Electric Vehicle Council

Powered by Fuels Institute

A BEST PRACTICE GUIDE FOR

EVSE Regulations

OCTOBER 2022

Tammy Klein
Founder & CEO
Transport Energy Strategies

www.transportenergystrategies.com

EXECUTIVE SUMMARY

Regulatory Best Practices

As the electric vehicle (EV) market continues to grow in the U.S., so does infrastructure. According to the U.S. Department of Energy, there are (as of December 2021) 45,846 total charging station locations with 112,048 ports (90,813 level 2 (L2) and 21,235 direct current fast charging (DCFC)).[1] EV drivers currently do about 80% of their vehicle charging at home, but this is expected to change as the market continues to grow.[2] There is growing interest in the potential to develop public EV-charging stations (EVCS) at workplaces, fuel stations, retailers, and other sites. Utilities, states, and localities are providing funding for infrastructure expansion at these kinds of sites, and $7.5 billion in federal funding is planned specifically to help achieve the Biden administration's 500,000 nationwide charger goal under the Infrastructure Investment and Jobs Act (IIJA).[3]

As shown in the *EV Market Regulatory Report* produced by the Fuels Institute in March 2021, a patchwork of requirements has been developed across the country among states, their public utility commissions, localities (county and cities), and now the federal government with IIJA funding. Several states, such as California, have been on the forefront of developing and implementing policies to encourage the uptake of the EV market and the spread of public EV charging.[4] Many localities around the country are beginning to follow.

However, the research for that report also revealed that most states and localities that were surveyed had little to no policies at all respecting public EV charging. This is expected to change quickly in the next several years as states and localities recognize the need to prepare for the rise in electrification and receive funding from different sources. One of those sources has been the Volkswagen Dieselgate settlement to the states, which many states are using to expand infrastructure.[5] Many state and local officials for the first time will have to consider developing and implementing policies to expand infrastructure.

1 "Electric Vehicle Charging Station Locations," Alternative Fuels Data Center, U.S. Department of Energy, accessed Dec. 9, 2021, https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC&ev_levels=dc_fast&ev_levels=3.

2 "Charging at Home," Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, accessed May 4, 2021, https://afdc.energy.gov/fuels/electricity_charging_home.html.

3 Infrastructure Investment and Jobs Act, H.R. 3684 (became Public Law No: 117-58 on November 15, 2021), available at https://www.congress.gov/bill/117th-congress/house-bill/3684/text.

4 Fuels Institute, EV Market Regulatory Report, March 2021, https://www.fuelsinstitute.org/Research/Reports/EV-Market-Regulatory-Report.

5 Infrastructure Investment and Jobs Act, H.R. 3684.

This guide has been prepared to help these officials and other readers understand in brief form the policy landscape in the U.S. at both the state and local levels, noting the types of policies that have been set and providing several examples of how different authorities having jurisdiction (AHJ) have implemented them. Policy topics addressed in this guide include the following:

- **states**
  - defining *public utility* and allowing kWh charging
  - installation-related policies
  - operation-related policies
  - EV-charging incentive programs
  - utility-related policies
- **localities**
  - expedited permitting requirements
  - parking requirements
  - EV-ready building code requirements
  - signage requirements
  - technical requirements

The guide concludes with best practice recommendations from regulated entities themselves, that is, stakeholders that have accumulated years of experience installing and operating EV-charging infrastructure around the U.S. Stakeholders from the EV-charging industry, fuel retailing, utility, and metropolitan planning organizations (MPOs) shared their expertise and actionable and practical recommendations as AHJs begin to develop and implement EV-charging policies. These recommendations include the following:

- Do not wait for federal funding to begin planning for the future expansion of charging, even if EV uptake in an AHJ is limited right now.
- Localities, particularly within a metropolitan area, but ideally at the state (and even federal) level, should consider harmonizing policies, particularly respecting permitting and other aspects affecting the installation and operation of charging infrastructure.

- Localities and states should take the lead in coordinating among themselves and with stakeholders now to begin discussing, developing, and implementing charging policies. Utilities should be engaged as an important stakeholder and partner as part of this effort.
- Localities may need to review their comprehensive plan, zoning, and land-use code to eliminate unintended barriers to charging.
- State public utility commissions (PUCs) should address issues surrounding cost recovery, time of use (TOU), and demand charges.
- States, following California and New Jersey's lead, should consider implementing expedited and streamlined permitting policies. In the absence of a state action, localities should consider developing and implementing such a policy to help facilitate the installation of EVCS. Similarly, localities can adopt EV-ready/EV-capable building codes to help facilitate the expansion of charging and better enforce parking regulations that impact consumers' ability to charge.
- Policies should take into account the issue of equity, and localities should remember rural areas. Localities may want to review resource materials from the Justice40 Initiative, led by the U.S. Department of Transportation.[6]
- States and/or localities can consider developing a reliability standard to ensure that EVCS downtime is kept to a minimum.
- Incentives to help site hosts new to public EV charging reduce risk is key.

These recommendations are discussed in greater depth and with additional insight in the final section of this guide.

This report was written before the National Electric Vehicle Infrastructure (NEVI) formula program requirements were released in February 2022. However, a number of topics addressed in NEVI are directly addressed in this report, such as EVCS installation and operation. This report is meant as a complement to these federal efforts and provides, in addition, real-world experience and guidance from government and industry with years of experience in the charging space.

6 "Justice40 Initiative," U.S. Department of Transportation, last updated November 18, 2021, https://www.transportation.gov/equity-Justice40. See also Argonne National Laboratory, "Electric Vehicle Charging Equity Considerations," at https://www.anl.gov/es/electric-vehicle-charging-equity-considerations.

CONTENTS

INTRODUCTION

The *EV Market Regulatory Report* included an analysis to identify commonalties and differences in states as well as more than 100 cities and counties. That analysis found that 35 states have addressed issues related to the pricing of charging (allowing kilowatt-hour (kWh) pricing) and that 29 states have made it clear in policy that charging site hosts are not public utilities subject to that industry's regulatory regime.

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 electric vehicle supply equipment (EVSE). California, by far, has the most developed regulatory regime.

Localities have tended to address issues such as siting/zoning, station design, parking, and signage. Out of 100 localities surveyed for the 2021 report, 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. Within metropolitan statistical areas, the lens used to evaluate these cities and counties, there was a lack of alignment on issues generally related to EVSE installation, including permitting. Even in California, not all cities have yet adopted requirements set by the state respecting expedited and streamlined permitting. Correcting this inconsistency is one stated intent behind the enactment of the policy.

Policy topics addressed below include the following:

- **states**
  - defining *public utility* and allowing kWh charging
  - installation-related policies
  - operation-related policies
  - EV-charging incentive programs
  - utility-related policies
- **localities**
  - expedited permitting requirements
  - parking requirements
  - EV-ready building code requirements
  - signage requirements
  - technical requirements

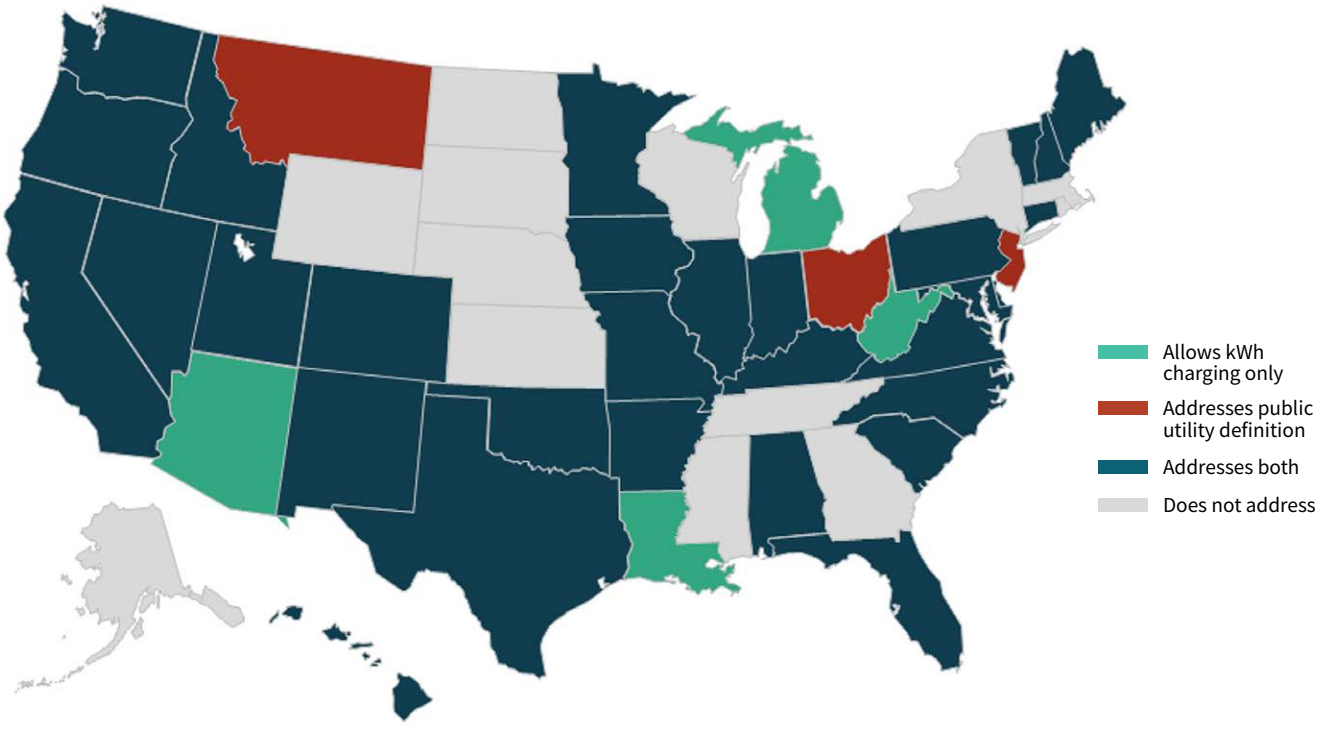
EXAMPLES OF STATE POLICIES

The sections below provide an overview and examples of policies that states have set respecting the definition of *public utility* and allowing kWh charging, installation- and operation-related policies, incentive programs, and utility-related policies.

PUBLIC-UTILITY DEFINITION AND ALLOWING KILOWATT-HOUR CHARGING

More than 30 states have addressed two common issues (Figure 1). The first is clarifying that an EVSE site host is not a public utility and thus not subject to the regulatory regime that governs utilities. The regulatory regime is not applicable and it would prove burdensome to those entities looking to develop EV-charging sites. The second is allowing site hosts to charge by the kWh, which may be more transparent for EV drivers. It is important to note that 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 utilities or prohibited third-party deployments for that reason.

FIGURE 1: STATES ADDRESSING KILOWATT-HOUR CHARGING AND PUBLIC-UTILITY DEFINITION ISSUES



INSTALLATION-RELATED POLICIES

Installation-related policies cover issues such as siting; permitting; parking; site design (including compliance with Americans with Disability Act (ADA) requirements); property flow; curb cuts; and proximity of charging equipment to other equipment on-site, such as petroleum dispensers. Additional policies include requirements and processes for construction and installation of EVSE, as well as engagement with the local utility.

According to the Fuels Institute Electric Vehicle Council's *EV Market Regulatory Report* (2020), 10 states have adopted such policies.[7] Some states, such as Massachusetts, have installation requirements tied to EV-infrastructure incentive programs. Still other states have taken a direct approach with detailed policies. Several examples of state approaches follow in Table 1.

TABLE 1: EXAMPLES OF STATE APPROACHES ON POLICIES GOVERNING EVSE INSTALLATION

STATE	SUMMARY OF POLICY
California	The state has adopted an expedited permitting policy under state legislation (AB 1236) that localities in the state must adopt. Cities and counties must adopt an ordinance that creates an expedited and streamlined permitting process for EVSE. Each city or county must consult with the local fire department or district and the utility director to develop the ordinance, which must include a checklist of all requirements for EVSE to be eligible for expedited review. AB-1236 requires the following: • Localities must enact ordinances creating an expedited, streamlined permitting process for EVCS including L2 and DCFC. • A checklist of all requirements needed for expedited review must be posted on each locality's website. • EVCS projects that meet the 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 plug-in electric vehicle (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. • 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. 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. It should be noted that a visual hazard is different from a visual impairment. *California continued on the next page*

Table 1 continued on the next page

7 Fuels Institute, *EV Market Regulatory Report*, 3.

Table 1 continued from the previous page

STATE	SUMMARY OF POLICY
California *continued from the previous page*	In California, EVCS permit applications are supposed to be approved through a truncated permitting process. EVCS permit applications will usually be reviewed for compliance with building, electrical, accessibility, and fire safety regulations. The permit applications may also receive public safety, structural, and engineering reviews based on the processes and organizational structure of the locality. If possible, these reviews are done concurrently.[8] Other recent legislation (AB 970) assigns specific timelines for permitting review and deems an application approved if timelines are not met. [9]

Illinois	Prior to installation of an EVCS, the retail customer shall provide notice in writing to the servicing electric utility of plans to install an EVCS that includes the following:
	• the name, address, and electric utility account number of the retail customer who owns, uses, operates, or maintains the EVCS
	• the location of the EVCS
	• when an EVCS is to be installed by an installer, maintainer or repairer (IMR):
	  • the business name, address, and phone number of the IMR that is the certificate holder
	  • the Commission docket number in which the IMR obtained a certificate from the Commission
	• the load and technical specifications of the charging stations
	• whether the charging station is for personal or commercial use[10]

Massachusetts	Massachusetts is an example of a state that has attached installation requirements as a condition of receiving grant funds to develop EVSE. Its Massachusetts Electric Vehicle Incentive Program (MassEVIP) provides funding for both fleet EVs and the development of EVSE. Among other requirements, applicants must: • allow the general public to have practical access to, and use of, the parking space and the EVCS for a minimum of 12 hours per day at the location identified in the application and describe such access in the application • ensure the EVCS location is designed to protect the equipment from physical damage, which includes curbs, wheel stops, setbacks, bumper guards, and bollards • ensure the charging station parking space and area around the charging station is maintained, including snow removal and general cleaning • install directional signage to the EVCS location, starting at the entrance of the parking area • ensure the station can charge EVs produced by multiple manufacturers • comply with ADA requirements and ensure that at least 5% of the site's EV-charging spaces, but not less than one such space, be accessible to persons with disabilities[11]
Minnesota	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 Society of Automotive Engineers; 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.[12]

Table 1 continued on the next page

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; California Governor's Office of Business and Economic Development, *Electric Vehicle Charging Station Permitting Guidebook*, July 2019, https://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf.

9 California AB 970 (approved October 8, 2021) at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB970.

10 83 Illinois Administrative Code § 469.120 (2020).

11 Massachusetts Department of Environmental Protection, *MassEVIP Public Access Charging (PAC) Program Requirements,* December 4, 2020, accessed Aug. 31, 2021, https://www.mass.gov/doc/massevip-public-access-charging-requirements/download.

12 Minnesota Statutes §§ 325F.185, 326B.35 (2020).

Table 1 continued from the previous page

STATE	SUMMARY OF POLICY
Oregon	The legislature enacted legislation requiring the development of a statewide EVSE permit and inspection protocol regulations. 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.[13]

Source: Compiled by Transport Energy Strategies, August 2021

13 Revised Code of Washington § 19.27.540 (2021).

OPERATION-RELATED POLICIES

Operation-related policies govern issues such as 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. According to the Fuels Institute Electric Vehicle Council's EV Market Regulatory Report (2020), five states have adopted such policies.[14] Several states address operation-related questions that include requiring multiple payment options and/or prohibiting subscriptions plans (Table 2).

TABLE 2: EXAMPLES OF STATE APPROACHES ON POLICIES GOVERNING EVSE OPERATION

STATE	SUMMARY OF POLICY
California	EVSE service providers may not charge a subscription fee or require membership for use of their public charging stations. In addition, providers must disclose the actual charges for using public EVSE at the point of sale; allow at least two options for payment; and disclose the EVSE geographic location, schedule of fees, accepted methods of payment, and network roaming charges to the National Renewable Energy Laboratory. Exceptions apply. Also, the California Air Resources Board has adopted interoperability billing standards for network roaming payment methods for EVSE. Providers would be required to meet these standards within one year of adoption. For new AC chargers after January 2021 and DC chargers after 2023, the state requires EVSE to be type certified and field verified to ensure that a kWh dispensed equals a kWh received.[15]
Connecticut	Owners and operators of public EVSE that require payment must allow multiple payment options to allow public access. 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.[16]
New Hampshire	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.[17]

Source: Compiled by Transport Energy Strategies, August 2021

14 Fuels Institute, *EV Market Regulatory Report*, 3.

15 California Health and Safety Code §§ 44268, 44268.2 (2020); California Air Resource Board, *EVSE Standards Regulation, Final Order,* June 2020, available at https://ww2.arb.ca.gov/our-work/programs/electric-vehicle-supply-equipment-evse-standards; 4 California Code of Regulations §§ 4001, 4002.11 (2020).

16 Connecticut General Statutes § 16-19ggg (2016).

17 New Hampshire Revised Statutes § 236:131 (2020).

EV-CHARGING INCENTIVE PROGRAMS

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 Volkswagen Clean Air Act Civil Settlement. Table 3 provides examples of the types of incentives some states have offered to support EVSE scale up.

TABLE 3: EXAMPLES OF STATE APPROACHES ON INCENTIVE POLICIES TO SUPPORT EVSE SCALE UP

STATE	SUMMARY OF POLICY
Arkansas	The Arkansas Department of Energy & Environment 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 exceed $900; or • not more than 50% of the eligible equipment purchase and installation cost of the public EVCS, not to exceed $5,000.[18]
Oklahoma	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 alternative-fuel vehicles.[19]
Texas	The Texas Commission on Environmental Quality (TCEQ) administers the Alternative Fueling Facilities Program (AFFP) as part of the Texas Emissions Reduction Plan (TERP). AFFP provides grants for 50% of eligible costs, up to $600,000, to construct, reconstruct, or acquire a facility to store, compress, or dispense alternative fuels in the Clean Transportation Zone, including electricity for EV charging.[20]
Washington	The Washington State Department of Transportation 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.[21]

Source: Compiled by Transport Energy Strategies, August 2021

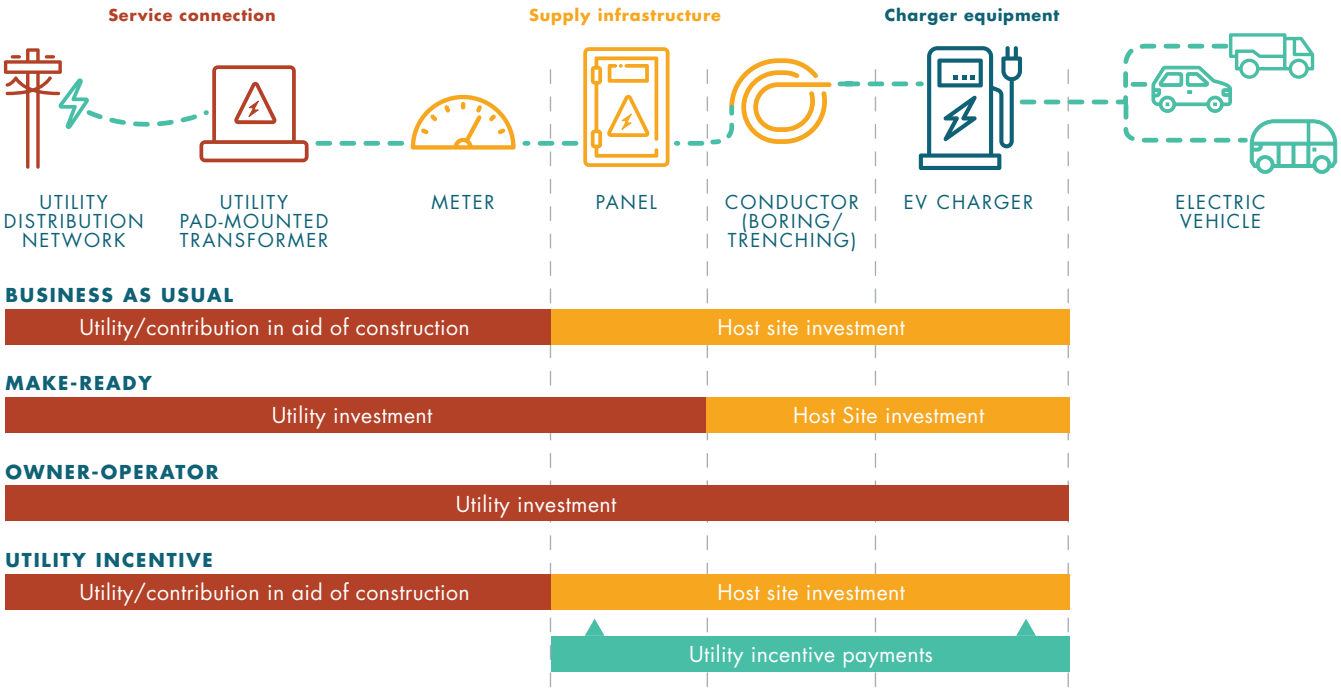
18 Administrative Code of Arkansas § 15-10-903 (2020).

19 Oklahoma Statutes § 68-2357.22 (2014).

20 Texas Statutes Health and Safety Code 386 (2019) and Texas Administrative Code 14.660-114.662 (2021).

21 Revised Code of Washington 47.04.350 (2019).

FIGURE 2: EV-CHARGING INFRASTRUCTURE UTILITY MODELS



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

UTILITY-RELATED POLICIES

States have also set policies respecting the utility's role in EV charging, also known as utility engagement. This does not include PUC or public service commission (PSC) decisions, which will be covered in more detail below. The most common public charging issues state legislatures are addressing related to utilities pertain to setting rates, requiring utilities to submit transportation electrification plans (TEPs) that detail how they will help the state achieve its electrification goals, and addressing the role of utilities in charging. This includes PUC/PSC and/or legislative discussions on the use of existing ratepayer dollars directed toward expanding EV-charging infrastructure and whether that may impact the competitive marketplace for charging as a service. With respect to the latter, several states have and continue to consider whether utilities can own and operate charging stations as well as expanding customer access to EV

charging through the direct deployment of charging infrastructure. 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. These three approaches are summarized in Figure 2.

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, which enables charging readiness for site hosts.[22] Such a solution may address upfront cost barriers and make charging infrastructure cost competitive for public charging market participants.[23]

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.[24] Some states also are considering 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.[25] 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 technology.[26]

22 Matthew Rogotzke, Garrett Eucalitto, and 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.

23 Rogotzke et al., 14.

24 Rogotzke et al., 14.

25 Rogotzke et al., 14.

26 Rogotzke et al., 14.

Several states via legislation have directed utilities to develop, or PUCs to oversee, the development of TEPs. 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 4 shows examples of types of state policies related to utility engagement.

TABLE 4: EXAMPLES OF STATE APPROACHES ON UTILITY ENGAGEMENT POLICIES

STATE	SUMMARY OF POLICY
Colorado	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 (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. Public electric utilities were required to file an application with the commission for widespread transportation electrification programs within their respective service territories by May 15, 2020, and every three years thereafter. Programs may include: • investments or incentives to facilitate the deployment of customer- or utility-owned EVSE and associated electrical equipment • facilitating electrification of public transit and other vehicle fleets • rate designs or programs that encourage PEV charging • customer education, outreach, and incentive programs that increase awareness of transportation electrification[27]
Connecticut	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.[28]
New Mexico	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.[29]
Utah	The Utah PSC is authorized to establish a large-scale EVSE program with a maximum cost of $50 million. 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.[30]

Source: Compiled by Transport Energy Strategies, August 2021

27 Senate Bill 19, 077 (2019) and Colorado Revised Statutes 41-1-103.3, 41-3-116, and 40-5-107 (2021).

28 Connecticut General Statutes 16-19f (2021).

29 New Mexico House Bill 521, 2019, and New Mexico Statutes 62-3 (2021).

30 Utah House Bill 396 (2020) and Utah Code 54-4-41 (2018).

Much of the action and engagement with respect to charging generally is happening at the regulatory level in respective states' PUCs, which have considered hundreds of filings in the last few years from utilities on a range of EV-related issues, including charging, different types of incentives, rates, and others. Table 5 summarizes select examples of utility rate designs that have been approved by PUCs in several states.

TABLE 5: EXAMPLES OF STATE PUC APPROACHES ON UTILITY RATE DESIGNS FOR EV-CHARGING

STATE	SUMMARY OF POLICY
Arizona	Tucson Electric Power was approved on February 20, 2019, to invest in certain elements of their Energy Efficiency Implementation Plan. The PSC-approved programs including the distributed energy resource, smart home EV pilot, residential EV rate, REV West, and smart city EV build-out plan. These programs include elements seeking to enhance vehicle-to-grid efforts, including smart charging and incentives for charging infrastructure.[31]
Hawaii	On January 15, 2020, Hawaiian Electric was approved to establish a fast-charging service and EV rate in Maui through the subsidiary Maui Electric Company. The utility will own and operate four DCFC stations that will add to the existing EVohana network on the island. New rates 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. The commission reduced the initial budget of the program and required modifications to the EV rate where a rate structure was eventually approved following the company's adoption of the shared savings mechanism requested by the commission.[32]
Maine	On February 25, 2020, the Maine PUC approved portions of several proposed EV pilots by Central Maine Power. The commission denied any funding for DCFC make-ready and incentives, which was the bulk of the $3.5 million initially proposed by Central Maine Power. In addition to $240,000 for make-ready investment in 60 L2 charging stations, the commission also approved a new rate structure for DCFC stations that seeks to lower the operating costs for station hosts.[33]
New York	In July 2020, the state PSC approved a $701 million EV make-ready program that will run through 2025 and be funded by investor-owned utilities (IOUs). 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 PSC order caps the total budget at $701 million and will run through 2025.[34]

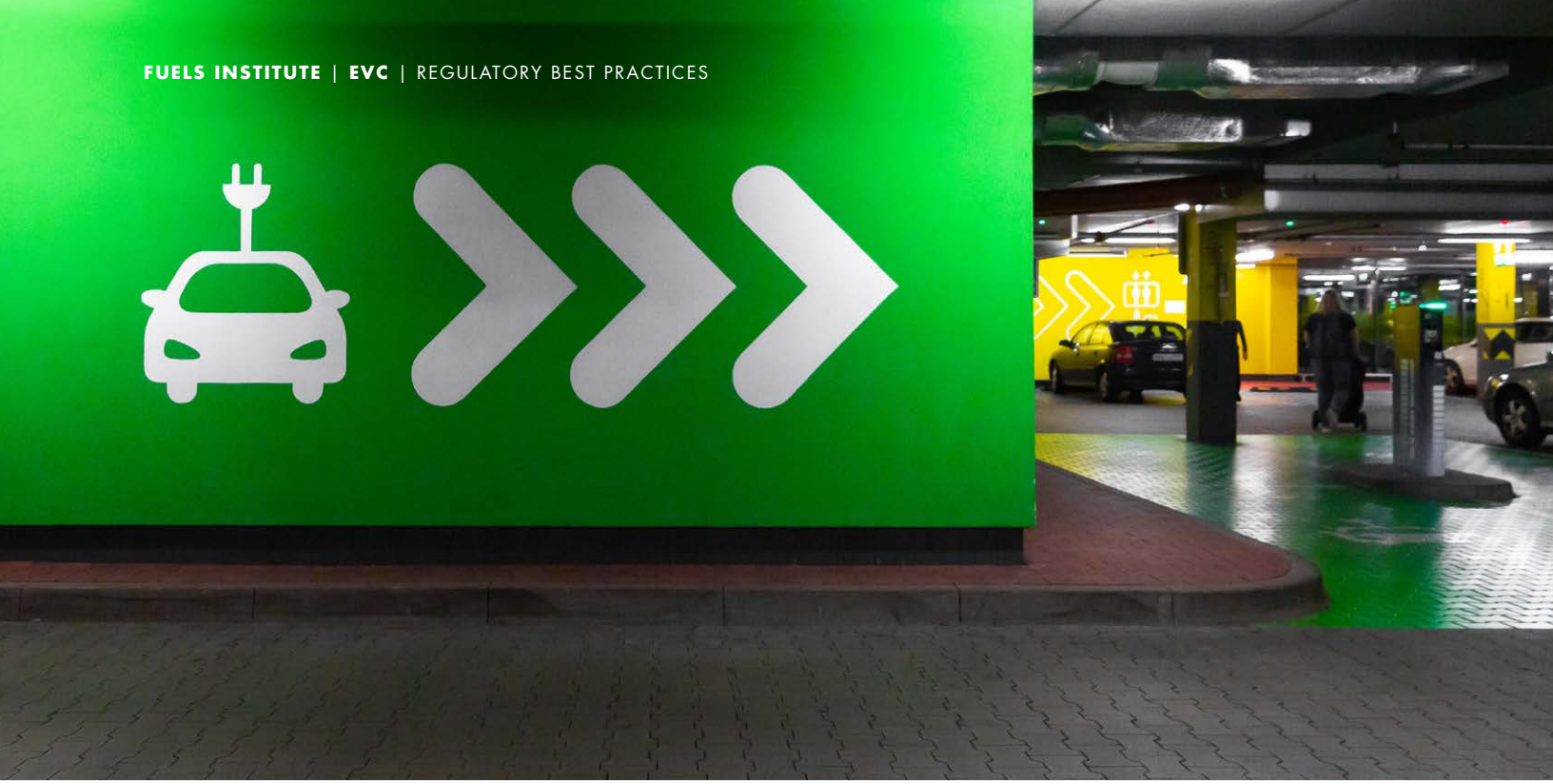
Source: Compiled by Transport Energy Strategies citing data from Atlas Public Policy's EV Hub, Electric Utility Filings Dashboard, June 2020

31 Arizona Corporation Commission, docket number E-01933A-17-0250, Tucson Electric Power Company, filed August 1, 2017, https://edocket.azcc.gov/search/docket-search/item-detail/20126.

32 Hawaii Public Utilities Commission, docket number 2018-0422, Maui Electric Company, Limited, filed December 21, 2018, https://dms.puc.hawaii.gov/dms/dockets?action=details&docketNumber=2018-0422.

33 Maine Public Utilities Commission, case number 2019-00217, *Commission Initiated Request for Proposals for Pilot Programs to Support Beneficial Electrification of the Transportation Sector* (P.L. 2019 CH. 365, Section 5), case start August 20, 2019, https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2019-00217.

34 State of New York Public Service Commission, Case 18-E-0138, Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs, issued and effective July 16, 2020, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6238DD07-3974-4C4E-9201-3E339E311916%7d.



EXAMPLES OF POLICIES SET BY SOME LOCALITIES

In the EV Market Regulatory Report, more than 100 of the most populated cities and counties in the U.S. were selected to survey what types of policies, if any, were being implemented. The research revealed that 49 cities' and counties' policies have ordinances or other regulations in effect concerning public EV charging. Nearly half (23) of those cities and counties are in California, and nearly all policies focus on aspects of EVSE installation. Most public EV-charging regulation appears to take place in cities, though there are a few counties that also regulate public charging.

Policies tend to fall into the following categories:

- **permitting requirements specific to non-residential 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 6 provides a short example from the city of Atlanta of a general approach to setting these kinds of policies cities and counties and includes the foregoing categories.

TABLE 6: EXAMPLE OF LOCAL GENERAL APPROACHES TO SETTING POLICIES FOR PUBLIC EV CHARGING: ATLANTA

STATE	SUMMARY OF POLICY
Atlanta, Georgia	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 certain specified building occupancies must have EVSE infrastructure installed at the parking spaces dedicated for the use of the building. 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 is included in the policy such as: 1. Installation of EVSE must meet NFPA 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 must be placed at least 4.5 feet 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 devices must be located as to not impede pedestrian travel or create trip hazards. 4. Wayfinding signs, if installed, must be placed to effectively guide the motorists to the EV parking space and/or charging station. Private regulatory signage must be placed in a manner that must not interfere with any parking space, drive lane, or exit. 5. Each EVCS and parking space for which any parking incentive was granted must be reserved for use as an EVCS or as EV-reserved parking. If time limits or usage requirements 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 must be observed. Vehicle immobilization or non-consensual towing may be enforced for the EVCS and parking spaces by the owner or operator of the parking spaces even when no parking incentive was granted. 6. Any EVCS and parking spaces for which any parking incentive was granted must be operational at all times. When an EV parking station is not operational for 14 consecutive days, it must be considered to have been removed from service. The failure to maintain the number of EVCSs and parking spaces shall be cause to require the installation of the number of parking spaces required by the district regulations. 7. A phone number or other contact information must be provided when the station is not functioning in a manner that allows EVs to be charged.[35]

Source: Compiled by Transport Energy Strategies, August 2021

35 This a brief summary of some of the requirements; see the ordinance for further detail: Atlanta Code of Ordinances Sec. 16-28.017 (2021).

PERMITTING REQUIREMENTS

Some cities that were included in the survey require a permit before an EV charger can be installed. Some localities have implemented expedited review processes and requirements for EVSE permitting, particularly in California, which requires localities to implement such processes (noted above). Some localities have developed guidelines, checklists, websites, and other information to assist prospective site hosts.[36] Others allow application packages to be submitted online, such as in Houston.[37] Common information a locality requires in the permitting process includes:

- site plans
- a single-line electrical diagram
- load calculations and whether a panel upgrade will be required
- a separate mechanical permit application if ventilation will be required for the station
- charger installation instructions from the manufacturer
- how the site host will address accessibility, with clear diagrams and text showing how the project will meet ADA requirements[38]
- easement requests, if necessary

Localities may require a site plan and may need to address the following elements:

- utility interconnection requirements and an electrical plan
- grading and drainage that may be required at the site
- landscaping plan, particularly if any trees will need to be removed, which may trigger a tree removal permit
- lighting
- parking, with the number of required and existing parking spaces shown in the plan
  - some AHJs have ordinances requiring a certain percentage of parking spaces be dedicated to EV charging
- accessibility and compliance with ADA requirements
- equipment anchorage
- EVSE protection, such as with the placement of bollards and curbs
- ensuring right-of-way for pedestrians and that cords will not present trip hazards
- types of station and wayfinding signage used to direct drivers into EV-charging spaces
- adherence to all applicable codes, such as the National Electric Code (NEC), National Fire Protection Code (NFPA) and the International Building Code (IBC), among others.

Table 7 provides two examples of approaches to regulating permitting for EV charging.

36 The city of Tustin, California, has a checklist that exemplifies what an AHJ may require and what a checklist looks like: City of Tustin, *Eligibility Checklist for Expedited Electric Vehicle Charging Station Permit: Non-Residential Buildings and Facilities*, August 2017, https://www.tustinca.org/DocumentCenter/View/647/EVCharger-Eligibility-Checklist--Non-Residential-PDF.

37 Houston Permitting Center, *Electrical Vehicle Charging Outlets Permit*, https://www.houstonpermittingcenter.org/hpwcode1056.

38 California Governor's Office of Business and Economic Development, *Electric Vehicle Charging Station Permitting Guidebook*, 28–29.

TABLE 7: APPROACHES TO REGULATING PERMITTING FOR EV CHARGING

STATE	SUMMARY OF POLICY
Berkeley, California	• Prior to submitting an application for processing, an applicant must verify that the EVCS meets applicable health and safety standards and requirements imposed by the state and the city. An EVCS must meet all applicable safety and performance standards established by the California Building, Electrical and Green Building Standards Codes, the Society of Automotive Engineers, 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. • A permit application that satisfies the requirements in the city's checklist must be deemed complete and be promptly processed. Upon confirmation by the building official that the permit application and supporting documents meet the requirements of the city's checklist and are consistent with all applicable laws and health and safety standards, the building official will approve the application and prepare the permit for issuance. • If the building official determines that the permit application is incomplete, the building official must issue a written correction notice to the applicant, detailing all deficiencies in the application and any additional information required to be submitted to facilitate expedited permit issuance. • Review of an application must be limited to the building official's review of whether the application meets the checklist and any applicable California Building Standards Code requirements. However, if the building official makes a finding, based on substantial evidence, that the EVCS could have a specific, adverse impact upon the public health and safety, the applicant may be required to apply for a use permit. In the case that a use permit to install an EVCS is required, its application may not be denied unless written findings are made based upon substantial evidence in the record that the proposed installation would have a specific, adverse impact upon the public health or safety, and there is no feasible method to satisfactorily mitigate or avoid the specific, adverse impact. The findings must include the basis for the rejection of potential feasible alternatives of preventing the adverse impact.[39]
Boston, Massachusetts	The City of Boston has separate permitting processes for new and existing developments. An electrical permit is required to install EVSE for existing developments. However, installation of a charging station associated with the development of a new residential or non-residential property can be processed in association with the underlying permit(s). Electrical permit applications are on the city's online portal, where the user creates an account to electronically apply for permits. Relevant project information includes any team members, number of floors being worked on, existing service, new service information, and attaching all necessary attachments. After obtaining the required permit and satisfying the relevant requirements, site hosts can proceed with installation.[40]

Source: Compiled by Transport Energy Strategies, August 2021

39 Berkeley Municipal Code, Section 19.15 (2021).

40 City of Boston, *How to Guide: Electric Vehicle Charger Installation*, December 2019, https://www.boston.gov/sites/default/files/file/2019/12/How%20To%20Install%20an%20EVSE.pdf.

PARKING REQUIREMENTS

Several cities have parking-related requirements for EVs (Table 8).

TABLE 8: APPROACHES TO REGULATING PARKING FOR EV CHARGING

STATE	SUMMARY OF POLICY
Clayton County, Georgia	A minimum of one EVCS shall be provided for all new developments that have 100 parking spaces or more.[41]
Dallas, Texas	Up to 10% of parking counted as required parking for a main use on the property may be EV-charging spaces.[42]
Mesa, Arizona	If spaces for EVs are provided, allowed compact parking spaces can be increased by 1% for every two EVCSs; up to a maximum of 25% of the total minimum required.[43] (11-32-4).
Montgomery County, Maryland	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-volt charging station and associated infrastructure are provided 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.[44]
Riverside County, California	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 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. Charging stations and associated equipment or materials shall not encroach into the minimum required areas for driveways, parking spaces, garages, or vehicle maneuvering.[45]

Source: Compiled by Transport Energy Strategies, August 2021

41 Clayton County [Georgia] Code of Ordinances, Section 4.87(L) (2021).

42 The Dallas City Code, Section SEC. 51A-4.217 (2021).

43 Mesa [Arizona] Code of Ordinances, Section 11-32-4 (2021).

44 Montgomery County [Maryland] Code, Section 6.2.5.F (2021).

45 Riverside County [California] Code of Ordinances, Section 17.188.045 (2021).

EV-READY BUILDING CODE REQUIREMENTS

California, Massachusetts, Oregon, and Washington and more than 23 localities have implemented EV-ready building codes that require a certain percentage of parking spaces in residential, multi-unit dwellings, and commercial buildings to be EV-ready and/or EV-capable.[46] These terms are defined as follows:

- **EV-ready spaces:** Full circuit installations include 208/240 V, 40-amp panel capacity, raceway, wiring, receptacle, and overprotection devices similar to a dryer circuit.
- **EV-capable spaces:** Panel capacity and the conduit (raceway) are installed to accommodate the future build-out of EV charging with 208/240 V, 40-amp circuits.
- **EV-installed spaces:** EV charging must be installed in new buildings that are constructed.

The International Code Council in September 2021 published an educational resource on EV-readiness provisions for residential, multi-unit dwellings, and commercial buildings.[47] Table 9 summarizes model code language pertaining to commercial buildings.

TABLE 9: EVSE-INSTALLED, EV-READY SPACE AND EV-CAPABLE SPACE REQUIREMENTS FOR NEW COMMERCIAL BUILDINGS

TOTAL NUMBER OF PARKING SPACES	MINIMUM NUMBER OR % OF EVSE-INSTALLED SPACES(A)	MINIMUM NUMBER OR % OF EV-READY SPACES(B)	MINIMUM NUMBER OR % OF EV-CAPABLE SPACES
1			
2 – 10			
11 – 15			
16 – 19			
21 - 25			
26+	_# or _% of total parking spaces	_# or _% of total parking spaces	_# or_% of total parking spaces

Notes: (a) Where EVSE-Installed Spaces installed exceed the required values in Table C401.4.1 the additional spaces shall be deducted from the EV-Ready Spaces requirement. (b) Where EV-Ready Spaces installed exceed the required values in Table C401.4.1 the additional spaces shall be deducted from the EV-Capable Spaces requirement.

Source: International Code Council, September 2021

46 The Southwest Energy Efficiency Project is tracking these developments on an ongoing basis: "EV Infrastructure Building Codes: Adoption Toolkit," Southwest Energy Efficiency Project, https://www.swenergy.org/transportation/electric-vehicles/building-codes#requirements.

47 The International Code Council, "Electric Vehicles and Building Codes: A Strategy for Greenhouse Gas Reductions", September 2021 at https://www.iccsafe.org/wp-content/uploads/21-20604_COMM_EV_Strategy_RPT_v5.pdf (hereinafter "International Code Council).

The model code recommends that:

> Construction documents shall indicate the raceway termination point and proposed location of future EV spaces and EVSEs. Construction documents shall also provide information on amperage of future EVSE, raceway methods, wiring schematics and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformers, comply with the requirements of this code. Vehicle spaces equipped with EVSE shall be identified by signage. A permanent and visible "EV-Capable" or "EV-Ready" label shall be posted in a conspicuous place at the service panel to identify each panel space reserved to support EV-Capable or EV-Ready Spaces, respectively and at the termination point of the raceway or circuit termination point.[48]

Table 10 provides examples of EV-ready building codes that cities have instituted.

TABLE 10: APPROACHES TO REGULATING EV-READY BUILDING CODES FOR EV CHARGING IN NON-RESIDENTIAL SPACES

LOCALITY	SUMMARY OF POLICY
Chicago, Illinois	20% EV-ready (30+ spaces)[49]
Denver, Colorado	5% EV-installed, 10% EV-ready, 10% EV-capable [50]
San Jose, California	10% EV-installed, 40% EV-capable [51]
Sedona, Arizona	5% EV-capable [52]
Seattle, Washington	10% EV-ready [53]

Source: Compiled by Transport Energy Strategies, August 2021

48 International Code Council at 10.

49 Chicago City Ordinance SO2019-8025 (April 24, 2020).

50 ity of Denver Community Planning and Development, Code Amendment Proposal (2019).

51 San Jose [California] Municipal Code, Section 24.10.300 (2021).

52 Sedona [Arizona] City Code, Section 15.45 (2021).

53 Seattle Municipal Code, Section 23.54.030(L) (2021).

SIGNAGE REQUIREMENTS

Several cities have signage requirements for EV charging; see Table 11 for examples.

TABLE 11: APPROACHES TO REGULATING SIGNAGE FOR EV CHARGING

STATE	SUMMARY OF POLICY
Jersey City, New Jersey	At the direction of the municipal engineer, there must be appropriate signs and markings to be placed in and around the EVCS that prominently indicate the parking regulations. The signs must 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.[54]
Kansas City, Missouri	EV-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. A public EVCS must be posted with signage indicating that the space is reserved for EV-charging purposes only.[55]
Miami-Dade County, Florida	All EV parking spaces shall be prominently designated with a permanent above-ground sign that conforms to the figure below entitled "Electric Vehicle Charging Station Sign." The bottom of the sign must be at least 5 feet above grade when attached to a building, or 7 feet 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.[56] 

Source: Compiled by Transport Energy Strategies, August 2021

54 Jersey City Code of Ordinances, Section 332-28.1 (2021).

55 Kansas City [Missouri] Zoning and Development Code, Section 88-305-10-E (2021)

56 Miami-Dade [Florida] County Code of Ordinances, Section 33-122.5 (2021).

TECHNICAL REQUIREMENTS

Several cities have technical requirements for EVs; see Table 12 for examples. There may be other technical requirements, codes and standards that will be applicable as well and need to be considered, including the International Fire Code (IFC), National Electric Code (NEC) and National Fire Protection Association (NFPA) Code.

TABLE 12: APPROACHES TO TECHNICAL REQUIREMENTS FOR EV CHARGING

STATE	SUMMARY OF POLICY
Gwinnett County, Georgia	Commercial buildings, multifamily residential buildings and single-family residential units shall have electrical panels installed with space reserved for the installation of a 2-pole single-phase circuit that can be used for an electric vehicle charging system.[57]
Santa Clara, California	Santa Clara implements the California Green Building Code, which includes a technical provision related to construction plans and specifications. These must demonstrate that all raceways shall be a minimum of 1" and sufficient for installation at all required EVCS. 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 EVs at all required EVCE including EV Capable spaces; and 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.[58]
Warren, Michigan	Electric vehicle charging stations shall be maintained in all respects, including the functioning of the equipment. A phone number or other contact information shall be provided on the equipment for reporting non-functioning equipment, malfunctioning equipment, or other issues regarding the equipment.[59]

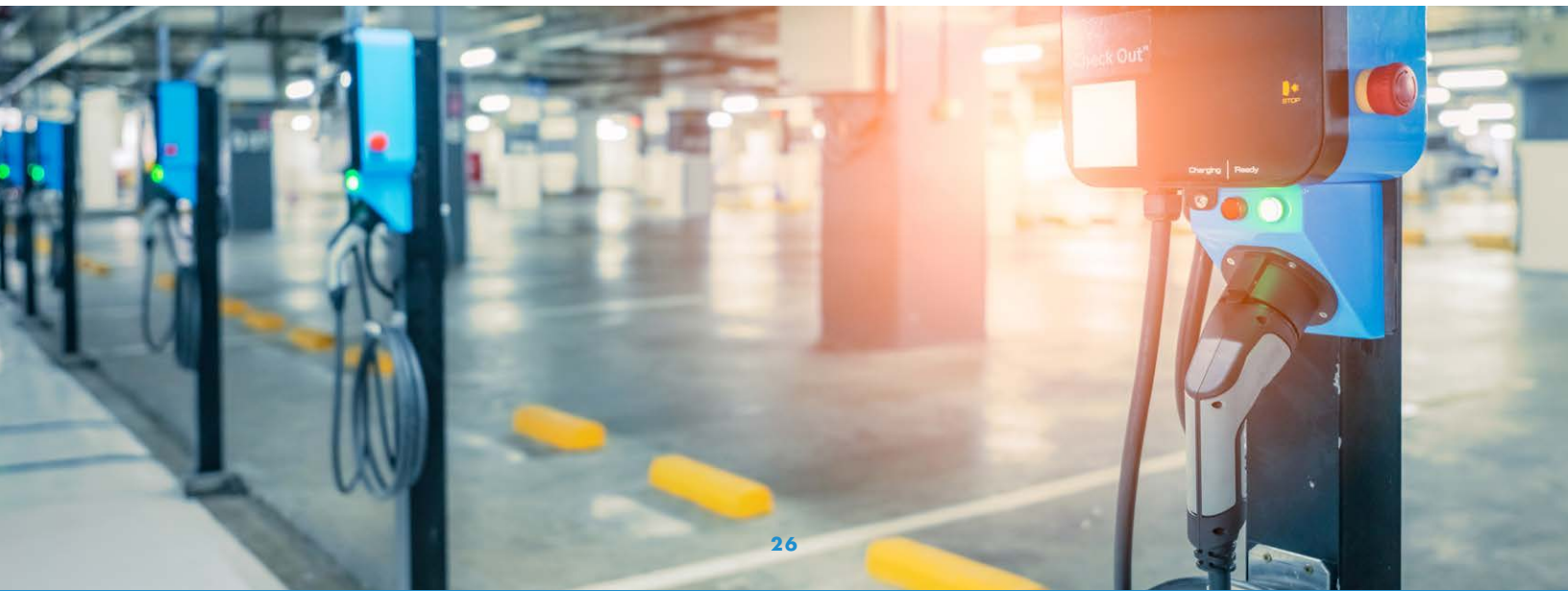
Source: Compiled by Transport Energy Strategies, August 2021

Note: These provisions are part of an overall EV-ready policy for these two areas. Policies cross over and may cover a range of topics.

57 Gwinnett County Code, Section 115.1 (2022).

58 City of Santa Clara Code, Section 15.38 (2022).

59 City of Warren Zoning Code, Article IV-E (2022).



SITE DESIGN REQUIREMENTS

Several cities have other site design requirements for EVs; see Table 13 for examples.

TABLE 13: APPROACHES TO REGULATING SITE DESIGN FOR EV CHARGING

STATE	SUMMARY OF POLICY
Contra Costa County, California	• 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. • 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. • EV-charging equipment must be illuminated by lighting to enable the equipment to be used at night. • 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.
Mesa, Arizona	EVCS may be placed in parking lot landscape islands. If necessary, shrubs and ground cover may be eliminated to accommodate the charging equipment.[60]
Montgomery County, Maryland	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 parking spaces required to be ready for EVCS.[61]
North Hempstead, New York	An 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 toward the off-street parking requirements specified in § 70-103. 3. Components for an EVCS may encroach up to 36 inches into a required setback or buffer.[62]

Source: Compiled by Transport Energy Strategies, August 2021

60 Mesa [Arizona] Code of Ordinances, Section 11-32-4 (2021).

61 Montgomery [Maryland] County Code, Section 6.2.5.F (2021)

62 Town of North Hempstead, New York, Municipal Code, Section 70-203X (2021).

Types of Policies that Can Best Facilitate the Quick, Efficient Expansion of Public EV-Charging Infrastructure:

VIEWS FROM INDUSTRY STAKEHOLDERS

In discussions with stakeholders involved in the EV-charging space, and as shown in the experiences and recommendations below, common issues related to expanding public charging include:

- creating necessary incentives to help reduce investment risk and address demand charges
- expediting permitting
- updating and addressing permitting, inspection, and zoning codes may inadvertently serve to constrain charging expansion
- instituting EV-ready/capable building codes

Stakeholder also raised the issue of reliability of charging stations and incorporating equity, which localities should consider. They highlighted the need to begin planning now for the future expansion of charging; for localities to consider harmonizing policies, especially in metropolitan areas as well as at the state and even national levels; for policymakers to better understand the EV-charging space; and for better coordination at all levels of government.

Turning to demand charges, PUCs should address issues surrounding cost recovery, TOU, and demand charges. One of the primary operating costs for DCFC stations is the cost of electricity. In the absence of an EV-charging rate, DCFC customers take service under rates that include both energy and demand components. A study by Rocky Mountain Institute found that when utilization of DCFC stations is low, which is common given the nascency of the technology and EV industry, demand charges can account for up to 90% of a station's monthly electricity bill, resulting in prohibitively high operating costs. To meet current and future EV needs, and maximize ratepayer savings, some third-party charging companies have said that utilities might consider designing and implementing purely volumetric energy-based EV-charging rates that mitigate the impact of demand charges.

Some state PUCs have instituted new demand charge "holiday" rates or reductions. Examples include:

- **Southern California Edison:** Created an approved demand-charge-free rate for all non-residential DCFC load for a five-year period, followed by the phase-in of a modest demand charge over the following five years. The long-term demand charge is lower than the demand charge on the default rate. The TOU volumetric energy charges have been increased to recover costs previously recovered in the demand charge.
- **Eversource (Connecticut):** Approved a demand-charge-free rate for all DCFC charging load with increase in volumetric energy charge to recover costs previously recovered in the demand charge. No limit on term of rate offering.
- **NV Energy (North and South territories) (Nevada):** Approved a DCFC rate with a ten-year transitional demand charge (2019–2028).
- **ConEd (New York):** Approved an economic development rate for DCFC that includes a bill discount for seven years.
- **Pacific Power (Oregon):** Approved a rate beginning with a demand-charge discount of 90%, phasing in at 10% per year until the demand charge is restored at 100%. TOU volumetric energy charges are adjusted to recover costs previously recovered in demand charges.
- **Florida Power and Light:** With approval by the Florida PSC, the company has created the utility-owned public charging for EVs tariff of $0.30 kWh for electricity sold to users of DCFC stations. The rate is based on a comparison of a cost-per-mile basis of recent gas prices. Two other tariffs, 1) EV-charging infrastructure riders for general service demand and 2) general service large demand, will reduce the impact of demand changes brought about by charging stations with low utilization.

With respect to permitting, states can implement policies that have been proven effective, such as California's streamlined permitting and make-ready laws as well as New Jersey's accessory use bill (S3223) noted in the sections above.

Localities can adopt EV-ready/EV-capable building codes to help facilitate the expansion of charging. Buildings constructed today will last for 50 years or more and retrofitting parking structures is at least four to eight times more expensive than outfitting garages at initial construction, with residents often bearing these costs. When installed during initial construction, EV-charging infrastructure costs are generally less than 1% of the total building construction cost. Elements that could be included in EV-ready/capable building codes specifically for multi-unit dwellings and non-residential/ commercial properties include:

- Size the primary electrical panel capacity to provide 20% of parking stalls with at least 40-amp 208/240 V service for each parking space.
- Distribute subpanels throughout parking facility, with no parking space more than 100 feet from an interconnection point (deeded spaces).
- "Future proof" the building by providing the option to utilize automatic load-management systems to provide L2 EV charging to 100% of parking spaces, as described in section 625.41 of the National Electrical Code (2014).
- Require that 20% of spaces be EV-ready and up to 100% of spaces be EV-capable.

Finally, several stakeholders highlighted that an extended zoning review, with multiple rounds of commenting, and the application of parking count minimums are the most common causes of project delays. Below are recommended policies and best practices local governments can adopt to improve EV-charging installation timelines:

- Establish and enforce permitting turnaround times. For example, a California law (AB 970) deems a permit automatically complete within 5-10 days and deems a permit automatically approved within 20-40 days.
- Establish an expedited EV permit review process that encourages permit reviewers to administratively approve permits (a.k.a. "approved as noted"). An example is California's expedited permitting law, noted above.).
- Amend zoning codes to clarify that public EVCS (L2 or DCFC) does not require further zoning board approval and to clearly identify any exceptions.
- Appoint an EV-infrastructure permitting point-person to help applicants through the entire permitting process.
- Align planning codes so that EVCS application reviews are limited to health and safety.
- Publish an ordinance or bulletin clarifying that EV-charging spaces count as one or more parking spaces for zoning purposes. Count EVCS spaces as regular parking stalls in the parking count study to include supporting equipment (transformer, switchboards, power cabinets). California legislation (AB 1100 and AB 970) can serve as a model or guide for states and localities.
- Classify EVCS is as an accessory use to a site, not as a traditional fueling station. Allow EVCS as an approved use as a primary use of a site with streamlined permit and zoning review.
- Require only an electrical permit, as opposed to an additional EVCS permit.
- Adopt an online permitting process. Clear permitting and inspection processes, requirements, and forms should made available on a public-facing website for single-family home, multi-family home, and workplace, public, and commercial medium- and heavy-duty charging. Establish an online submittal and payment process, ideally through a portal.

- Route permit applications through one department, not multiple. In cases where multiple departments need to review, the reviews should be concurrent rather than sequential. Limit the number of review comments and consolidate when possible.
- Incorporate and prioritize planning for zero-emission vehicles and supporting infrastructure within documents, such as the general plan, capital improvement plan, climate action plan, and design guidelines.
- Offer pre-application meetings with knowledgeable staff.

Finally, several stakeholders raised the issue of utility service connection timelines and site constraints and easements, with the following regulatory best practices recommended:

- Require utilities to disclose average timelines for service connection for EV-charging accounts.
- Provide special easement considerations for EV charging, including the ability to include utility easement language in site leases and contracts between an EV-charging developer and landowner or a long-term ground lessee.
- Allow for utility make-ready for EV charging (which could be modeled after legislation enacted in California, AB 841).
- Allow visibility into where power is available on the grid, such as with hosting capacity maps or a way to check with the utility if power is available at a specific site.
- Improve the feasibility study phase for new projects without having to go through the full design process.
- Maintain an inventory of utility equipment commonly used in EV-infrastructure installations, specifically transformers that otherwise can be "made to order" and require long lead times.
- Provide dedicated design and construction staff for EV-infrastructure projects.
- Streamline utility design approvals.

Below are specific recommendations and perspectives from various stakeholders involved in expanding public charging.

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS: It's Important for Localities to Prepare Now for EV Growth

Though EVs only represent 2% of vehicle sales in the U.S. as of 2021, that will change in the coming years, and localities need to be prepared. EV readiness is an important priority for the North Central Texas Council of Governments, as a fast-growing region with EV uptake growing faster than the national average. With all the economic growth in the region and new construction, supporting the development of EV-charging infrastructure (both public and private) with EV-ready/EV-capable building codes is becoming a priority, and it makes economic sense to put the infrastructure in so that when the time comes to install EVSE, the costs will be lower and more manageable. Another important policy consideration for localities are incentives for putting infrastructure into place, such as local government incentives that would waive or expedite permits if charging infrastructure is installed in new building construction.

7-ELEVEN: We Need Better Solutions for Demand Charges and Expedited/ Streamlined Permitting

There are many barriers to the successful implementation and operation of the EV-charging business, according to Becky Knox, senior energy policy analyst at 7-Eleven Inc. Removing barriers to market, such as high demand charges and slow, antiquated siting and construction processes, are key to ensuring the rapid expansion of nationwide fast convenient EV charging for all customers.

7-Eleven believes that state policymakers, utilities, and stakeholders need to work together on solutions that create more favorable rate structures for EV fast charging. Companies are less likely to invest in areas with high demand rates because they can add significant cost to operations, making a successful long-term business unobtainable. At this early stage in the EV market, when charger utilization is still relatively low, it will be difficult, and costly, to successfully operate a nationwide fast-charging network if the demand-charge issue is not addressed.

Additionally, the process of installing EV infrastructure for DCFC needs to be updated and expedited. This includes working with AHJs to streamline the permitting and inspection process so that projects can move forward faster. It also includes working with utilities to expedite siting of locations with available capacity as well as speeding up interconnection and easement processes. Some states have already started addressing these issues and could provide a good foundation for identifying best practices and lessons learned.

Working in partnership with state policymakers, AHJs, utilities, and other stakeholders to create favorable utility rate structures and streamlined implementation processes are key factors in advancing the EV fast-charging market. These types of changes will help ensure that consumers have access to more convenient, reliable, and fast EV-charging solutions.

FLO: Localities Have a Critical Role to Play in Expanding Charging

FLO is a leading North American EV-charging network operator and a major provider of smart charging software and equipment. FLO's headquarters and network operations center are based in Canada, with an office in Montreal and regional teams located in Ontario, British Columbia, California, New York, and Texas. There are measures that already exist in other jurisdictions that localities should consider adopting to better facilitate the expansion of public charging infrastructure. For example, the company is supportive of expedited and streamlined permitting policies, such as those that exist in California. Second, enforcing measures that already exist are important. One example is enforcing parking policies that restrict EV-charging spaces to only EVs.

Adopting EV-ready/EV-capable building codes is important, such as the Green Building Code legislation adopted in California and implemented by localities. However, California's building code currently only addresses L2 charging; FLO recommends a pathway encouraging DCFC make-ready infrastructure build-out so that the option is available to site hosts that want it. This is an issue that is currently under discussion and being addressed in California. Policies should be flexible and focus on the "state of the art." For example, California has minimum requirements with respect to payment standards, which requires an EMV-chip credit-card reader. However, FLO notes that while this is beginning to phase out, regulators will likely be to slow to adapt the regulation as the market evolves quickly. This will result in unnecessary added costs and create potential reliability issues with the station.

Localities should beware of lowest-cost charging solutions. Rather, to ensure people keep adopting EVs, governments need to focus on both increasing the quantity of charging stations and ensuring the quality of those stations. Cory Bullis, senior public affairs specialist for the U.S. for FLO, says, "FLO is trying to prevent a race to the bottom with charging equipment because there are tons of stories about broken chargers in the wild. Consumers are frustrated, consumers hate it, and then they feel like EVs are not a good fit for them."

One way to address this, he says, is by developing and implementing a reliability standard. "In any of your procurements, you should mandate a percentage of uptime, in a given year," Bullis notes. FLO recommends at 97% uptime target. Since localities are using public dollars and need to show good stewardship of these funds, they should require uptime to guarantee reliability and reduce downtime.

In addition, localities have a central role in developing curbside charging because they can help with site selection, permitting, and reserving spots for charging. Bullis notes that "cities need to take an active role in guiding and shaping that process to make it a reality. And cities should want curbside charging to be a tool in their toolbox because it's going to be an important service for a lot of their citizens that can't access charging at home, especially those at apartment complexes."

Finally, equity is also an important consideration in expanding public EV charging. FLO suggests the following principles that localities should consider in ensuring equity, particularly in low-income, disadvantaged, and rural communities.

1) **Ensure funding provides assured and measurable benefits:** Given that low-income and disadvantaged communities have typically been left behind in initial efforts to electrify transportation, 50% of ongoing public and ratepayer funding for transportation electrification programs should go to projects located in these communities. Half of these funds should also go to projects that benefit households with lower incomes residing in these communities. Projects must be allowed to fulfill both of these requirements if they meet specified criteria.

2) **Distribute charging stations equitably:** To ensure all communities can access and benefit from EVs, governments and utilities need to ensure the chargers they fund are distributed evenly by population density, geographical area, and population income level—including low-, middle-, and high-income levels—across the state and their respective service territories, with considerations given to redundancy in deployment to provide adequate support to drivers.

3) **Ensure equitable reliability of charging stations:** Public- or ratepayer-funded charging stations must be reliable and maintained equitably across communities, regions, geographies, and charging networks. No community—with a particular focus on low-income and disadvantaged communities—should struggle with a lower level of reliability from publicly funded stations deployed in their area. State agencies and utilities should analyze the reliability of public- or ratepayer-funded charging stations to determine whether there are inequities with regards to their reliability.

4) **Deploy stations in rural areas:** As part of statewide efforts to deploy charging stations evenly, the unique challenges to deploying infrastructure in rural communities, where electrical capacity is often limited, must be addressed. Identifying best practices and lessons learned has the potential to help standardize and expedite solutions in these areas; in other words, our solutions must be data driven. Deploying more robust infrastructure in rural areas also enables potential microgrid developments and vehicle-grid integration solutions, which provides resiliency benefits in the event of public-safety power shut-offs.

5) **Fund community-based organizations to deliver incentives to households with lower incomes:** Governments and utilities offer a number of consumer-facing incentives for EVs and charging stations, among other things. Public access to these incentives is often obscured or overly complex, which only exacerbates trust issues typically expressed by marginalized groups toward government bodies—and limits the uptake of EV incentive programs. Partnerships with community-based organizations, then, are crucial given that these organizations best understand the unique needs of their respective communities and can more effectively deliver these incentives to households with lower incomes to make sure families can access the benefits of these technologies.

6) **Electrify shared-mobility applications:** Shared-mobility applications provide critical access to transportation, and driver and rider demographics are typically primarily represented by lower-income and underserved groups. To support these services' transition to EVs and help underserved groups access zero-emission shared-mobility services (which can include car-sharing, ride-hailing, and vanpooling services), government, utilities, and infrastructure providers must have a dedicated

focus in deploying infrastructure solutions at "urban mobility hubs," where shared-mobility vehicles are most concentrated, defined as downtown cores, airports, and nearby multi-dwelling units.

7) **Upgrade panels to support home charging for households with lower incomes:** Many older homes, typically built decades ago, are occupied by people with lower incomes and lack the appropriate electrical infrastructure to support EV charging. The cost to upgrade electrical panels is one of many barriers that prohibit families living below certain income thresholds from switching to an EV. Given the substantial wage gaps between families at the lower and higher ends of income ranges, dedicated funding is needed to target these households and remove this cost-related barrier to electrification. Doing so will have a multiplier effect by also enabling building electrification and supporting renewables integration.

SOUTHERN COMPANY: Engage Utilities Now

Lincoln Wood, electrification policy manager at Southern Company, says it's important for states and localities to engage utilities, especially as they prepare to devote more funding to installing EV-charging infrastructure. He says, "With $7.5 billion in federal EV infrastructure funding made possible by the bipartisan infrastructure bill, it has never been more important to engage utilities early in the process. We want to partner with state and local governments, transportation agencies and industry stakeholders to share our energy expertise and knowledge of state requirements to put these funds to work quickly and efficiently."

Wood says it is critical that the lines of communication remain open among site hosts, charging companies, state and local officials, and utilities to expand EV-charging infrastructure. He notes it's important to understand more how utilities work and their constraints. "Utilities have regulatory responsibilities – there are processes and reasons for why things are done the way they are. We are in the business of providing safe, reliable, affordable, and clean electricity to the customers we serve and remain focused on proactive grid preparation and management to meet EV charging demands as the market matures."

Wood says harmonizing various regulatory processes at the state and local levels, as well as funding and timelines, is an all-hands-on-deck task to ensure that as EVs begin to scale up, the infrastructure will be there. He points to, as an example, the regulatory lag that can occur in PSCs between the time that utility programs are approved and that they can actually be implemented. He notes that federal funding will help speed up the expansion of charging infrastructure but aligning processes is important as well.

Wood says that grant funding will be available down the road for ports and airports for conversion from diesel to EVs and will involve a multi-stakeholder process to apply for those grants. It's important for states and localities to begin looking at potential opportunities and preparing for them now. "To me, that means laying the groundwork now," he says, "so that when the time comes, the right players are in the room at the right time to put the proposal together."

KUM & GO: Metropolitan Areas Should Consider Harmonizing EV-Charging Policies

In addition to addressing the issue of demand charges (a critical barrier in expanding charging), in Kum & Go's view there are three other areas that localities should consider as they develop and implement EV-charging policies: improving the permitting process by adopting expedited, streamlined permitting policies; clarifying ADA requirements related to charging; and harmonizing policies among localities in metropolitan areas, if not state- or nationwide.

Brad Petersen, director of retail fuels at Kum & Go, says that permitting varies widely among the jurisdictions where the company operates and, surprisingly, some of the most progressive and supportive charging policies also have the most complicated permitting regimes. "We are able to complete our permitting stage and start construction in a timely manner in some areas, and in other areas the permitting process is very slow," he says. This will need to change to expand charging, or fuel retailers may conclude it is just too complicated to develop charging stations in some jurisdictions.

Another issue Petersen highlights is that localities should consider clarifying for site hosts the ADA accessibility requirements for charging sites. These issues are currently being considered in states like California, but Petersen says it will ultimately save time and costs for charging station developers to have clarity on what those requirements are as charging continues to grow. He also highlighted potential ADA issues with existing stations that may affect site hosts. "Localities really need to be considering this now as they develop charging policies," Petersen says.

Finally, Petersen says regulatory consistency, at least among localities in metropolitan areas, is critical. To really help expand charging infrastructure, regulatory regimes should ideally be consistent at the state or even national levels. The difficulty for fuel retailers and convenience store operators is that they typically have consistent, replicable store designs to control both development costs and provide a seamless customer experience. A patchwork of regulatory requirements may impact both. "When we build stores, we try to be consistent," Petersen says. "The inconsistencies create complications and slows down the process, [and] it creates additional work to ensure compliance." Harmonized regimes, especially for permitting, could address this issue.

FREEWIRE: Ensure Policies Account for New, Emerging Technologies

Peter Olmsted, director of regulatory affairs for FreeWire Technologies, explained that with the substantial public and private investments being committed to deploy EV-charging infrastructure, it is critical to ensure that these investments result in the biggest bang-for-the-buck. DCFC will be a critical piece of the EV-charging ecosystem as long as deployment is timely and cost effective. FreeWire observes that the time and cost associated with building or upgrading traditional electrical and grid infrastructure can present barriers to the deployment of fast-charging equipment, which presents a risk to meeting EV adoption targets. FreeWire offers battery-integrated ultrafast charging solutions that overcome these barriers and deliver energy whenever and wherever it's needed by connecting to the grid at low voltage power that is converted to high power output delivered to vehicles. With this innovative technology, Olmsted says FreeWire's Boost Charger can avoid the complexity of upgrading traditional grid infrastructure, as well as help to manage energy costs associated with fast charging.

"We are encouraging utilities, regulators, and policymakers to think outside of the box and design EV-charging programs that leverage and reward technology innovations such as pairing DCFC and energy storage technologies," says Olmsted. "By creating space in EV-charging programs for innovative solutions to compete on equal terms, FreeWire believes that site hosts will be able to select from the broadest range of technology options available in the market. We believe that the best EV-charging programs are those that are designed to encourage the most optimal outcome, including speed of deployment and reduced grid impact. While we understand the purpose of utility make-ready and demand-charge relief programs, we are concerned that these will slow deployment and increase the total cost of fast-charging solutions."

For example, Olmsted notes that FreeWire has proposed a per-kWh incentive for battery storage in some states to support the deployment of EV charging paired with battery storage. In other words, in situations where battery-integrated EV charging offers the ability to reduce costs associated with make-ready infrastructure, FreeWire has suggested that it would be appropriate to incentivize these technology configurations. This would put different technology solutions—make-ready infrastructure and technologies like FreeWire's—on equal footing in terms of the customer value proposition. "Funding can be invested in traditional make-ready infrastructure or on capital equipment and energy storage," Olmsted says. "We are trying to educate policymakers and regulators that there is opportunity to push the industry to innovate and deliver solutions that will benefit EV drivers, site hosts, the grid, and ratepayers at large."

Olmsted also points out that with the new federal funding for EV-charging infrastructure, it will be critical for states and localities to build on prior programs, such as those established as part of the Volkswagen Settlement. Olmsted says, "It's important to get those dollars to work as quickly as possible to expand charging across the country. States and localities should look at lessons learned from these programs in order to stimulate near-term market activity."

ELECTRIFY AMERICA: Addressing Demand Charges, Charging Station Permitting, and EV-Ready Building Codes Is Crucial to Expanding Ultra-Fast Charging

According to Electrify America, addressing utility-demand charges at the state level, and permitting processes as well as EV-ready building codes at the local level, are critical for expanding public EV charging, including ultra-fast charging. In the company's view, utility-demand charges present the largest long-term barrier to expand the development of public EV charging in the U.S. because of the impact utility-demand charges have on EVCS and especially on high-power charging.

Many in the industry have recognized this, but it has become a more critical issue as charging stations have moved toward much higher rates of power. "It used to be that when you did a DC fast charging installation, you installed maybe one or two 50 kilowatt chargers," says Andrew Dick, state government affairs and public policy manager at Electrify America. "Your entire site level demand was a maximum of 50 or 100 kilowatts. But the minimum we install at our standard highway corridor site is two 350 kilowatt and two 150 kilowatt chargers, or 1000 kilowatts of potential demand." That is 10 to 20 times more powerful than a conventional installation—and this has evolved in just a few years.

The increase in power increases the exposure to demand charges, which are based on maximum site-wide power demand during a billing period. "It used to be the conventional wisdom in this industry

and with some policymakers that demand charges are a utilization problem," Dick says. The idea is that charging would hit a tipping point in utilization where a charging company would generate enough in revenues because there are frequent enough charging sessions that would offset demand charges." However, he continues, "when you get to 350 kilowatts, that really is no longer the case." He says that finding a long-term solution to demand charges that will allow charging stations to operate economically into the future is a pressing issue that will not be resolved when a certain level of utilization is achieved. He referenced research by the Great Plains Institute showing that, even at higher levels of utilization, most 350 kW chargers will not reach a financial break-even point without substantially reducing or eliminating demand charges.

Some states are beginning to address this issue. Dick says, "There are a number of different approaches you can take, and it's not a one-size-fits-all. For different states, the policy might be different. We've seen utilities that just simply say, 'We're going to create a new EV rate that doesn't have a demand charge, or sometimes it's for a certain period of time, or sometimes the demand-charge phases back in.' That can be an effective approach, as long as it's not phasing back into the same starting point, which was too high even for a mature utilization station."

Some utilities have offered demand-charge credits that are based on the nameplate capacity rather than just being a percentage reduction in the demand charge over a given month. Other utilities have put limiters in place so that demand charges are never more than a certain percentage of a utility bill in any given month. Dick notes that this strategy can be effective since demand charges can account for 80% or more of utility bills for DCFC stations. "There are a lot of different ways to approach the problem, but the demand charges, particularly for ultra-fast-charging infrastructure, that's by far the biggest issue on the utility side of things," Dick says.

At the local level, Electrify America notes that permitting processes can be challenges. Dick highlights that under California's expedited and streamlined permitting legislation, which localities are required to implement, permitting application reviews for an EVCS are to be limited to the question whether or not the station meets health and safety requirements. That is the case in many California localities that have implemented the state legislation. However, permitting processes can create barriers to station installation in other jurisdictions, where planning officials may reject EV-charging projects due to parking count minimums or station aesthetics.

Zoning officials may conclude a property is not zoned for hosting a charging station or that a zoning classification for a charging station doesn't even exist. Dick says, "Some jurisdictions will determine that the closest thing in their code is an automobile service station, obviously something very different from EV charging, a full-on gas station with a garage and underground tanks. Sometimes we've had to do code updates to address these kinds of zoning and planning issues, which can be time consuming. Streamlining zoning and planning codes is something that can be helpful in expanding public EV charging."

EV-ready and EV-capable building codes can be especially helpful in ultimately controlling installation costs since the physical construction of tearing up an existing parking lot to put in conduit, known as trenching, can be a major cost. "The one thing that we would say in that instance is that a lot of EV readiness codes historically have been written only to contemplate Level 2 charging equipment," Dick says. "And as the vehicles get faster and faster, and as the battery capacities get bigger, Level 2 is maybe still part of the solution, but it's not the only solution. So having an alternative written into those codes where you can use DC fast chargers to meet requirements we think is pretty important."

CAPITAL DISTRICT TRANSPORTATION COMMITTEE: Check Your Comprehensive Plan, Zoning, and Land Use Codes, and Update Them as Needed to Help Facilitate EV Charging

Jacob Beeman, Senior Transportation Planner at the Capital District Transportation Committee, the designated MPO for the Albany-Schenectady-Troy and Saratoga Springs metropolitan area, says it's especially important for municipalities to look at their existing land-use and zoning regulations to plan for EV and infrastructure scale up. "A lot of municipalities haven't updated land-use and zoning regulations in a long time," he says. Municipalities can update these codes to facilitate EVs adoption and expansion of charging infrastructure, and they can proactively do so even when there may be a financial limit in actually funding infrastructure.

Beeman says that through a technical assistance program provided by the MPO and local regional planning commission municipalities can receive assistance in assessing and developing EV-friendly zoning regulations: "We took that on, and we did a review of the municipality's existing comprehensive plan and zoning regulations." One thing that Beeman says he realized is that a municipality's comprehensive plan may have to be updated first before zoning and land-use codes are updated, and municipalities should be looking at this now.

Beeman says the MPO worked with five different municipalities in New York state who have already implemented EV-friendly land-use and zoning codes to develop a list of best practices for others. "I talked to them about what the process was, what the benefits could be for them, and how they can incentivize implementation. Then we created a document of potential zoning changes that went from least prescriptive to most prescriptive. We had to start at the beginning with describing what an EV is, what infrastructure is, and then progress from there," Beeman says.

A best practices paper was prepared in March 2021 for the Town of Colonie, New York, a member of the MPO. The paper investigated the feasibility of incorporating EVCS requirements into the town's zoning and development codes and provided example language from model municipalities. In the audit of the comprehensive plan, the paper's authors noted that including language that supports EVs in local comprehensive plans makes it easier to establish specific EV policies, ordinances, and regulations in other areas of local code and helps lay the foundation for EV adoption in a municipality. The review team, among other recommendations, included:

- **Review the comprehensive plan:** EVs can be supported in the comprehensive plan directly or more generally through the identification of the municipality's broader environmental and sustainability goals.
- **Adopt zoning language that defines terms associated with EVs:** Adopt zoning language that specifically defines the terms associated with EV charging and does not unnecessarily restrict the installation of EVSE.
- **Establish EV-ready building codes:** These EVSE-ready building regulations should require the installation of EVSE in new developments and/or require the installation of EV provisions to reduce the cost and ease the installation of future EVSE.
- **Review permitting processes:** Establish a standardized, low-cost permitting process for residential and commercial EVSE installations.
- **Standardize parking signage:** Establish consistent standardized EV parking signage to be used throughout the town.

DUKE ENERGY: PLAN EARLY, PLAN OFTEN, PLAN NOW

Jim Poch, electric transportation manager at Duke Energy, says utilities have a critical role to play supporting the deployment of EVs, including by creating a foundational network and readying the grid for EV demand and charging management.

CREATING A FOUNDATIONAL NETWORK

Utilities can help seed the market and ensure that consumers have access to EV charging as the transportation sector begins to transition to electric fuel. By leveraging a long-term perspective on capital investments, utilities can sustain operations through early growth years during which charging infrastructure cannot provide sufficient return on investment for others. This role may be especially important in areas where adoption may occur more slowly, such as low- and moderate-income neighborhoods. Convenient and equitable access to charging is critical for consumer adoption, which includes ensuring that charging stations operate properly and are maintained so that the user experience is smooth. "If we don't have that focus, the transition to electrification will come with unnecessary hiccups," Poch says.

READYING THE GRID AND ENABLING CHARGING MANAGEMENT

Will the grid be able to handle large-scale penetration of EVs? Poch says yes—with some caveats that are important for policymakers to keep in mind: "We feel very good about the grid's capacity because we think with smart charging and distributed generation or energy storage that we can shift a lot of this load to off-peak hours, where our nation has a tremendous amount of unused capacity. There's a very big opportunity there." To make that opportunity a reality, utilities need the ability to participate with and enable charging management solutions.

Advanced planning is still critical, especially for areas where EV loads are likely to be concentrated. "When the economics of transportation electrification becomes a business advantage, people are going to quickly flip the switch and say, 'I need a charging load for my new fleet in three months.' And there are some areas on the grid [where] it may take time to upgrade the grid to handle this additional load," says Poch. He adds that the critical question is how we can proactively prepare and get ready for this now so that needed upgrades are deployed in the most efficient manner possible. This consideration is critical for policymakers at all levels to keep in mind. Examples Poch notes include:

1) Last-mile delivery fleets, which are often concentrated near airports
2) Fast charging at truck stops, which require a much higher load
3) Charging that may be installed at an automobile dealership

The bottom line is that planning needs to be done right down to the local level early, often, and now. The transition to electrification must be carefully managed and coordinated at all levels of government and among stakeholders.

Poch says it is important to remember that it's not just a vehicle purchase but a vehicle and infrastructure purchase. And it's not just infrastructure for the customer but infrastructure for the grid that supports the customer. The utility has an obligation to serve, and to do so in a way that meets its regulated responsibilities. Allowing utilities early input on EV-charging plans at the state and local levels is critical for the smooth rollout of charging.

Including utilities in the process is helpful, even critical, notes Cory Gordon, director of transportation electrification at Duke Energy. "We hope that more and more localities and businesses can view us as an ally in this journey."

GETGO AND GIANT EAGLE: Incentives, Ensuring Fair Competition, and Better Consumer Education Is Key

Giant Eagle Inc. operates supermarkets and GetGo convenience stores with locations in Pennsylvania, Ohio, West Virginia, Indiana, and Maryland. The company supports incentives to expand public EV charging, better definitions of the utility role in charging to ensure fair competition, addressing the critical issue of demand charges, and better, more unified consumer education about EVs. Incentives at the federal, state, and local levels are important for Giant Eagle and other potential early adopters of public EV charging to make it feasible for them to enter the space. Rugwed Phatak, chief of staff and senior director of marketing for GetGo, notes that "government incentives get retailers into the game faster and excited about helping to support building out the infrastructure." He says in the early years of expanding public EV charging, strong incentives are critical to support the build-out and reduce risk. "These incentives are critical to building out the initial and very expensive fast-charging network and gives us more heart to move faster and to get buy-in from our shareholders and the broader organization."

Another recommendation for states and state PUCs is to ensure a free market and define the utility role in charging to avoid an unfair competitive advantage. Without such clarity, this could serve as a disincentive for prospective site hosts and slow the expansion of public charging. Demand charges are a big issue for Giant Eagle (and others in the space). Phatak notes, "This can be a really crippling thing, as retailers are thinking about dipping their toe into public EV charging," Phatak says. "Until you have mass and scale, the demand-charge thing is quite scary, actually." Without addressing this issue quickly, demand charges may serve as a hindrance to the spread of public EV charging.

Finally, there could be better education at the federal, state, and local levels. "There doesn't seem to be a unified consumer education program," Phatak says. "Governments are talking to people. Utilities are talking to people. Retail and others in the charging space are talking to people. There just doesn't seem to be a unified approach to education." He notes the lack of a unified approach even affects those who are actually charged with developing EV-charging infrastructure and to communicate its importance internally to their company management and boards. "There has to be more partnership that includes government, retail, utilities, and others in the space where we're all really invested in building out this charging infrastructure. It's an opportunity, and GetGo and Giant Eagle are excited to be part of the discussion and solution" Phatak says.

EVGO: Connect the Watts to Accelerate Charger Deployment

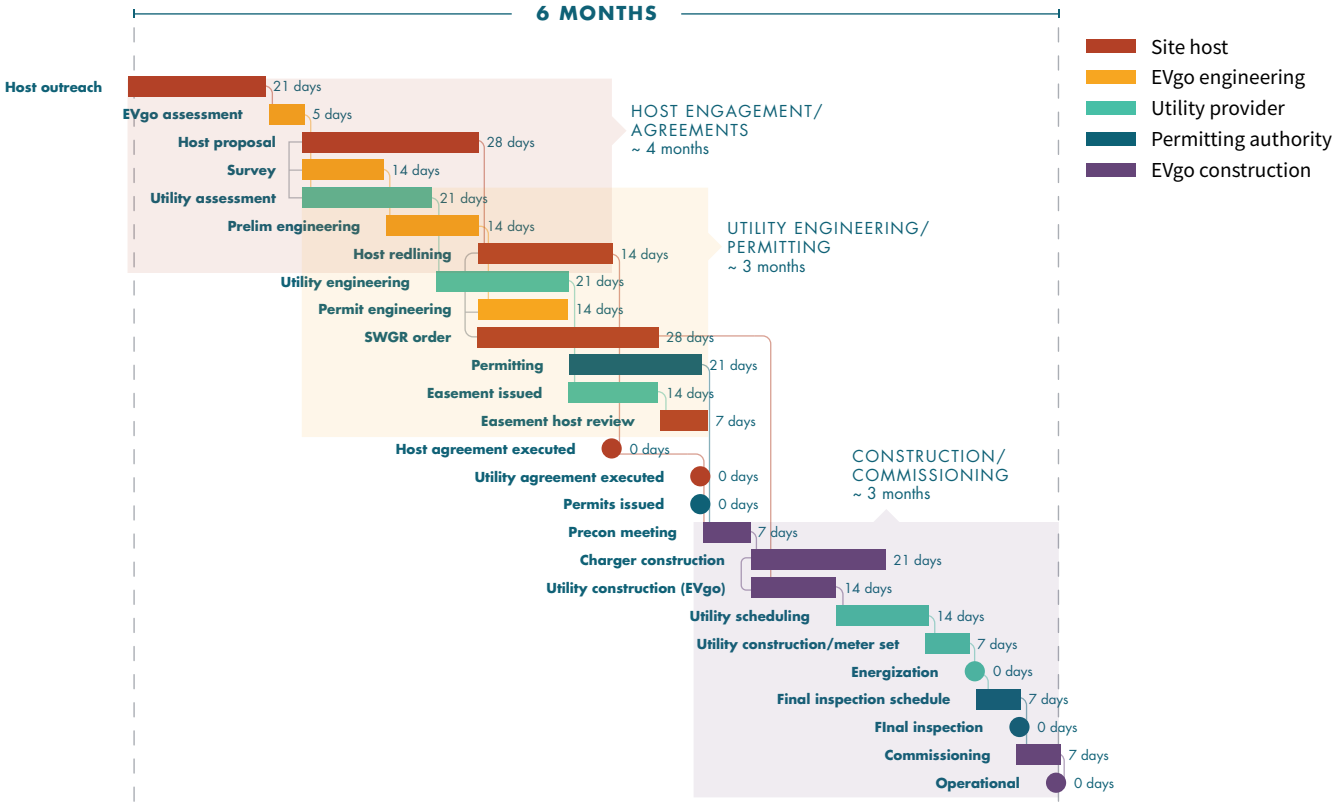
EVgo, which has the largest public DCFC network in the U.S., has developed the Connect the Watts initiative to help stakeholders involved in the charging infrastructure ecosystem—including utilities, state agencies, and permitting authorities—identify best practices to streamline and expand charging infrastructure deployments. The Connect the Watts initiative identifies three critical areas of attention to streamline EVCS: permitting, public funding design, and utility engagement.

One key action that stakeholders, especially localities, will need to address is expediting the process of bringing chargers online.

> To build and energize those thousands of fast-charging stations, all stakeholders will have to work together to streamline the process of site identification, design, permitting, installation, and utility interconnection. Actual construction of a charging station takes just 4-8 weeks, but the entire process to bring a fast charger online—from host engagement through utility engagement and permitting to utility interconnection—currently takes an average of approximately 18 months. With proper planning, engagement and alignment of all parties involved, and process streamlining through adoption of best practices, this average timeline can be reduced to just 6 months.

Figure 3 illustrates that six-month timeline.

FIGURE 3: 26 INTERWOVEN STEPS TO BRING AN EV FAST-CHARGING STATION TO LIFE



Source: EVgo, 2021

As it relates to local permitting authorities, the EVgo team recommends seven best practices for more streamlined EV-charging permitting processes:

1) **Adopt an online permitting process:** Use an online portal that guides the electric vehicle service provider (EVSP) through forms and requirements for permit submission, accepts electronic signatures and payments for plan check reviews, and results in approvals around two weeks after submission.

2) **Offer expedited processing that shortens permitting timelines for EV-charger projects:** Offer an EVCS-specific or generalized process for expedited review and establish dedicated staff. Where applicable, adopt and enforce state guidelines. Maintain an ongoing training program for staff to become familiar with continuous EVCS equipment and market developments. Process payments and administrative items needed to issue permits within one to three business days (the current average is one to two weeks to several months).

3) **Waive the requirement for pre-appointment or pre-approvals for EV-charger projects.**

4) **Standardize EVCS permitting reviews:** Establish and publish EVCS-specific, detailed permitting guidelines on the locality's website outlining expectations for permit design sets and the application and review process.

5) **Streamline the administrative process to avoid document-processing delays.**

6) **Require only an electrical permit for these primarily electrical-oriented projects:** Keep permit applications within one department. Simple modification of parking stalls to accommodate EVCS need not require a building permit, and striping, signage, and ADA compliance can be inspected by the electrical inspector.

7) **Bring policy level support for equipment placements:** Allow EVCS and supporting equipment (including transformer, switchboards, and power cabinets) within building, property, and landscaping setbacks. Include EVCS and supporting equipment in the landscape impact study.

The company has also identified five areas of program design that public funding agencies should keep in mind as they implement the IIJA or other state programs:

1) **Deploy funding quickly with multiple funding rounds:** Have multiple program windows per year for continuous development and the opportunity to adjust programmatic details based on learnings. Allow administrators time to reevaluate through several, small solicitations per year instead of one large lump sum. Issue a small amount of funding first to jumpstart the market and adapt later based on learnings.

2) **Value charger locations with a transparent scoring rubric:** Provide an explicit, points-based score card to evaluate applications. This guidance tells the EVSP what program administrators are seeking for an ideal DCFC location so the EVSP may tailor projects accordingly. Specify criteria, not locations.

3) **Publish a schedule and stick to it:** Give charging networks a clear indication of when EVSE programs will launch and commit to those timelines to provide certainty to potential applicants and the market overall. The schedule should include the open date for the request for proposals (RFP), a commitment for a decision timeline from the funder, a timeline for redlines, and deadlines for charger energization.

4) **Solicit public comment on RFP design:** Releasing the RFP after publishing draft guidelines allows charging-network operators to spot red flags that may impede successful projects from moving forward, suggest best practices from other successful programs, and share the latest EV-charging technology.

5) **Allow the EVSP to build at risk:** Charging-network operators should be allowed to build at their own financial risk between the time the program starts accepting applications to when the grant is awarded. If an application receives an award, those expenses should be reimbursable.

Finally, the company identified five areas for utilities to focus on to streamline EV-charging deployment in their service territories:

1) **Easement process streamlining:** Utilities should make easement language available to the public and should dedicate right-of-way resources to EV developers for work on public property.

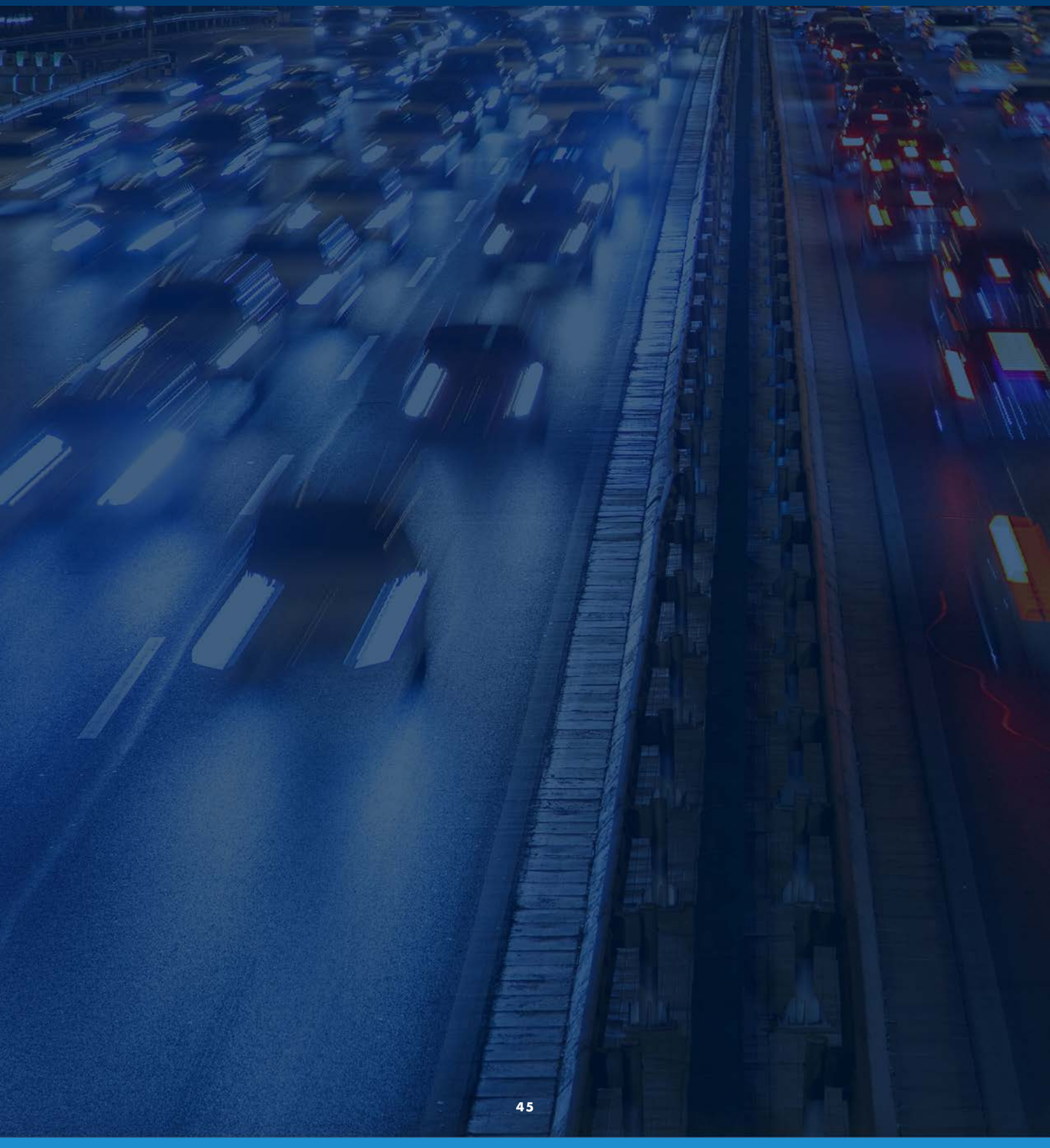
2) **Utility equipment inventory maintenance:** Maintain an inventory of transformers instead of having each "made to order." Locality permitting must typically be completed within one year of being approved. However, long-lead items such as transformers that are the responsibility of the utility may take up to 20 weeks to obtain, thus putting the project in jeopardy. Moreover, ordering utility equipment once the project has been assigned allows for a faster timeline.

3) **Design and construction staffing:** EV-dedicated design and construction resources can lead to a 40-day design cycle time and four-week utility construction timeframe.

4) **Study phase streamlining:** Meet with an EV team specialist to provide an assessment of interconnection options.

5) **Utility design approvals streamlining:** Have dedicated EV staff who are already familiar with fast-charger installation projects, self-imposed deadlines for turnaround, and enough staff to be able to handle project volume.

GLOSSARY AND WORKS CITED



Glossary

ADA	Americans with Disability Act
AHJ	authorities having jurisdiction
DCFC	direct current fast charging
ERIG	Emissions Reduction Incentive Grants
EV	electric vehicle
EVCS	electric vehicle charging station
EVSE	electric vehicle supply equipment
EVSP	electric vehicle service provider
IIJA	Infrastructure Investment and Jobs Act
IMR	installer, maintainer or repairer
MassEVIP	Massachusetts Electric Vehicle Incentive Program
MPO	metropolitan planning organizations
PEV	plug-in electric vehicle
PSC	public service commission
PUC	public utility commissions
RFP	request for proposals
TOU	time of use

Works Cited

4 California Code of Regulations §§ 4001, 4002.11 (2020).

83 Illinois Administrative Code § 469.120 (2020).

Administrative Code of Arkansas § 15-10-903 (2020).

Advanced Grid, "An EV Future: Navigating the Transition," Research Office of Electricity, U.S. Department of Energy, https://www.evplusgridworkshop.com/.

Arizona Corporation Commission, docket number E-01933A-17-0250, Tucson Electric Power Company, filed August 1, 2017, https://edocket.azcc.gov/search/docket-search/item-detail/20126.

Atlanta Code of Ordinances Sec. 16-28.017 (2021).

Berkeley Municipal Code, Section 19.15 (2021).

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.

California Air Resource Board, *EVSE Standards Regulation, Final Order*, June 2020, available at https://ww2.arb.ca.gov/our-work/programs/electric-vehicle-supply-equipment-evse-standards.

California Governor's Office of Business and Economic Development, *Electric Vehicle Charging Station Permitting Guidebook*, July 2019, https://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf.

California Health and Safety Code §§ 44268, 44268.2 (2020).

Capital District Clean Communities Coalition, Capital District Transportation Committee, and Capital District Regional Planning Commission, *Town of Colonie, Enhanced Development Regulations: Electric Vehicle Zoning Guidance & Best Practices*, March 21, 2021, https://mcusercontent.com/0ceacc853dc73fbc4cac713a5/files/6a662a53-4b30-7aef-d341-d33c93d74ccf/EV_Zoning_Guidance_and_Best_Practices_White_Paper_Town_of_Colonie_NY.pdf.

"Charging at Home," Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, accessed May 4, 2021, https://www.energy.gov/eere/electricvehicles/charging-home.

Chicago City Ordinance SO2019-8025 (April 24, 2020).

City of Boston, *How to Guide: Electric Vehicle Charger Installation*, December 2019, https://www.boston.gov/sites/default/files/file/2019/12/How%20To%20Install%20an%20EVSE.pdf.

City of Denver Community Planning and Development, Code Amendment Proposal (2019).

City of Tustin, *Eligibility Checklist for Expedited Electric Vehicle Charging Station Permit: Non-Residential Buildings and Facilities*, August 2017, https://www.tustinca.org/DocumentCenter/View/647/EVCharger-Eligibility-Checklist--Non-Residential-PDF.

Clayton County [Georgia] Code of Ordinances, Section 4.87(L) (2021).

Colorado Revised Statutes 41-1-103.3, 41-3-116, and 40-5-107 (2021).

Colorado Senate Bill 19, 077 (2019),

"Connect the Watts with the EVgo Charging Station Ecosystem," EVgo Services LLC, https://www.evgo.com/connect-the-watts/. Connecticut General Statutes § 16-19ggg (2016).

Connecticut General Statutes 16-19f (2021).

"Electric Vehicle Charging Station Locations," Alternative Fuels Data Center, U.S. Department of Energy, accessed Dec. 9, 2021, https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC&ev_levels=dc_fast&ev_levels=3.

EVgo, *Best Practices for Charging Infrastructure Program Design: Local Permits*, https://site-assets.evgo.com/f/78437/x/0a6d0c7746/connect-the-watts-compendium.pdf (last accessed November 4, 2021).

EVgo, *Best Practices for Charging Infrastructure Program Design*: Public Funding, https://site-assets.evgo.com/f/78437/x/0a6d0c7746/connect-the-watts-compendium.pdf (last accessed November 4, 2021).

EVgo, *Best Practices for Charging Infrastructure Program Design: The EV Charging Ecosystem*, https://site-assets.evgo.com/f/78437/x/99bf9cc6f8/connect-the-watts_overview.pdf (last accessed November 4, 2021).

"EV Infrastructure Building Codes: Adoption Toolkit," Southwest Energy Efficiency Project, https://www.swenergy.org/transportation/electric-vehicles/building-codes.

Fitzgerald, Garrett and Chris Nelder, *EVgo Fleet and Tariff Analysis: Phase 1: California* (Boulder, CO: Rocky Mountain Institute, April 2017) https://rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf.

Fuels Institute, *EV Market Regulatory Report*, March 2021, https://www.fuelsinstitute.org/Research/Reports/EV-Market-Regulatory-Report.

Fuels Institute, *Installing and Operating Public Electric Vehicle Charging Infrastructure*, August 6, 2021, https://www.fuelsinstitute.org/Research/Reports/Installing-and-Operating-Public-Electric-Vehicle-C.

Hawaii Public Utilities Commission, docket number 2018-0422, Maui Electric Company, Limited, filed December 21, 2018, https://dms.puc.hawaii.gov/dms/dockets?action=details&docketNumber=2018-0422.

Houston Permitting Center, *Electrical Vehicle Charging Outlets Permit*, https://www.houstonpermittingcenter.org/hpwcode1056.

Infrastructure Investment and Jobs Act, H.R. 3684 (became Public Law No: 117-58 on November 15, 2021), available at https://www.congress.gov/bill/117th-congress/house-bill/3684/text.

Jersey City Code of Ordinances, Section 332-28.1 (2021).

"Justice40 Initiative," U.S. Department of Transportation, last updated November 18, 2021, https://www.transportation.gov/equity-Justice40.

Kansas City [Missouri] Zoning and Development Code, Section 88-305-10-E (2021)

Maine Public Utilities Commission, case number 2019-00217, *Commission Initiated Request for Proposals for Pilot Programs to Support Beneficial Electrification of the Transportation Sector* (P.L. 2019 CH. 365, Section 5), case start August 20, 2019, https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2019-00217.

Massachusetts Department of Environmental Protection, *MassEVIP Public Access Charging (PAC) Program Requirements*, December 4, 2020, accessed Aug. 31, 2021, https://www.mass.gov/doc/massevip-public-access-charging-requirements/download.

McFarlane, Dane and Matt Prorok, *Analysis: How Demand Charges Impact Electric Vehicle Fast Charging Infrastructure*, July 31, 2019, Great Plains Institute for Sustainable Development, https://betterenergy.org/blog/demand-charges-and-dcfc/.

McFarlane, Dane, Matt Prorok, Brendan Jordan, and Tam Kemabonta, *Analytical White Paper: Overcoming Barriers to Expanding Fast Charging Infrastructure in the Midcontinent Region* (Minneapolis, Minnesota: Midcontinent Transportation Electrification Collaborative on behalf of the Great Plains Institute, July 2019), https://scripts.betterenergy.org/reports/GPI_DCFC_Analysis_July_2019.pdf.

Mesa [Arizona] Code of Ordinances, Section 11-32-4 (2021).

Miami-Dade [Florida] County Code of Ordinances, Section 33-122.5 (2021).

Minnesota Statutes §§ 325F.185, 326B.35 (2020).

Montgomery County [Maryland] Code, Section 6.2.5.F (2021).

"Municipal EV Toolkit," Maine Clean Communities, https://www.mainecleancommunities.org/municipal-ev-toolkit. Naperville [Illinois] Code of Ordinances, Section 11-2A-23 (2021).

Nelder, Chris and Emily Rogers, *Reducing EV Charging Infrastructure Costs*, Rocky Mountain Institute, 2019, https://rmi.org/ev-charging-costs.

New Hampshire Revised Statutes § 236:131 (2020).

New Jersey Senate Bill 3223, Pamphlet Law, July 19, 2021, https://www.njleg.state.nj.us/2020/Bills/S3500/3223_R1.PDF.

New Mexico House Bill 521, 2019.

New Mexico Statutes 62-3 (2021).

Oklahoma Statutes § 68-2357.22 (2014).

Oregon Administrative Rules § 918-311-0065 (2021).

"Plug-in Electric Vehicle Charging Station Readiness," California Governor's Office of Business and Economic Development, https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/.Revised Code of Washington § 19.27.540 (2021).

Revised Code of Washington 47.04.350 (2019).

Riverside County [California] Code of Ordinances, Section 17.188.045 (2021).

Rogotzke, Matthew, Garrett Eucalitto, and 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.

San Jose [California] Municipal Code, Section 24.10.300 (2021).

Seattle Municipal Code, Section 23.54.030(L) (2021).

Sedona [Arizona] City Code, Section 15.45 (2021).

Smart Electric Power Alliance, *Utility Best Practices for EV Infrastructure Deployment*, June 2020, https://sepapower.org/resource/best-practices-for-utility-ev-infrastructure-deployment/.

State of New York Public Service Commission, Case 18-E-0138, *Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs*, issued and effective July 16, 2020, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b6238DD07-3974-4C4E-9201-3E339E311916%7d.

Tacoma [Washington] Municipal Code, Building and Development Code, Section 2.02.136 (2021).

Texas Administrative Code 114.620-114.629 (2021).

Texas Statutes Health and Safety Code 386 (2019).

The Dallas City Code, Section SEC. 51A-4.217 (2021).

"EV Infrastructure Building Codes: Adoption Toolkit," Southwest Energy Efficiency Project, https://www.swenergy.org/transportation/electric-vehicles/building-codes.

Town of North Hempstead, New York, Municipal Code, Section 70-203X (2021).

Utah House Bill 396 (2020) and Utah Code 54-4-41 (2018).

Electric Vehicle Council
Powered by Fuels Institute

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.

For more about the Fuels Institute, visit fuelsinstitute.org.

FUELS INSTITUTE STAFF

John Eichberger
Executive Director
jeichberger@fuelsinstitute.org

Jeff Hove
Vice President
jhove@fuelsinstitute.org

Amanda Patterson
Communications & Projects Coordinator
apatterson@fuelsinstitute.org

Amanda Appelbaum
Director, Research
aappelbaum@fuelsinstitute.org

Marjorie Kass
Director, Marketing and Communications
mkass@fuelsinstitute.org

For a list of current Fuels Institute Board members and financial supporters, please visit fuelsinstitute.org.

Fuels Institute

OBJECTIVE • COLLABORATIVE • RESEARCH

(703) 518-7970
FUELSINSTITUTE.ORG
@FUELSINSTITUTE

1600 DUKE STREET
SUITE 700
ALEXANDRIA, VA 22314