS shall be identified by an International Symbol of Accessibility complying with the California Building Code Section 11B703.7.2.1. The required standard-accessible EVCS shall not be required to be identified with an International Symbol of Accessibility. • Where 26 or more total EVCS are provided, all required van-accessible and standard-accessible EVCS shall be identified by an International Symbol of Accessibility complying with the California Building Code Section11B-703.7.2.1. • Location of signs: Identification signs shall be reflectorized with a minimum area of 70 sq. in. Required identification signs shall be visible from the EVCS it serves. Signs shall be permanently posted either immediately adjacent to the vehicle space or within the projected vehicle space width at the head end of the vehicle space. Signs identifying van-accessible vehicle spaces shall contain the designation "van accessible." Signs shall be 60" minimum above the finished floor or ground surface measured to the bottom of the sign. Signs located within an accessible route shall be 80" minimum above the finished floor or ground surface measured to the bottom of the sign. Signs may also be permanently posted on a wall at the interior end of the vehicle space.

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CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Long Beach *Continued*	California	Los Angeles—2	Other requirements for EVSE: • Standards: EVSE shall be installed in accordance with the California Energy Commission Article 625 Electric Vehicle Charging System. EVSE shall be listed by a nationally recognized testing laboratory in compliance with UL 2202 "Standard for Electric Vehicle Charging System Equipment" and/or UL 2594 "Standard for Electric Vehicle Supply Equipment." • Location: EVSE shall be installed in accordance with manufacturer's guideline and shall be suitable for the environment (indoor/outdoor). If installed indoors, the EVSE shall be clearly marked by the manufacturer as "ventilation not required" in a location clearly visible after installation and the EV coupler (i.e., the nozzle) shall be located between 18" and 48" above the floor level. If installed outdoors, the EV coupler shall be located between 24" and 48" above the floor level. • Prevent physical damage: If the EVSE or EV charger is located in an area subject to vehicular damage, an enclosure or guard shall be so arranged and of such strength as to prevent the damage. A 4" diameter steel pipe filled with concrete, a minimum of 40" above the floor level, and installed in a footing measuring 12" diameter and 3" deep is deemed as adequate protection. (Long Beach Municipal Code, Section 18.47.050)
Los Angeles	California	Los Angeles—2	Ordinance implementing California Green Building Code standards state law (Los Angeles Municipal Code, Section 99.05.106) 8-10% of parking spaces must be EV, depending on whether classified Tier 1 or Tier 2 (Los Angeles Municipal Code, Section 99.12.101 (Table A5.601)) The number of required EV spaces shall be 30% of the total number of parking spaces provided, but in no case less than one space, for all types of parking facilities. Calculations for the required number of EV spaces shall be rounded up to the nearest whole number. (Los Angeles Municipal Code, Section 99.05.106.5.3.3) When multiple charging spaces are required, raceway(s) is/are required to be installed at the time of construction and shall be installed in accordance with the Los Angeles Electrical Code. Construction plans and specifications shall include, but are not limited to, the following: (1) the type and location of the EVSE. (2) the raceway shall originate at a service panel or a subpanel(s) serving the area and shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet(s), box(es), enclosure(s), or equivalent. (3) plan design shall be based upon 40 A minimum branch circuits. Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage, unless otherwise permitted by the Los Angeles Electrical Code. (4) the service panel or subpanel(s) shall have sufficient capacity to accommodate the required number of dedicated branch circuit(s) for the future installation of the EVSE. (Los Angeles Municipal Code, Section 99.05.106.5.3.2) When only a single charging space is required, a raceway is required to be installed at the time of construction and shall be installed in accordance with the Los Angeles Electrical Code. Construction plans and specifications shall include, but are not limited to, the following: (1) The type and location of the EVSE. (2) A listed raceway capable of accommodating a 208/240 V dedicated branch circuit. (3) The raceway shall not be less than trade size 1". The raceway shall originate at a service panel or a subpanel serving the area and shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet, box, enclosure, or equivalent. (Los Angeles Municipal Code, Section 99.05.106.5.3.1)

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Los Angeles County	California	Los Angeles—2	Permit required under Article 85 of the Los Angeles County Code of Ordinances. EVSEs and their associated electrical equipment rated for less than 400 A do not require an electrical plan check, and a permit for that specific installation may be obtained over the counter at a local Building and Safety District Office. (Los Angeles County Code of Ordinances, Section 85-4). The permit application for the EVCS must comply with the requirements of the PEV infrastructure permitting checklist, which is contained in the most current version of the Zero-Emission Vehicles in California: Community Readiness Guidebook published by the Governor's Office of Planning and Research of the State of California and as adopted by the building official. The EVCS or EVSE shall also comply with all other applicable Los Angeles County Codes and California Health and Safety Laws. (Los Angeles County Code of Ordinances, Section 85-7) Any parking space served by EVSE and any parking space intended as a future EV-charging space shall qualify as a required standard automobile parking space where such parking space meets or exceeds the minimum length and width requirements for a standard automobile parking space. (Los Angeles County Code of Ordinances, Section 22.112.080L)
Marin County	California	San Francisco—12	See ordinance implementing California Green Building Code standards. For all new nonresidential construction and for nonresidential alterations and additions modifying the parking area, the minimum number of parking spaces that are EV ready and EV capable, meaning have the electrical service capacity install to provide required charging voltage, shall be provided as required by the Marin County Code Title 19 (Building Code); see Chapter 19.04, Subchapter 2. All such spaces shall conform to the accessibility standards established in the CBC. Such spaces shall be counted towards the parking requirements of this section. (i) Size. EVCS shall meet the minimum size standards established in state regulations. (ii) Signage. Each EV-charging stations shall be clearly marked with a sign reading "Electrical Vehicle Charging Station" and the associated California Vehicle Code restrictions, and only a vehicle that is connected for electric charging shall be allowed to park in the stalls or spaces so designated. (Marin County Municipal Code, Section 24.04.340)
Houston	Texas	Houston—5	A single EV1 or EV2 charging station at an existing location will not require electrical plans unless there are structural plans required for the installation. For all EV3 installations, and in new construction, or when multiple charging stations are to be installed, plans will be required including the one-line diagram, load analysis, panel schedule, and disconnect means, with the connected load, wire size, and overcurrent protection. (EV1 charging stations are small installations typically installed in residences and EV2 charging stations are installed in both residential and commercial locations. EV3 charging stations are large installations for quick charges which often are placed at fueling stations.) Structural plans must be designed and sealed by a Texas Professional Engineer for securing the stations to existing structures or to a new foundation or structure with following wind resistances depending on the structure. (See City of Houston, Electric Vehicle Charging Station Permit Guideline, (CE1256), Oct. 22, 2019 at https://www.houstonpermittingcenter.org/media/1006/download)

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Kansas City	Kansas	Kansas City—31	Vehicle charging equipment must be designed and located so as to not impede pedestrian, bicycle, or wheelchair movement or create safety hazards on sidewalks. 1. Information must be posted identifying voltage and amperage levels and any type of use, fees, or safety information related to the EVCS. 2. Public EVCS must be posted with signage indicating that the space is reserved for EV-charging purposes only. (Kansas City Zoning and Development Code, Section 88-305-10)
Miami-Dade County	Florida	Miami—7	All EV parking spaces shall be prominently designated with a permanent above-ground sign which shall conform standards for EVCS signs. The bottom of the sign must be at least 5' above grade when attached to a building, or 7' above grade for a detached sign. The number of required EVSE spaces or EVSE-ready spaces shall be determined based on the total number of off-street parking spaces, as shown in the table in the statute. The property owner or operator may establish the hours during which vehicles may be charged and the length of charging time permitted per vehicle, provided such information is depicted on the sign in the manner shown in the figure included in the ordinance. (Miami-Dade County Code of Ordinances, Section 33-122.5)
New York City	New York	New York—1	A minimum of 20% of the parking spaces in an open parking lot shall be equipped with electrical raceway capable of providing a minimum supply of 11.5 kVA to an EVSE from an electrical supply panel. The raceway shall be no smaller than 1" (inch). The electrical supply panel serving such parking spaces must have at least 3.1 kW of available capacity for each stall connected to it with raceway. Such raceway and all components and work appurtenant thereto shall be in accordance with the New York City Electrical Code. Exceptions: 1. The provisions of this section shall not apply to open parking lots for buildings of occupancy group M (Mercantile). 2. The commissioner may waive compliance with this section if the commissioner determines that the open parking lot is a temporary facility that will be in service no longer than three years. 3. The provisions of this section shall not apply to open parking lots for buildings in which not less than 50% of the residential units are for households earning up to 60% of the area median income as determined by the U.S. Department of Housing and Urban Development. (The New York City Administrative Code, Section 406.7.11)
North Hempstead	New York	New York—1	EVCS shall be permitted in all commercial districts, subject to the following: 1. Each EVCS shall include vehicle impact protection (bollards) or a similar structure. 2. A maximum of two parking spaces that are designated for the exclusive use of electric charging and the sale of electricity may be counted towards the off-street parking requirements specified in § 70-103. 3. Components for EVCS may encroach up to 36" (inches) into a required setback or buffer. (Town of North Hempstead Code, Section 70-203X)
Mesa	Arizona	Phoenix—10	If spaces for electric cars are provided, allowed compact parking spaces can be increased by 1% for every two electric car charging stations; up to a maximum of 25% of the total minimum required. (Mesa Code of Ordinances, Section 11-32-4) EVCS may be placed in parking lot landscape islands. If necessary, shrubs and ground cover may be eliminated to accommodate the charging equipment. (Mesa Code of Ordinances, Section 11-32-2)

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Oakland	California	San Francisco—12	Construction shall include EV-charging electric infrastructure as specified in this section to facilitate future installation of EVSE. All EV-charging electric infrastructure and EVSE (when installed) shall be in accordance with the California Electrical Code. (Table showing number of EV spaces in proportion to total parking spaces at a site.) Specific requirements on circuits, raceways, and electrical panel capacity requirements under this section as well. EV-Ready Building Code: 10% EV ready, 10% "raceway installed," 20% total panel capacity. (Oakland Code of Ordinances, Section 15.04.3.11.130)
Orange County	California	Los Angeles—2	Where required by the fire code official, other systems and operations including but not limited to battery systems assembly, battery reconditioning and storage, research, and development of battery storage systems, EV manufacturing and testing, and battery charging systems for cars and carts inside of buildings or structures, shall comply with this chapter. (Orange County Code of Ordinances, Section 3-3-13.)
Philadelphia	Penn-sylvania	Phila-delphia—8	Permit required; liability insurance required (The Philadelphia Code, Section 11.600.10)
Washington County	Oregon	Portland—25	A minimum of one EV-charging space shall be ADA compliant; EV-charging parking spaces shall be posted with signage not to exceed 5 sq. ft. in size. EV-charging unit outlets and operable parts shall be no less than 18" off the ground if indoors and 24' off the ground if outdoors and no higher than 48" off the ground to ensure easy access. (Washington County Community Code, Section 413)
Riverside	California	Riverside—13	Permit required for new installations. All EVCS shall meet all applicable health and safety standards and the requirements imposed by the state and the City, local fire department, and utility director. EVCS shall meet all applicable safety and performance standards established by the California Electrical Code, the SAE, the National Electrical Manufacturers Association, and accredited testing laboratories such as Underwriters Laboratories and, where applicable, rules of the Public Utilities Commission regarding safety and reliability. Provides for expedited permitting if all health, safety, and building code requirements are met. EVCS legally established or permitted prior to the effective date of this ordinance are not subject to the requirements of this ordinance unless physical modifications or alterations are undertaken that materially change the size, type, or components of an EVCS in such a way as to require a new permit. (Riverside Code of Ordinances, Section 16.23)
Riverside County	California	Riverside—13	All development projects that require 25 to 49 parking spaces shall designate two parking spaces for EVs. All development projects that require 50 or more parking spaces shall designate three spaces for EVs and designate one additional space for EVs for each additional fifty (50) parking spaces. All EV parking spaces shall be serviced by an EVCS. If capable, a charging station may service more than one EV parking space. All EV parking spaces shall be shown on parking site plans. Signage shall be installed designating spaces for EVs only. Charging stations shall be installed in locations easily accessible to service an EV.

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Riverside County *Continued*	California	Riverside—13	Charging stations and associated equipment or materials shall not encroach into the minimum required areas for driveways, parking spaces, garages, or vehicle maneuvering. (Riverside County Code of Ordinances, Section 17.188.045) Permit required for all charging stations. (Riverside County Code of Ordinances, Section 10.56)
San Bernardino County	California	Riverside—13	Installation of an EVCS shall require a current and effective permit. (San Bernandino County Code of Ordinances, Chapter 17)
San Diego	California	San Diego—17	Site and floor plan must be provided with the permitting application. Construction and electrical permits required; a building permit may be required if alterations will be made to an existing structure or to modify or relocate an existing disabled accessible parking space serving the premises. (San Diego Municipal Code, Section 141.0419) Where the scope of work includes only pre-wiring for a future installation of an EVCS, only an electrical permit is required to be obtained. The scope of work for a future installation must be limited to conduit/wiring and the termination of conduit/wiring to a junction box. A separate permit will be required to be submitted for the installation of the actual charging station. When the scope for a future installation includes the termination of the wiring to a receptacle or a charging station (pedestal), then the project will be reviewed as an EVCS. (City of San Diego, Information Bulletin 187: Electric Vehicle Charging Systems, July 2020 at https://www.sandiego.gov/sites/default/files/dsdib187.pdf)
San Diego County	California	San Diego—19	The building official shall follow a streamlined permitting process for EVCS system meeting all of the following requirements: a) Satisfying the information requirements specified in the latest version of the checklist published on the County of San Diego website. b) Conforming to all applicable codes and ordinances adopted by the County of San Diego. (San Diego County Ordinance 10437 (Aug. 3, 2016))
San Francisco	California	San Francisco—12	In new construction and major alterations, 100% of off-street parking spaces in buildings and facilities provided for passenger vehicles and trucks shall be EV spaces capable of supporting future EVSE. Electrical engineering design and construction documents shall indicate the location of all proposed EV spaces. When EVSE is installed, it shall be in accordance with the San Francisco Building Code and the San Francisco Electrical Code. When a single EV space is required per San Francisco Building Inspection Commission Codes, Section 5.106.5.3.3, install a full branch circuit with a minimum of 40-A 208 or 240 V capacity, including listed raceway, electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. The raceway shall not be less than trade size 1 (nominal 1′ inside diameter). The circuit shall be installed in accordance with the San Francisco Electrical Code and the San Francisco Building Code. For a minimum of 10% of EV spaces, and in no case less than two EV spaces when the total number of EV spaces is two or more, install a full circuit with minimum of 40-A 208 or 240 V capacity per EV space, including listed raceway, sufficient electrical panel service capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. Calculations for the number of EV spaces shall be rounded up to the nearest whole number.

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San Francisco *Continued*	California	San Francisco—12	Installation of one EV fast charger may reduce the number of EV spaces required under Section 5.106.5.3.2(a) by up to 10 EV spaces, provided the project includes at least one EV space equipped with a full circuit able to deliver 40 A at 208 or 240 V to the EV space, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The electrical panel board(s) provided at each parking level served by EV fast chargers shall have sufficient capacity to supply each EV fast charger with a minimum of 30 kW AC in addition to the capacity to serve any remaining EV spaces with a minimum of 8-A at 208 or 240 V per EV space simultaneously, with a minimum of 40 A per circuit. After the requirements of 5.106.5.3.2(a) and (b) are met, each planned EV fast charger may reduce the number of planned EV spaces required under 5.106.5.3.2(c) by up to 10 spaces. Design and construction documents shall indicate how many accessible EVCS would be required under California Building Code Title 24 Chapter 11B Table 11B-228.3.2.1, if applicable, in order to convert all EV spaces required under 5.106.5.3.2 to EVCS, excluding the exceptions in 5.106.5.3.2. Design and construction documents shall also demonstrate that the facility is designed so that compliance with accessibility standards will be feasible for accessible EV spaces at the time of EVCS installation. Surface slope for any area designated for accessible EV spaces shall meet slope requirements in Section 11B-812.3 at the time of original building construction and vertical clearance requirements in Section 11B-812-4, if applicable. Other specific technical requirements under Section 5.106. For single EV-charging spaces: Install a full branch circuit with a minimum of 40 A 208 or 240 V capacity, including listed raceway, electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. The raceway shall not be less than trade size 1 (nominal 1" inside diameter). The circuit shall be installed in accordance with the San Francisco Electrical Code and the San Francisco Building Code. For multiple spaces: a) Install a full circuit with minimum of 40 A 208 or 240 V capacity per EV space, including listed raceway, sufficient electrical panel service capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. Calculations for the number of EV spaces shall be rounded up to the nearest whole number. b) circuit panelboard(s) shall be installed at each parking level with service capacity to deliver a minimum 40 A at 208 or 240 V multiplied by 20% of the total number of EV spaces. The panelboard(s) shall have sufficient space to install a minimum of one 40-A dedicated branch circuit and overcurrent protective device per EV space up to a minimum of 20% of the total number of EV spaces. The circuits and overcurrent protective devices shall remain reserved for exclusive use by EV charging. c) For future spaces: Provide space for future installation of additional electrical panelboards to support a 40 A 208 or 240 V capacity branch circuit and overcurrent protection device per EV space, or equivalent consistent with Section 5.106.5.3.2.1; or provide space in installed electrical panelboard(s) to support installation of a 40 A 208 or 240 V capacity branch circuit and overcurrent protection device per EV space, or equivalent consistent with Section 5.106.5.3.2.1. Install raceway or sleeves where penetrations to walls, floors, or other partitions will be necessary to install panels, raceways, or related electrical components

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CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
San Francisco *Continued*	California	San Francisco—12	necessary for future installation of branch circuits. All such penetrations must comply with applicable codes, including but not limited to the San Francisco Electrical Code and the San Francisco Fire Code. An electrical permit obtained by a California state–licensed electrical contractor is required to install EVSE defined in Section 202 of this Code, and the alteration or modification of any portion of the electrical system on the property. San Francisco Building Inspection Commission Codes, Section 106A))
San Mateo County	California	San Francisco—12	Implements California Green Building Code Standards for EVCS. (San Mateo County Code of Ordinances, Ordinance 94767 (2016))
Pierce County	Wash-ington	Seattle—15	EVCS are exempt from zoning requirements and are allowed outright within the County. (Pierce County Code, Section 18A.33.270)
Santa Ana	California	Los Angeles—2	Implemented California Green Building Code (Santa Ana Code of Ordinances, Article VIII) Permit required; expedited permitting process (Santa Ana Code of Ordinances, Section 8-2903-2904)) An EVCS shall meet all applicable safety and performance standards established by the California Electrical Code, the SAE, the National Electrical Manufacturers Association, and accredited testing laboratories such as Underwriters Laboratories and, where applicable, rules of the Public Utilities Commission regarding safety and reliability. (Santa Ana Code of Ordinances, Section 8-2902)
Santa Clarita	California	Los Angeles—2	Permit required; expedited permitting process; an EVCS shall meet all applicable safety and performance standards established by: (1) The City of Santa Clarita Electrical Code (2) The City of Santa Clarita Building Code (3) The City of Santa Clarita Fire Code (4) The SAE (5) The National Electrical Manufacturers Association (Santa Clarita Municipal Code, Chapter 25.04)
Seattle	Wash-ington	Seattle—15	All permits including the installation or replacement of electrical services, shall provide plan details on submitted construction documents showing the location of equipment and conduit for future installation of EVCS. All occupancies shall provide adequate capacity to serve a future demand load of one EVCS per parking space. Sets demand factors according to number of parking spaces allocated. (Seattle Electric Code, Section 220.57) 10% of spaces must be EV ready in new buildings (Seattle Municipal Code, Section 23-53-030) To facilitate future installation of EV charging outlets in all occupancies when a new or replacement electrical service is to be installed, the following shall be provided: (1) A location shall be designated, together with the required working clearances, for a future electric vehicle charging system panelboard. The location shall be marked with a permanent placard identifying the space as "RESERVED FOR FUTURE ELECTRICAL VEHICLE CHARGING SYSTEM." The clearance dimensions shall be documented on the placard. The placard shall be written with 1-inch letters, or

(Continued on next page)

Summary of Policies by City and County *(Continued from previous page)*

CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Seattle *Continued*	Wash-ington	Seattle—15	(2) Space and capacity as calculated by Section 220.57 shall be reserved in the electrical service equipment for installation of an overcurrent protection device to serve the electric vehicle charging system branch circuits. Space shall be reserved for future EV charging equipment. The location shall be marked with a permanent placard identifying the space as "RESERVED FOR FUTURE ELECTRIC VEHICLE CHARGING SERVICE." The clearance dimensions shall be documented on the placard. The placard shall be written with 1-inch letters. (3) Conduit pathway shall be identified on the electrical drawings. Where the construction of the building will prevent the future installation of conduit, at least one of the following means shall be installed to facilitate the installation of a future Electrical Vehicle Charging System: (a) Block outs in the structure, (b) Short sections of conduit stubbed out to accessible space, or (c) Other acceptable means. (Seattle Electric Code, Section 625.27)
Snohomish County	Wash-ington	Seattle—15	Level 1, L2, and DCFC allowed in most zoning categories (Snohomish County Code, Section 30.22.100)
Tacoma	Wash-ington	Seattle—15	Signage posted indicating the space is only for EV-charging purposes, including the days and hours of operation if time limits or tow away provisions are to be enforced. Way-finding signage should be provided where EV parking is provided in multi-level parking garages. Electrical room(s) serving areas with EV-charging parking spaces should be designed to accommodate the electrical equipment and distribution required to serve a minimum of 20% of the total parking spaces with 208/240 V 40-A EV-charging infrastructure. Dedicated 40 A, 20/240 V dedicated branch circuit, raceways, and all other EV-charging equipment. The branch circuit shall be identified for EV service in the service panel or subpanel directory. Electric panel capacity and future EV-charging spaces should support a minimum 208/240 V 40 A branch circuit for each EV-ready parking space. The branch circuit needs to be identified as "EV ready" in the service panel or subpanel directory. Raceways should be installed for any portion of the pathway located below slabs, below grade, or within floor, wall, or roof assemblies and should terminate at a point close to the proposed location of the EV-charging space. The raceways need to be permanently and visibly marked as "EV ready." Where future EV-charging spaces are located within exterior on-grade parking spaces that are more than 4" from a building, the raceways should be extended either below grade to a pull box, or stubbed out above grade with protection from vehicles by a curb or other device. Marked pathways and capped sleeves are permitted in lieu of surface-mounted raceway. Locations should also be indicated on the electrical plans. (City of Tacoma Municipal Code, Section 2.02.136)

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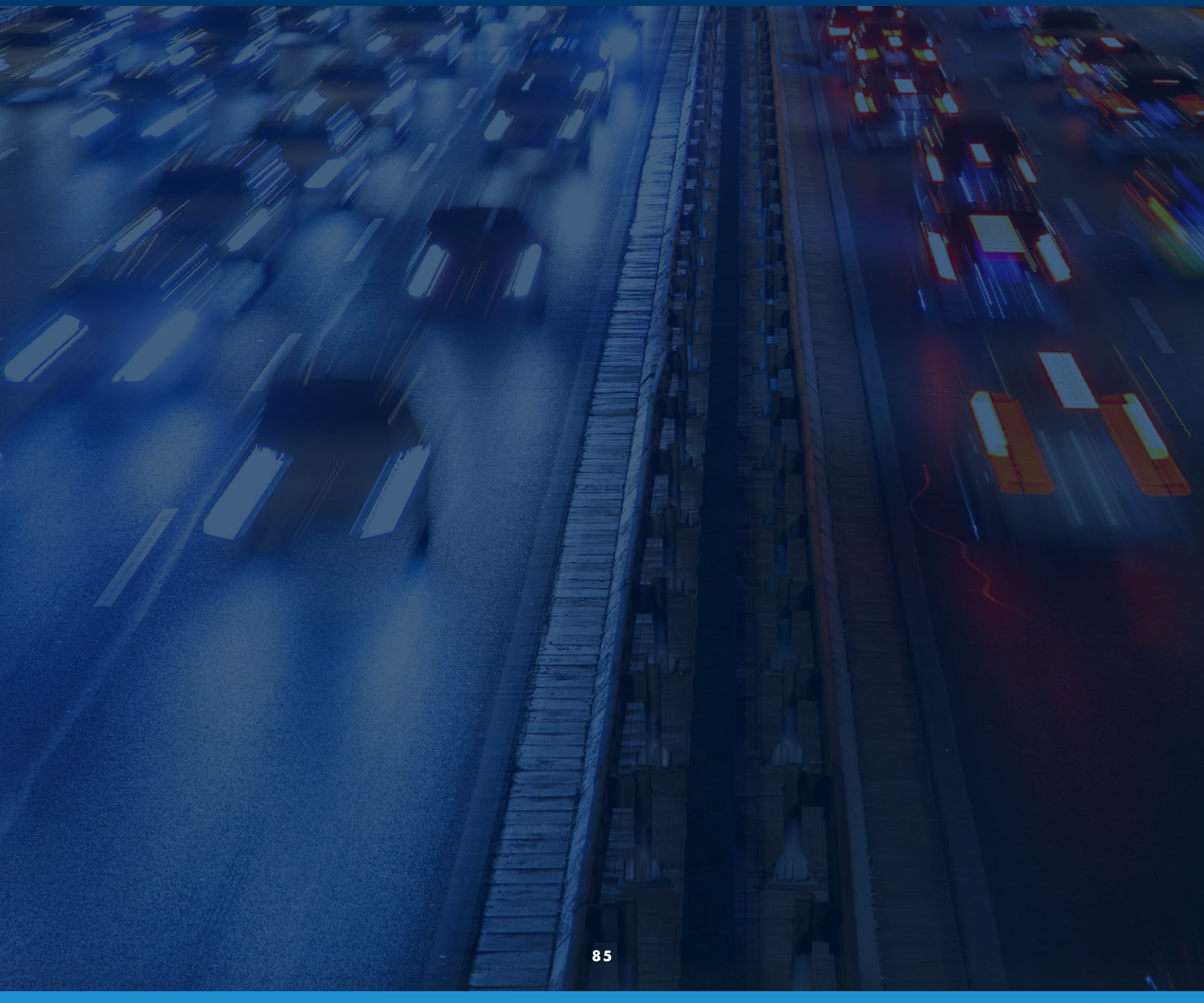
Summary of Policies by City and County *(Continued from previous page)*

CITY OR COUNTY	STATE	MSA—MSA RANK	INSTALLATION (SITING, PERMITTING, ZONING, SITE DESIGN, CONSTRUCTION)
Warren	Michigan	Detroit—14	It shall be unlawful for any person to construct or erect an EVCS upon any property within the city without first having obtained a permit from the Building Division or other designated city division/department. The permit application shall be accompanied by a plot plan prepared by a licensed professional architect, engineer, landscape architect, professional community planner, or land surveyor showing the type, size, and proposed location of the EVCS and payment of the permit fee established by resolution adopted by City Council. The fee shall be based on the existing fee schedule adopted by City Council. The requirement for submission of an official plot plan is not required for properties zoned R-1-A, R-1-B, R-1-C, and R-2 when the EVCS is located inside a structure. If the EVCS is located outside of the structure for properties zoned R-1-A, R-1-B, R-1-C, and R-2, a plot plan drawn to scale by the owner, occupant, or interested party is required. Level 3 EVCS are permitted in every zoning district except R-1-A, R-1-B, R-1-C, R-1-P, and R-2 that is for residential use when accessory to the primary permitted use. Installation shall be subject to permit approval administered by the Building Division. If the primary use of the parcel is the retail electric charging of vehicles, then the use shall be considered a gasoline service station for zoning purposes. Installation shall be located in and subject to approval in zoning districts which permit gasoline service stations. For a newly developed parcel, an EVCS space shall be included in the calculation for minimum required parking spaces required in accordance with Section 4.32. For an existing parcel, an approved existing parking space (except a handicapped space) may be converted to an EV parking space without being in violation of the requirements in Section 4.32. (Warren Code of Ordinances, Article IV-E)
Montgomery County	Maryland	Washington, DC—6	An EVCS-ready parking space must be: 1. Located in a preferential, highly visible area within the parking facility; 2. A minimum width of 9 feet; 3. Designed so that the space and pathways for the future installation of at least a 120 V charging station and associated infrastructure are provided; and 4. Constructed such that all conduits leading to the electrical room, including electrical service conduit, service size, and the electrical room, are appropriately sized to accommodate future electrical equipment necessary for the number of EVCS-ready parking spaces required. (Montgomery County Code, Section 6.2.5.F) Any parking facility constructed after May 12, 2014, containing 100 parking spaces or more, must have a minimum of one parking space ready to be converted to a station for charging EVs for every 100 parking spaces, or fraction thereof. (Montgomery County Code, Section 6.2.3.E)

Source: Compiled by Transport Energy Strategies citing each city's or county's applicable policy, July 2020

APPENDIX C

Summary of State Incentives



APPENDIX C: SUMMARY OF STATE INCENTIVES

STATE	GROUP	OTHER INCENTIVES
Arkansas	4	The Arkansas Energy Office of the Division of Environmental Quality may offer a rebate for each approved private EVCS, public EVCS, CNG refueling station, liquefied natural gas refueling station, and liquefied petroleum gas refueling station that is: • Not more than 75% of the qualifying costs of the station, not to exceed $400,000; • Not more than 50% of the eligible equipment purchase and installation cost of the private EVCS, not to $900; or • Not more than 50% of the eligible equipment purchase and installation cost of the public EVCS, not to exceed $5,000. (Administrative Code of Arkansas, Section 15-10-903)
California	1	• The San Joaquin Valley Air Pollution Control District's Charge Up! Program provides incentives for the purchase and installation of EV chargers in the San Joaquin Valley. Charge Up! offers up to $6,000 for L2 EV chargers and up to $25,000 for Level 3 DCFC. • The Fresno County Incentive Project, funded by the California Energy Commission, offers rebates of up to $4,000 for single-port EVSE and up to $7,000 for dual-port EVSE toward the purchase and installation of the unit. Eligible applicants include businesses, non-profit organizations, or government entities based in California, or with a California-based affiliate, as well as property owners or entities with property owner authorization to install EVSE. • The Southern California Incentive Project, funded by the California Energy Commission as part of the California Electric Vehicle Infrastructure Project, offers rebates of up to $70,000 per DCFC for installations at new sites and 75% of total project costs, up to $40,000, per DCFC for installations at replacement or make-ready sites. • Funding may be available from Sacramento County for L2 chargers (up to $5,000).
Colorado	2	CEO, the Regional Air Quality Council, and the Colorado Department of Transportation have partnered to provide grants through the ALT Fuels Colorado program for new, publicly accessible CNG fueling equipment; co-located EV-charging and propane station equipment at funded CNG stations; and CNG, propane, and EVs. CEO will administer the station grants to advance infrastructure development along major statewide transportation corridors. The Regional Air Quality Council and CEO will fund 80% of the cost of a charging station up to the following set maximums: • L2, fleet-only charging stations: $6,000 • L2, dual-port station: $9,000 • L3, multiple-connection standard station: $30,000
Connecticut	2	Charge Up CT provides incentives for qualifying building owners, which may include retail stations.
Delaware	4	The state offers a rebate for commercial public-access points of 75% of the cost up to a maximum $3,500 for a single-port station and $7,000 for a dual-port station.
Florida	4	Local governments may use income from the infrastructure surtax to provide loans, grants, or rebates to residential or commercial property owners to install EVSE, propane fueling infrastructure, and natural gas fueling infrastructure, if a local government ordinance authorizing this use is approved by referendum. (Florida Statutes 206.9951 and 212.055)
Georgia	5	An eligible business enterprise may claim an income tax credit for the purchase or lease of qualified EVSE provided that the EVSE is located in the state and accessible to the public. The tax credit is for 10% of the cost of the EVSE, up to $2,500. (Georgia Code 48-7-40.16)
Hawaii	4	The Hawaii PUC offers a rebate for the new installation or upgrade of a L2 or DCFC. Rebates range from $3,000–$35,000. Eligible applicants include individuals, non-profits, private businesses, and government entities. Priority will be given to applicants with EVSEs that are publicly available, serve multiple individuals, or service EV fleets. Only EVSE installed or upgraded after December 31, 2019, are eligible. The PUC may award up to $500,000 in rebates annually. (Reference House Bill 1585, 2019, and Hawaii Revised Statutes 269)

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Summary of State Incentives *(Continued from previous page)*

STATE	GROUP	OTHER INCENTIVES
Illinois	4	The Department of Commerce and Economic Opportunity provides rebates toward the purchase and installation of EVCS. Eligible applicants for this rebate program include units of government, businesses, educational institutions, non-profits, and individual residents. The maximum possible total rebate award is $50,000. EVCS must be purchased and installed prior to submitting a rebate application. Completed applications will be processed on a rolling basis. Eligible charging stations that are purchased and installed (in compliance with program guidelines) on or after August 29, 2013, will qualify for the rebate program. (Citizens Utility Board)
Maryland	2	The Maryland Energy Administration administers the Maryland Alternative Fuel Infrastructure Program, which provides grants to plan, install, and operate public-access alternative fueling and charging infrastructure, including up to $55,000 for DCFC. Grant award amounts are based on the alternative fuel technology and are capped at 50% of project costs. There are specific requirements for charging under the program. The Maryland Energy Administration offers a rebate to an individual, business, or state or local government entity for the costs of acquiring and installing qualified EVSE. Between July 1, 2017, and June 30, 2020, rebates for 40% of the costs of acquiring and installing qualified EVSE, or up to $4,000. The program depleted for 2020, but additional funding could be available in 2021.
Minnesota	4	The Minnesota Pollution Control Agency offers grants for the installation of public DCFC EVSE along Minnesota highways and interstates. Grants are available for 80% of the project costs, up to $170,000 per 150 kW EVSE (eligible in Albert Lea only) and up to $70,000 per 50kW EVSE. A total of twenty-one 50kW EVSE and one 150kW EVSE will be funded.
Missouri	4	Beginning January 1, 2020, nonresidential customers are eligible to apply for incentives to install EVSE along highway corridors. Each station-site must have two DCFC and two L2 chargers. Each site is eligible for incentives up to $240,000; sites with planned DCFCs with a capacity of 100 kilowatts or greater are eligible for incentives up to $360,000. Applications for incentives will be accepted until December 31, 2023, or until funding is exhausted, whichever is earlier.
Nevada	3	The Nevada Office of Energy will establish the Nevada Clean Energy Fund to fund qualified clean energy projects, including any program, technology, product, or service that supports the deployment of alternative fuel vehicles and related infrastructure. Technologies that involve the combustion of fossil fuels are not eligible for funding. (Reference Nevada Revised Statutes 701B.930-995)
New Mexico	3	The New Mexico Environment Department provides funding for eligible mitigation projects for NOx emissions. The department will fund up to $20,000 per eligible dual-port L2 EVSE installation and up to 75% of the cost of a DCFC installation. Additional requirements may apply.
New York	2	The NYSERDA's Clean Transportation Program provides funding for projects that enhance mobility, improve efficiency, reduce congestion, and diversity transportation methods and fuels through research and development of advanced technologies. NYSERDA offers annual solicitations that support new product development and demonstration as well as research on new transportation policies and strategies. NYSERDA's Charge Ready NY program offers rebates for public and private entities toward the purchase and installation of L2 EVSE at public parking facilities, workplaces, and MUDs. Rebates are available for $4,000 per port. Owners of DCFC EVSE that meet the following requirements are eligible for an annual per-EVSE-connector incentive: (1)Connector using a commonly accepted non-proprietary standard or a proprietary standard in the case where it is co-located with a commonly accepted non-proprietary standard (2)Publicly accessible, without restriction or fees for parking (3)Stations that received a building permit and/or provided payment for utility service excess distribution facilities after March 1, 2019

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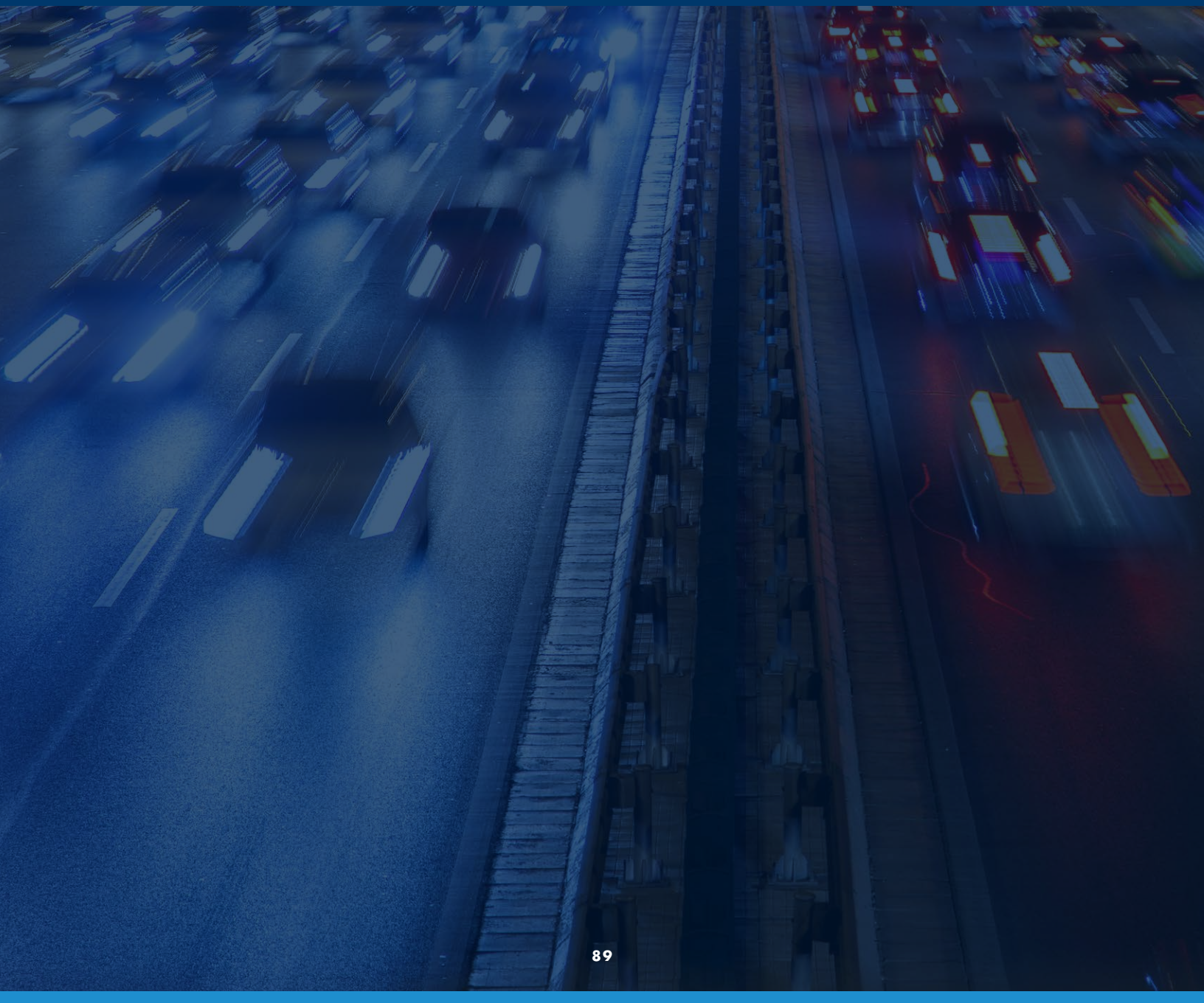
Summary of State Incentives *(Continued from previous page)*

STATE	GROUP	OTHER INCENTIVES
New York *Continued*	2	(4)The full incentive is available for plugs rated with power capacity of 75kW and higher, and a 60% incentive is available for plugs rated 50kW to 74kW. Payments are made annually from the date equipment is placed in service, through 2025. (5)Minimum power capacity of 50 kW in a single- or parallel-output configuration
North Carolina	3	The North Carolina Department of Environmental Quality's Zero-Emission Vehicle DC Fast Charge Infrastructure Program provides funding for the purchase and installation of public-access DCFC EVSE. The program will prioritize EVSE installed along specific highway corridors.
Oklahoma	4	For tax years beginning before December 31, 2027, a tax credit is available for up to 45% of the cost of installing commercial alternative fueling infrastructure. Eligible alternative fuels include natural gas, propane, and electricity. The infrastructure must be new and must not have been previously installed or used to fuel alternative fuel vehicles. (House Bill 2095, 2019, and Oklahoma Statutes 68-2357.22)
Penn-sylvania	4	The Pennsylvania Department of Environmental Protection offers rebates for the acquisition, installation, operation, and maintenance of L2 EVSE. Rebates are available for L2 EVSE on publicly accessible government-owned or non-government-owned property, at workplaces, or at MUDs that are not publicly accessible. Public access networked: $5,000 per plug or up to 80% of total project costs; public access, non-networked: $5,000 per plug or up to 70% of total project costs.
Rhode Island	2	The Rhode Island Office of Energy Resources offers financial incentives through the Electrify RI Program for the installation of new EVSE at Rhode Island workplaces, MUDs, government properties, and publicly accessible locations. Funds are awarded on a first-come, first-served basis.
Tennessee	5	The Tennessee Department of Environment and Conservation will provide funding for, among other things, EVSE.
Texas	4	The Texas Commission on Environmental Quality administers the Emissions Reduction Incentive Grants Program and Rebate Grants Program as part of the Texas Emissions Reduction Plan. The grant program provides grants for various types of clean-air projects to improve air quality in the state's nonattainment areas and other affected counties, including EVSE. Qualifying projects must reduce emissions of NOx or other pollutants by at least 25% as compared to baseline levels and must meet operational and fuel usage requirements. (Texas Statutes Health and Safety Code 386 and Texas Administrative Code 114.620-114.629)
Utah	3	The Utah Department of Environmental Quality offers rebates for up to 50% the installation cost of L2 and DCFC EVSE. Utah-based businesses and non-profit organizations are eligible for a maximum rebate of $75,000 each, and governmental entities are also eligible to apply.
Vermont	2	The Vermont Department of Housing and Community Development provides funding to governments, businesses, non-profit organizations, homeowner associations, electric utilities, and EVSE providers for the cost and installation of eligible EVSE. Funding is available for up to 60% of project costs, with a maximum of $150,000 per project site.
Washington	2	State tax credits for qualified alternative fueling infrastructure are for up to 50% of the cost to purchase and install the infrastructure. (Revised Code of Washington 82.16.0496 and 82.04.4496) WSDOT will establish a green transportation capital grant program to fund projects to reduce the CI of the Washington transportation system, including fleet electrification, modification or replacement of facilities to facilitate fleet electrification and hydrogen fueling, upgrades to electrical transmission and distribution systems, and construction of charging and fueling infrastructure. To receive funding for a project, a transit authority must provide matching funding for that project that is at least equal to 20% of the total cost of the project. (Revised Code of Washington 47.66.120) WSDOT offers competitive grants to strengthen and expand the West Coast Electric Highway network by deploying EVSE with L2 and DCFCs and hydrogen fueling infrastructure along highway corridors in Washington. Eligible project costs include siting, equipment purchases, electrical upgrades, installation, operations, and maintenance. (Revised Code of Washington 47.04.350)

Source: Compiled by Transport Energy Strategies citing individual state policies as applicable and the DOE's Alternative Fuels Data Center database, September 2020

APPENDIX D

Summary of Utility Incentives



APPENDIX D: SUMMARY OF UTILITY INCENTIVES

STATE	GROUP	UTILITY INFRASTRUCTURE INCENTIVES
Arizona	3	Salt River Project offers a rebate of $1,500 per port for commercial, workplace, and multi-family customers who install networked L2 EVSE. EVSE must be installed between May 1, 2020, and April 30, 2021. Funds will be awarded on a first-come, first-served basis. TEP offers rebates and technical support to businesses, multi-family dwellings, and non-profit customers that purchase and install between two to five EVSE ports. TEP will evaluate the electrical capacity and supporting EVSE infrastructure at locations that install six or more ports on a case-by-case basis. Higher rebates are available for commercial customers located in lower-income areas. Low-income areas are defined as U.S. Census tracts where the average household income does not exceed 80% of the median Arizona household income. Retailers may be eligible for DCFC funding of $24,000 per port; up to 75% of project cost.
Arkansas	4	Entergy offers an incentive for L2 commercial EV chargers but has not disclosed amount.
California	1	• Burbank Water and Power residential and commercial customers who install a L2 EV charger are eligible for a rebate of $2,000. • Rebates of up to $500 are available to Colton Electric Utility customers who install L2 plug-in chargers at their residence or business. • Glendale Water & Power offers rebates of up to $2,000 for commercial or multi-family customers. • The Los Angeles Department of Water & Power Commercial EV Charger Rebate Program offers a rebate of up to $5,000 per qualified L2 single-port charger, with up to an additional $750 per extra charge port. • Pasadena Water and Power's Commercial Charger Incentive Program offers $3,000 rebate for installation of smart L2 charging stations for commercial, workplace, MUD, and fleet customers. • The City of Rancho Cucamonga Municipal Utility's EV Commercial Charger Rebate Program provides an incentive of up to $4,000 per L2 charging station to commercial customers who install a workplace or public EV charger. • The Charge Ready Program is designed for nonresidential Southern California Edison customers to support deployment of a minimum of 10 charging stations at participating locations. The program includes qualified Level 1 and L2 charging stations, covers all electric infrastructure costs related to installation of the new circuit, and offers a rebate to offset some or all of the costs for the charging stations and their installation. • AMP provides rebates of up to $800 to residential customers and up to $5,000 to commercial customers toward the purchase of L2 EVSE. • PG&E EV Fast Charge Program offers competitive incentives to facilitate the installation of DCFC EVSE. PG&E will cover the cost to make-ready a site for DCFC. Projects must involve the purchase of a DCFC from the approved vendor list. To qualify, sites must receive electric service from PG&E and the DCFC must be available to the public 24 hours a day, 7 days a week. • PG&E's Commercial Electric Vehicle Rate creates a new rate class for commercial EV-charging customers like workplaces, public fast charging, and medium- and heavy-duty fleets. The new rate aims to provide a more affordable and simple structure for EV charging with a new subscription charge based on connected charging capacity, plus a TOU volumetric rate that encourages charging overnight and during mid-day hours. PG&E must not collect any non-marginal distribution costs through the new rates. The company is required to file an application for a real-time EV commercial rate within the next 12 months.
Florida	4	Duke Energy offers free L2 and DCFC EVSE, installation, warranty, and network connection services to its customers through the Park & Plug pilot program. Eligible entities include MUDs, workplaces, businesses, and areas along high-traffic corridors. Site hosts are responsible for electricity costs and must agree to participate in the pilot program through December 2022.

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Summary of Utility Incentives *(Continued from previous page)*

STATE	GROUP	UTILITY INFRASTRUCTURE INCENTIVES
Hawaii	4	Hawaii Energy administers EVCS incentives funded through the State of Hawaii Act 142 under contract with the Hawaii PUC. The state legislature has allocated a total of $400,000 for EVCS installation projects completed between January 1, 2020, and June 30, 2021: • Round 1 funding: $150,000 in rebates for EVCS installation projects completed on January 1, 2020, through June 30, 2020 • Round 2 funding: $250,000 in rebates for EVCS installation projects completed on July 1, 2020, through June 30, 2021. Rebates are available on a first-come, first-served basis while funding lasts.
Idaho	3	Yellowstone-Teton Clean Cities offers a rebate of $5,000 toward the purchase of publicly accessible EVSE. Eligible entities include businesses and municipalities in the communities surrounding Grand Teton National Park and Yellowstone National Park. Rebates are offered on a first-come, first-served basis. (No rebates as of March 2020, but the program could be revived.)
Iowa	4	Commercial Central Iowa Power Cooperative customers are eligible for rebates for the purchase of EVs and the purchase and installation of L2 EVSE; for EVSE, the amount is $1,000. Alliant Energy offers a rebate to commercial and industrial customers who purchase and install L2 EVSE for use by employees, tenants, or the public. The rebate is $500 for the purchase of a single-port EVSE, $1,000 for a dual-port EVSE, and $1,500 for a dual-port networked EVSE. Rebates are available on a first-come, first-served basis.
Louisiana	4	Nominal incentive available for L2 charging through Etech program ($250)
Mass-achusetts	2	Eversource's EVCS program provides installation and funding support for nonresidential customers to install approved L2 or DCFC EVSE at businesses, MUDs, workplaces, and fleet facilities. To qualify, customers must own, lease, or operate a site where vehicles are typically parked for at least two hours. Eligible installation expenses include trenching, dedicated service meter, conduit, and wiring costs. National Grid's EVCS program provides nonresidential customers with installation and funding support to install approved L2 or DCFC EVSE at businesses, MUDs, and workplaces. Additional terms and conditions apply.
Michigan	4	The Consumers Energy PowerMIDrive program offers rebates to residential and commercial customers who install L2 or DCFC EVSE. Commercial customers installing qualified, publicly accessible EVSE are eligible for rebates up to $5,000 per L2 and up to $70,000 per DCFC EVSE installed.
Mississippi	5	Nominal incentive available for L2 charging through Etech program ($250)
Missouri	4	Ameren Missouri's Charge Ahead program will offer competitive incentives to eligible nonresidential customers to install L2 EVSE or DCFC charging stations at qualifying workplaces, MUDs, and public areas. Sites must be located in Ameren Missouri's service territory and require no electrical upgrades. Public areas are eligible for incentives up to $70,000 for six L2 ports and two DCFCs. Ameren's Corridor Charging Sub-Program, part of the Charge Ahead program, will provide incentives up to $360,000 per site for development and long-term ownership and operation of DCFC stations at approximately 11 pre-determined locations along major highway corridors in Ameren Missouri territory. (Filing E-2018-0132)
Nebraska	5	Nebraska Public Power District offers residential and commercial customers a $4,000 rebate for the purchase of a new EV and a $500 rebate for the installation of an eligible L2 EVSE. Participants must purchase the EVSE through Nebraska Public Power District.

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Summary of Utility Incentives *(Continued from previous page)*

STATE	GROUP	UTILITY INFRASTRUCTURE INCENTIVES
New York	2	ConEdison offers an electric rate reduction ranging from 34% to 39% for businesses in New York City and Westchester County that install a publicly accessible DCFC. To qualify, the charger must have a power output of at least 100 kW. Additional terms apply. The rate reduction is available through April 2025. Station owners can charge for use per hour, per session, or per unit of electricity: (1) Per hour: If you charge per hour, there is a set cost for any vehicle whether it is charging or not, and different vehicles receive electricity at different rates, so the cost of energy may vary widely by charging session. (2) Per session: This is usually more appropriate for workplace charging or charging stations that have very short, regular sessions. (3) Per unit of energy (usually kWh): This accurately accounts for the true cost of electricity for the charging station owner but does not give an incentive for a car that is fully charged to leave the space. (Filing 19-E-0065) Central Hudson Gas & Electric offers a per-plug incentive for up to 100 publicly available DCFCs. The starting incentive proposed would be $11,000 per plug for plugs rated at 75 kW or greater, regardless of the year of participation, and would decline ratably over a maximum payment period of five years. (Filing 18-E-0138) ConEdison offers a per-plug incentive for DCFC stations to address initial operating expense challenges for customers who receive a Fast Charging business incentive rate. (Filing 18-E-0138) New York State Electric & Gas offers a per-plug incentive for up to 160 publicly available DCFC stations. The purpose of the incentive payment is to support the deployment of DCFC stations while utilization is relatively low by offsetting electric delivery cost. The starting incentive would be $8,000 per plug for plugs rated at 75 kW or greater and would decline ratably over a maximum payment period of seven years. (Filing 18-E-0138) Orange & Rockland Utilities offers a per-plug incentive for up to 40 publicly available DCFC stations. The starting incentive would be $11,000 per plug for plugs rated at 75 kW or greater, regardless of the year of participation, and would decline ratably over a maximum payment period of seven years. (Filing 18-E-0138) Rochester Gas & Electric offers a per-plug incentive for up to 74 publicly available DCFC stations. The purpose of the incentive payment is to support the deployment of DCFC stations while utilization is relatively low by offsetting electric delivery cost. The starting incentive would be $17,000 per plug for plugs rated at 75 kW or greater and would decline ratably each year. (Filing 18-E-0138) National Grid offers a per-plug incentive for up to 300 publicly available DCFC stations and will conduct a study to determine the magnitude of any necessary system upgrades after an application is received. The starting incentive would be $7,500 per plug for plugs with simultaneous charging capability rated at 75 kW or greater and would decline consistently each year. Funding for the program is coming from NYSERDA's System Benefits Charge, which already has been collected. (Filing 18-E-0139-8) A business incentive rate for publicly accessible DCFC stations that reduce energy delivery costs between 34% and 39%. (Filing 17-E-0814)
Ohio	5	American Electric Power Ohio offers financial incentives for the hardware, network services, and installation of EVSE for up to 300 L2 and 75 DCFC charging stations. Incentives in varying amounts are available to all nonresidential customers that have a valid American Electric Power Ohio account. EVSE must be installed at a workplace, government facility, MUD, or other publicly available charging location served by American Electric Power Ohio. The following incentives are currently offered: • Incentives for L2 chargers—max six ports/customer: lesser of $50,000, 80% eligible project costs, or $10,000 per port • Incentives for DCFCs—max two stations/customer: lesser of $100,000, 80% eligible project costs, or $50,000 per station

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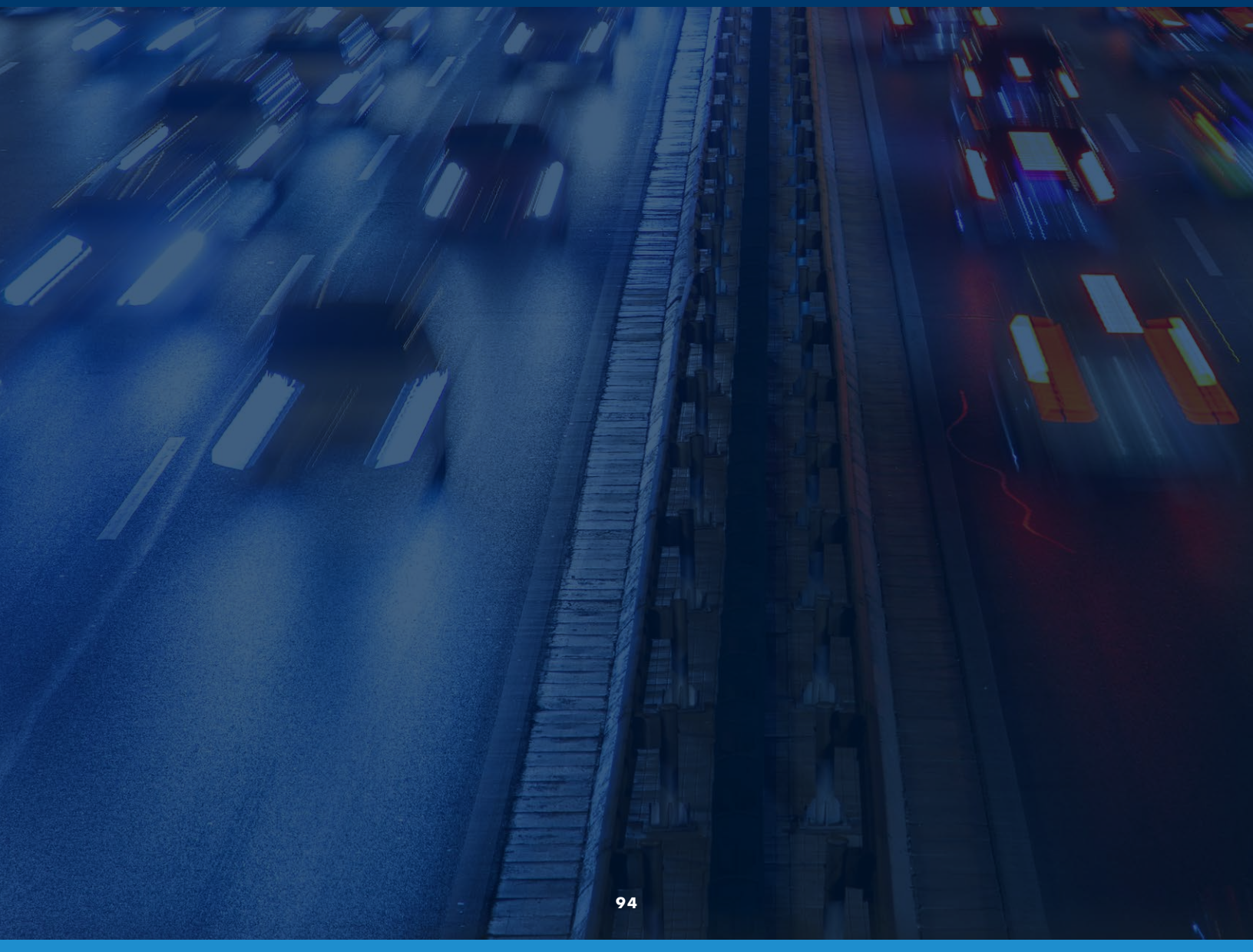
Summary of Utility Incentives *(Continued from previous page)*

STATE	GROUP	UTILITY INFRASTRUCTURE INCENTIVES
Oregon	2	Eugene Water & Electric Board offers rebates for residential and commercial customers to install L2 EVSE. Eligible residential customers may receive up to $500, and eligible commercial customers may receive up to $1,000. Various conditions (such as installation and equipment) apply. Pacific Power is offering nonresidential customers quarterly grants for up to 100% of eligible purchase and installation costs of EVSE. Twenty-five percent of funds will be earmarked for workplace charging and fleet electrification projects. Various conditions and requirements apply.
Pennsylvania	4	Duquesne Light Company offers rebates to commercial customers for the installation of publicly available L2 EVSE. Rebates are available for up to 100% of make-ready installation costs, up to $5,000 per plug, and up to $100,000 per site. Eligible projects must include a minimum of two L2 networked EVSE plugs.
Utah	3	Incentives of up to $7,000 available for multiport L2 charging stations and $63,000 for DCFC to be deployed at both nonresidential and MUDs available from Rocky Mountain Power and approved by Utah Public Service Commission with $10 million allocated. (Filing 16-035-36, decided 6/28/2019)
Virginia	4	Smart Charging Infrastructure Pilot will provide rebates for the infrastructure and upgrades (make-ready) to enable EV charging and rebates for smart charging equipment. The pilot will focus on deploying up to 25 L2 charging stations at multi-family sites, 400 L2 charging stations at workplaces, 30 DCFC at public locations, and 60 DCFC to transit agencies. One eligibility requirement is that participants must agree to provide charging data to the company. Dominion also will own up to four charging stations to support the electrification of the ride-share market segment in strategic locations. (Filing PUR-2019-00154)
Washington	2	Pacific Power offers nonresidential customers quarterly grants for up to 100% of eligible purchase and installation costs of EVSE. Twenty-five percent of funds will be earmarked for workplace charging and fleet electrification projects.
Wyoming	5	Yellowstone-Teton Clean Cities offers a rebate of $5,000 toward the purchase of publicly accessible EVSE. Eligible entities include businesses and municipalities in the communities surrounding Grand Teton National Park and Yellowstone National Park. Rebates are available on a first-come, first-served basis.

Source: Compiled by Transport Energy Strategies, May 2020

APPENDIX E

Summary of Volkswagen Settlement Incentives



APPENDIX E: SUMMARY OF VOLKSWAGEN SETTLEMENT INCENTIVES

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Alabama	$25,480,968	$3,822,145	Yes	$3,822,145	No	No	Plan mentions EVSE funding but does not allocate specific funding; applications for projects were accepted until August 31, 2020, but did not include EVSE.
Alaska	$8,125,000	$1,218,750	Yes	$1,218,750	No	No	Several projects have been selected, but no specific plan in place for EVSE at this time; $2.2 million allocated for diesel and electric school buses, one electric bus.
Arizona	$56,660,078	$8,499,012	No	$0	No	No	State choosing to spend $13 million to replace state fleet vehicles and $38 million to replace school buses.
Arkansas	$14,647,709	$2,197,156	Yes	$2,197,156	No	Possibly	Department of Environmental Quality would implement a funding assistance program for the installation of new EVCS. DEQ will provide rebates for eligible L2 EVSE and issue a request for proposals for DCFC EVSE. L2 EVSE rebate application materials under development, and DCFC EVSE request for proposals under development.
California	$422,636,320	$63,395,448	No	$10,000,000	No	Possibly	Plan targets $5 million for EVSE and $5 million for hydrogen fueling stations; funding up to 80% of costs for publicly accessible facilities. Solicitation packages are currently under development according to CARB.
Colorado	$68,739,918	$10,310,988	Yes	$10,310,988	Partially	Possibly	Under the plan, CEO will manage fast-charging highway corridor investments through ALT Fuels Colorado with the support of Regional Air Quality Council. Fast-charging stations will be installed primarily along Tier 1 and Tier 2 corridors identified in Colorado's 2016 Statewide Network Plan. As proposed in the plan, EVCS may be installed on average every 50 miles. The installation of highway corridor charging stations will help reduce the "range anxiety" that accompanies ZEVs and should promote a more rapid transition to ZEV technologies across Colorado. Fast-charging corridor incentives will range from $250,000 for two-dispenser stations to $380,000 for four-dispenser stations. Incentives and program requirements may change depending on market developments or needs of an individual site.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Colorado *Continued*	$68,739,918	$10,310,988	Yes	$10,310,988	Partially	Possibly	Regional Air Quality Council and CEO will fund 80% of the cost of a charging station up to the following set maximums: (1) L2, fleet-only charging stations: $6,000 (2) L2, dual-port station: $9,000 (3) L3, multiple-connection standard station: $30,000 (CEO will provide an additional $5,000 for Level 3 charging station projects outside of the seven-county Denver Metro Area.) (4) L3, ultra-fast multiple-connection standard station (minimum 100+ kW): $50,000 (one award available per organization per round) CEO is currently accepting applications for the ALT Fuels Colorado Electric Vehicle Direct Current Fast-Charging Plazas Program. This funding opportunity is designed to increase access to high-speed charging in and around the Denver Metro Area for public users and high-mileage fleets like transportation network companies. CEO will consider Plaza locations outside the Denver Metro Area with a strong business case. Applications closed for the first round September 30, 2020.
Connecticut	$55,721,170	$8,358,175	Yes	$8,358,175	No	Possibly	State plan covers funds for both EVSE and hydrogen fueling infrastructure. Will provide up to 60% of the cost to purchase, install, and maintain eligible light-duty EVSE that will be available to the public at a non-government-owned property. Solicitations have not started at this time.
Delaware	$9,676,683	$1,451,502	Yes	$1,451,502	Yes	Possibly	Funds will be utilized to incentivize the construction and operation of DCFC stations in the state to provide residents and travelers with convenient and consistent access to EVSE. Grant funding will be provided for the material costs of publicly available DCFC stations installed within the state of Delaware. Eligible entities for grant funding will include Delaware-based businesses, not-for-profit organizations, government entities, and educational institutions. Bid closed in June 2020, but winners have not yet been announced.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
District of Columbia	$8,125,000	$1,218,750	No	$0	No	No	The District is not allocating VW settlement funding for supply equipment, such as EVCS, for light-duty zero emissions vehicles.
Florida	$166,278,745	$24,941,812	Yes	$13,500,000	Partially	Possibly	Application closed May 2020 and winners have been announced: Electric Vehicle Charging Infrastructure Phase 1 provides a significant investment in the state's public safety infrastructure and growing need for Electric Vehicle Charging Infrastructure as EV purchases continue to increase. This phase is a competitive grant opportunity for public and non-public entities to install DCFC stations within a five-mile proximity to Interstates 4, 75, 275, 95, and 295. The purpose of this program is to develop a network of DCFC stations along the state's major evacuation routes. Electric Vehicle Charging Infrastructure Phase 1 divides the included interstates into 27 segments, with 40-mile segments for I-4, I-75, and I-95, and I-295, and I-275 into one segment each. The 27 segments will serve as individually competitive grants, with a maximum cost share using mitigation trust funds of $500,000. Competitive evaluation does include the applicant's desired cost share, factoring in the required cost share for non-public entities. At a maximum, Department of Environmental Protection will fund 27 projects at $500,000 each for a total of $13,500,000 for this phase; however, DEP does not anticipate each segment to reach the $500,000 maximum funding amount.
Georgia	$63,624,726	$9,543,709	No	$0	No	No	Spending funds on replacing buses in the state
Hawaii	$8,125,000	$1,218,750	Yes	$1,218,750	No	Possibly	Plans to develop 20-30 charging stations (mix of L2 and DCFC) and has requested funding from the trust. Solicitations have not yet begun.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Idaho	$17,349,037	$2,602,356	Yes	$2,602,356	Partially	Possibly	EVSE program will provide cost-shared funds with some strategic locations within Idaho for DCFC equipment. These locations will create a network of highways in Idaho that offer EVCS to the public. Charging sites stationed along the highways and interstates will be prioritized. Office of Energy and Mineral Resources is managing the project and funding still available. Only $300,000 has been awarded so far for government and tribal charging.
Illinois	$108,679,677	$16,301,952	No	$10,867,968	No	Possibly	Will fund EVSE projects on a case-by-case basis
Indiana	$8,125,000	$1,218,750	Yes	$1,218,750	No	No	Several projects have been selected, but no specific plan in place for EVSE at this time; $2.2 million allocated for diesel and electric school buses, one electric bus.
Iowa	$21,201,738	$3,180,261	Yes	$1,100,000	Yes	Possibly	$1.1 million is available for publicly accessible DCFC corridor sites along I-80 and I-35 or Level2 community charging sites across the state. Solicitation closed in February 2020, but winners have not yet been announced.
Kansas	$15,662,239	$2,349,336	Yes	$2,349,336	No	Possibly	Kansas Department of Health & Environment proposes to provide up to 60% of the cost necessary for acquisition, installation, operation, and maintenance of new light-duty zero-emission EVSE. This requires cost' share for all types of EV-charging equipment and chosen locations to maximize the total deployment of the equipment. The number of stations deployed is dependent on the type of equipment to be purchased. No solicitation has been opened yet.
Kentucky	$20,378,650	$3,056,797	Yes	$3,056,797	No	Possibly	The 2020 General Assembly has developed an approved spending plan and appropriated funds in fiscal year 2020-2021 to administer under the VW settlement beginning July 1, 2020. Based on the General Assembly's approved plan, The Kentucky Energy and Environment Cabinet has revised the beneficiary mitigation plan to reflect the spending authority provided by the legislature.
Louisiana	$19,848,805	$2,977,321	No	$0	No	No	Spending funds on replacing old diesel buses, trucks, and equipment in the state

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Maine	$21,053,064	$3,157,960	Yes	$3,157,960	No	No	Unclear whether the final plan is in place. No funding solicitations currently open for EVSE (or other projects)
Maryland	$75,714,238	$11,357,136	No	$11,357,136	No	Possibly	EVSE funds will be available along federally designated alternative fuel corridors. No funding solicitations for EVSE have been opened yet, but comments have been solicited and the comment period is open until October 12, 2020.
Mass-achusetts	$75,064,424	$11,259,664	Yes	$11,259,664	Partially	Possibly	The state is making $2 million available for public charging stations; $6,250 per port up to $50,000 per address and funding up to 80% of costs; solicitation closed in March 2019.
Michigan	$64,807,015	$9,721,052	Yes	$9,721,052	No	Possibly	Funding will be provided in the form of matching grants for: (1) 50-150 kWh DCFC equipment and accessories including, but not limited to, charger stand, charge cord, power outlet, battery storage, backup power, and software; and (2) hydrogen fuel-cell dispensing equipment. Solicitation for these projects expected to open up between now and the end of 2021.
Minnesota	$47,001,661	$7,050,249	Yes	$7,050,249	Partially	Possibly	State has already funded 47 charging stations in Phase 1 of its funding. In Phase 2, which will run from 2020-2023, it will use $3.5 million in funding for developing 43 DCFC and 104 L2 charging ports. Applicants will be reimbursed up to 80% of total eligible project costs or up to $65,000 per 50 kW charging station installations. Applicants will be required to apply for installation of the entire corridor including DCFC stations on multiple roadways. Grantees building fast-charging stations along corridors shall install them at approximately 15- to 70-mile increments along identified roadways approximately two miles or less from the exit. Fast-charging stations must be a minimum of 50 kW. Minnesota Pollution Control Agency may require the installation to include adequate electrical conduit at each station for future upgrades up to 350 kW and space for extending the parking pad.
Miss-issippi	$9,874,414	$1,481,162	No	$0	No	Possibly	No solicitations have been released yet

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Missouri	$41,152,052	$6,172,808	Yes	$6,172,808	No	Possibly	Solicitation open until October 15, 2020: State looking to install DCFC along highway corridors; for each site location, up to 80% of the project cost may be funded, regardless of placement on either government-owned or privately-owned property.
Montana	$12,602,425	$1,890,364	Yes	$1,890,364	No	Possibly	$78,294 available in current funding solicitation available until August 31, 2020, for EVSE.
Nebraska	$12,248,347	$1,837,252	Yes	$1,800,000	Partially	Yes	State has funded $1.18 million in EVSE projects for 35 new electric vehicle charging locations in 18 Nebraska counties.
Nevada	$24,874,024	$3,731,104	Yes	$3,731,104	No	Possibly	
New Hampshire	$30,914,841	$4,637,226	Yes	$4,637,226	No	No	Current solicitation, which closed July 13, 2020, focused on L2 chargers at government properties. A previous solicitation focused on DCFC chargers closed January 24, 2020.
New Jersey	$72,215,085	$10,832,263	Yes	$10,832,263	Partially	Possibly	$3.2 million in project funding so far disbursed under Phase 1. DEP will also dedicate an additional $7.6 million for EV-charging infrastructure including fast chargers. In another round of funding, state dedicating $7.6 million under its It Pay$ to Plug In program for L1, L2, and DCFC chargers. Solicitation closed July 22, 2020.
New Mexico	$17,982,661	$2,697,399	Yes	$2,697,399	Yes	No	
New York	$127,701,807	$19,155,271	Yes	$19,200,000	No	Possibly	$19.2 million in funding for light-duty ZEV EVSE and hydrogen fueling stations. Department of Environmental Conservation will use the 15% maximum funding allowed for these statewide projects.
North Carolina	$92,045,658	$13,806,849	Yes	$13,806,849	Partially	Possibly	Phase 1 application process closed, and the state expected to announce recipients in summer 2020; $3.45 million to be awarded; only DCFC was included in Phase 1. Phase 2 solicitation and timing has not been announced yet.
North Dakota	$8,125,000	$1,218,750	No	$1,193,955	Yes	No	State has fully funded EVSE portion of the settlement.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Ohio	$75,302,523	$11,295,378	Yes	$11,295,378	No	Yes	On July 1, 2020, Ohio Environmental Protection Agency released a Request for Applications for funding to install L2 EVCS at publicly available locations. State plans to release a second one for DCFCs in February 2021. EV alternative fuels corridor locations will receive priority.
Oklahoma	$20,922,485	$3,138,373	Yes	$3,138,373	Partially	Possibly	DEQ is announcing a second round (FY 2021) of $1.1 million to target 15 locations to continue expanding the electric charging network in Oklahoma. This program will reimburse up to 80% of the cost for charging station projects. The first round focused on two transportation corridors and single-point locations. A previous solicitation in 2019 funded $1.8 million for L2 and DCFC chargers.
Oregon	$72,967,518	$10,945,128	No	$10,945,128	No	Possibly	The Oregon legislature in SB 1008 (2017) authorized the Department of Environmental Quality to receive and manage funds from the VW settlement. The legislature authorized only a specific project focus, retrofitting exhaust controls, or replacing a select number of diesel school buses. The Oregon legislature convened in 2019 and provided additional priorities and criteria for selection of future mitigation actions. HB 2007 authorizes DEQ to fully disburse Oregon's remaining environmental mitigation funds. DEQ will complete an administrative rulemaking for the grant program to specify application requirements, project selection criteria, and other requirements pursuant to the preferences included in statute. Estimated rulemaking timeline will be complete in late 2020. Estimated grant program launch is early 2021.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Pennsylvania	$118,569,540	$17,785,431	Yes	$17,785,431	Partially	Possibly	DEP awarded $1.2 million in funding to five recipients under the calendar year 2018-2019 DC Fast Charging and Hydrogen Fueling Grant Program, totaling $1,244,316. This will fund the installation of publicly available DCFC for EVs in five locations in southeastern and southwestern Pennsylvania. As of June 14, 2019, DEP has approved, and submitted for payment, rebate redemption requests totaling $226,913 for 12 rebate recipients (19 vouchers). This will fund the installation of 54 L2 charging stations for EVs. The state has opened another solicitation worth $10 million on July 2, 2020, for DCFC and hydrogen fueling stations.
Rhode Island	$14,368,858	$2,155,329	Yes	$2,155,329	Partially	Possibly	Goal is to add at least 15-30 DCFC stations throughout the state with focus on I-95 alternative fuel corridor, with consideration of geographic diversity. As of January 6, 2020, funding for L2 workplace and L2 publicly accessible charging station incentives has been fully subscribed, but funding is still available for DCFC stations. For public DCFC, the lesser of 80% of project costs or caps of $25,000 per station and $50,000 per site location will apply. For entities applying for incentives across multiple site locations, there is a total award cap of $100,000.
South Carolina	$33,895,491	$5,084,324	No	$0	No	No	Funding awards to date have focused on replacing diesel school and transit buses.
South Dakota	$8,125,000	$1,218,750	No	$0	No	No	The state may fund EVSE at 5% but has focused efforts so far on replacing diesel trucks.
Tennessee	$45,759,914	$6,863,987	Yes	$6,863,987	No	Possibly	State has conducted a needs assessment for EVSE and has issued a request for information, which closed in November 2019. No solicitations have been released yet.
Texas	$209,319,164	$31,397,875	Yes	$31,397,875	No	Possibly	State has not yet opened a solicitation for EVSE but plans to in July 2020 for L2 EVSE and February 2021 for DCFC and hydrogen fueling stations. The state will cost share up to 70% for EVSE.

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

STATE	TOTAL VW SETTLEMENT ALLOCATION	POTENTIAL 15% TOTAL ALLOCATION	USING THE FULL 15% ALLOCATION?	AMOUNT DEDICATED TO EVSE UNDER STATE PLAN	EVSE PROJECTS FUNDED?	APPLICABLE TO PUBLIC CHARGING?	NOTES
Utah	$35,177,506	$5,276,626	No	$3,869,526	Partially	No	Plan was finalized in 2018. State has awarded $3.8 million for L2 and DCFC to government entities.
Vermont	$18,692,130	$2,803,820	Yes	$2,803,820	Partially	Possibly	In 2019, the EVSE grant program received 141 applications in two grant rounds, requesting over $4 million in funding. Thirty projects were awarded over $1 million in funding to install 75 L2 and five DCFC units located in state designated centers, highway corridors, public park and rides, major attractions and institutions, multi-family housing, and workplaces. The remaining $1.7 million in VW funding, with an additional $280,000 of Vermont Agency of Transportation funding, will support the installation of DCFC stations at priority locations on highway corridors helping to fill out geographic gaps in the EVSE network. RFPs for the next round were supposed to have been announced in spring 2020, but that does not appear to have occurred.
Virginia	$93,633,980	$14,045,097	Yes	$14,045,097	Yes	No	$14 million was allocated to EVSE; EVgo won the contract to install LDV EVSE network in August 2018.
Wash-ington	$112,745,650	$16,911,848	Yes	$16,911,848	Partially	Yes	Over $924,000 awarded so far to government chargers; in another round of funding, $4.5 million will be allocated for L2 and DCFC along high-traffic corridors, and awards were made in May 2020.
West Virginia	$12,131,842	$1,819,776	No	$606,592	No	Possibly	Has not opened any solicitations for EVSE at this time
Wisconsin	$67,077,458	$10,061,619	Yes	$10,061,619	No	Possibly	2019 Wisconsin Act 9 (2019-21 Enacted Budget) and Governor Tony Evers' Veto Message direct the Department of Administration to spend up to $10 million in VW settlement trust funds for EVCS grants. The VW Mitigation Program administers the grant program. No solicitation has been opened at this time.
Wyoming	$8,125,000	$1,218,750	No	$0	No	No	State focusing on replacing buses and trucks

Source: Compiled by Transport Energy Strategies, July 2020

APPENDIX F

Summary of Canadian Policies

APPENDIX F: SUMMARY OF CANADIAN POLICIES

PROVINCE/CITY	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES
British Columbia	2		"A person is exempt from Part 3 of the UCA with respect to the sale, delivery or provision of electricity for EV charging services to or for the public or a corporation for compensation, except for the provisions of sections 25 and 38 relating to safety only, in the class of cases where the person is not otherwise a public utility under the UCA." (Reference British Columbia Ministerial Order M104/2019)
Vancouver	2	For a commercial building or commercial component of a multiple-use development with 10 or more parking spaces, a minimum of one parking space for every 10 parking spaces, plus one space for any additional parking spaces that number less than 10, shall be provided with an energized outlet capable of providing L2 charging or higher to the parking space. For a commercial building or commercial component of a multiple-use development with less than 10 parking spaces, a minimum of one parking space shall be provided with an energized outlet capable of providing L2 charging or higher to the parking space. (Reference Parking Bylaw 6059, Bylaw No. 12156, 2018) All references to the electrical installation including receptacle, supply equipment, and rating of voltage and ampere in Article 10.3.1.1. are intended to align with the requirements of SAE AC L2 charging requirements, whether in applying load-managed solutions or separate branch circuits for each charging point. In addition to the requirements of Article 10.3.1.1., the installation of EV-charging systems and EVSE must meet the requirements of the Canadian Electrical Code, Part I and the manufacturer's instructions. (Reference Building Bylaw No. 12511 Sec. 10.3, 2019)	(1) In the case of an EVCS designed to accept payments via a network subscription, tap the appropriate RFID EV network card on the appropriate part of the EVCS and connect the EV to the EVCS via conductive or inductive means to initiate a charging session; (2) In the case of an EVCS designed to accept payments via a smartphone application, use the smartphone application appropriate to the EVCS and connect the EV to the EVCS via conductive or inductive means to initiate a charging session; (3) In the case of an EVCS designed to accept payments via an RFID-enabled credit card, tap the credit card on the appropriate part of the EVCS and connect the EV to the EVCS via conductive or inductive means to initiate a charging session; or (4) In the case of an EVCS designed to accept credit card payments by phone, call the phone number printed on the EVCS and provide the appropriate details to initiate a session, and connect the EV to the EVCS via conductive or inductive means to initiate a charging session. (5) The initial metered rates for all L2 charging stations in an existing meter zone shall, prior to adjustment in accordance with this Section 5A, be the metered rate for that block plus an additional $2.00 per hour. (6) The initial metered rates for all L2 charging stations not in an existing meter zone shall, prior to adjustment in accordance with this Section 5A, be $2.00 per hour. (7) The initial metered rates for all DCFC stations with a nominal power output of 50 kW in an existing meter zone shall, prior to adjustment in accordance with this Section 5A, be the metered rate for that block plus an additional $16.00 per hour. (8) The initial metered rates for all DCFC stations with a nominal power output of 50 kW not in an existing meter zone. (Bylaw No. 11866, 2017)

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Summary of Volkswagen Settlement Incentives *(Continued from previous page)*

PROVINCE/CITY	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES
Toronto	3	The Toronto Green Standard outlines sustainable design requirements for new private and city-owned developments. The Toronto Green Standard includes mandatory (Tier 1) and voluntary (Tiers 2–4) guidelines. They include standards for charging infrastructure including mandatory requirements for the installation of charging infrastructure and EV-capable parking spots in new developments. Tier 1 performance measures are mandatory and require charging units in 20% of parking spaces in mid to high-rise and commercial buildings, and 100% of parking spaces must be designed EV capable. There is an optional 25% requirement. (Reference PG23.9, 2017)	
Québec	3		The rates for using the public DCFC service for EVs are set at $10.25 per hour for the use of a 50 kW fast-charging station. (Reference Chapter H-5, r. 1 Regulation respecting the rates for using the public fast-charging service for electric vehicles, Hydro-Québec Act, Chapter H-5, s. 22.0.2, 2019)
Federal		The 2018 Canadian Electric Code includes the following requirements: • Voltages of EV supply equipment must not exceed 750 V. • A sign is required warning against the operation of the EVSE without sufficient ventilation, where the manufacturer's installation instructions require it. • EVSE must be supplied by a separate branch circuit that supplies no other loads except associated ventilation equipment, or from a branch circuit supplying another load or loads, provided that an EV energy management system is installed in accordance with other provisions in the code. • The connected load of a circuit supplying EVSE and associated ventilation equipment be considered as continuous. • Requires that each installation of EVSE rated at 60 A or more, or more than 150 volts-to-ground, be provided with a separate disconnecting means (1) on the supply side of the point of connection of the EVSE; (2) located within sight of and accessible to the EVSE; (3) capable of being locked in the open position.	

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Summary of Canadian Policies *(Continued from previous page)*

PROVINCE/CITY	GROUP	INSTALLATION-RELATED POLICIES	OPERATION-RELATED POLICIES
Federal *Continued*		• Each receptacle for EV charging be a single receptacle of CSA configuration 5–20 R supplied from a 125 V branch circuit rated not less than 20 A, protected by a Class A ground-fault circuit interrupter if installed outdoors within 2.5 meters of finished grade (1) of the appropriate CSA configuration in accordance with Diagram 1 or 2 when supplied from a branch circuit rated at more than 125 V or more than 20 A and (2) labeled in a conspicuous, legible, and permanent manner, identifying it as an EVSE receptacle. • Where an EVSE and other parts of a system, either on board or off board the vehicle are identified for and intended to be (1) interconnected to a vehicle and serve as an optional standby system, or (2) an electric power production source, or (3) provide for bi-directional power feed, and (4) be marked accordingly and meet the requirements of relevant provisions of the code. • code addresses indoor charging sites and permits them to include (1) integral, attached, and detached residential garages; (2) enclosed or underground parking structures, (3) repair and non-repair commercial garages, agricultural buildings, and similar rooms, or (4) other locations where the EV connector can couple to the EV. • where the EVSE requires ventilation, that (1) adequate ventilation be provided in each indoor charging site as specified in the code, (2) the EVSE be electrically interlocked with the ventilation equipment so that the ventilation equipment operates with the EVSE, (3) if the supply to the ventilation equipment is interrupted, the EVSE be made inoperable. • Addresses outdoor charging sites and permits them to include: (1) residential carports and driveways, (2) curbsides, (3) open parking structures, (4) parking lots, (5) commercial charging facilities, (6) similar locations.	

Source: Compiled by Transport Energy Strategies, July 2020

Abbreviations

AC	Alternating current
ADA	Americans with Disabilities Act
AHJ	Authority having jurisdiction
CALGreen	California Green Building Standards Code
CARB	California Air Resources Board
CBC	California Building Code
CDP	Coastal development permit
CEO	Colorado Energy Office
CHAdeMO	Charge de Move
CI	Carbon intensity
CNG	Compressed natural gas
CPUC	California Public Utilities Commission
DC	Direct current
DCFC	Direct current fast charging/charger
DEP	Department of Environmental Protection
DEQ	Department of Environmental Quality
DMS	California Division of Measurement Standards
DOE	U.S. Department of Energy
EV	Electric vehicle
EVCS	Electric vehicle charging station(s)
EVSE	Electric vehicle supply equipment
EVSP	Electric vehicle service provider
EXDF	EXDF
IOU	Investor-owned utility
ISA	International Symbol of Accessibility
kW	Kilowatt
kWh	Kilowatt hour
L2	L2 charging
LCFS	Low Carbon Fuel Standard
LDV	Light-duty vehicle
MJ	Megajoule
MOU	Memorandum of Understanding
MSA	Metropolitan statistical areas
MUD	multi-unit dwelling
NIST	National Institute of Standards and Technology
NOx	Nitrogen oxides
NYSERDA	New York State Energy Research and Development Authority
PG&E	Pacific Gas & Electric
PEV	Plug-in electric vehicle
PHEV	Plug-in hybrid electric vehicle
PUC	Public utility commission
REV West	Regional Electric Vehicle Plan for the West
RFID	Radio frequency identification
RFP	Request for proposal
SAE	Society of Automotive Engineers
TEF	Transportation electrification framework
TEP	Transportation electrification plan
TOU	Time-of-use
VGI	Vehicle-to-grid
VW	Volkswagen
WSDOT	Washington State Department of Transportation
ZEV	Zero-emission vehicle

Fuels Institute

EVC ELECTRIC VEHICLE COUNCIL

About the Electric Vehicle Council

The Electric Vehicle Council is a non-advocacy organization whose mission is to coordinate the efforts of organizations actively engaged in supporting the deployment of EV charging infrastructure. The EV Council works to distribute existing research and education materials to amplify and enhance its value to the market, as well as conducts original research to fill gaps in knowledge and further educate interested stakeholders concerning the opportunities, challenges, and successful strategies associated with the installation and operation of EV charging stations.

For more information on the Electric Vehicle Council and a current list of members, please visit: fuelsinstitute.org/Councils/Electric-Vehicle-Council

About the Fuels Institute

The Fuels Institute, founded by NACS in 2013, is a 501(c)(4) non-profit research-oriented think tank dedicated to evaluating the market issues related to vehicles and the fuels that power them. By bringing together diverse stakeholders of the transportation and fuels markets, the Institute helps to identify opportunities and challenges associated with new technologies and to facilitate industry coordination to help ensure that consumers derive the greatest benefit.

The Fuels Institute commissions and publishes comprehensive, fact-based research projects that address the interests of the affected stakeholders. Such publications will help to inform both business owners considering long-term investment decisions and policymakers considering legislation and regulations affecting the market. Research is independent and unbiased, designed to answer questions, not advocate a specific outcome. Participants in the Fuels Institute are dedicated to promoting facts and providing decision makers with the most credible information possible so that the market can deliver the best in vehicle and fueling options to the consumer.

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