

Roadmap for Electric Transportation: Model Legislation



Legal disclaimer

Model legislation builds upon the best practices seen in current state legislation and looks to the future for improvements to existing laws. Each model legislative option found in this kit is a starting point for legislators and interested stakeholders. The model legislative provisions are intended to be modified to the particularities of state legal systems and administrative cultures.

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How to Use This Legislative Kit

Many state legislators are trying to understand how transportation electrification can benefit their state. Staff at the Regulatory Assistance Project have scoured state legislative and regulatory experience to assemble a complete and useful resource for legislators interested in accelerating electric vehicle deployment. The kit includes this set of model legislative options with annotations noting their implications, as well as a policy guide, a fact sheet and presentation slides.

This model legislation and the guide also anticipate many new questions. Users should expect there will be questions and issues that go beyond those contemplated here, as that is the nature of innovation.

Policy Guide

The full kit begins with a policy guide providing a general overview of transportation electrification. The guide provides legislators and their staff members an overview of electric vehicle issues and options. It begins with a look at the merits of such legislation to answer the all-important question: “Why?” From there this resource outlines the “what” and “how” of the many issues and options. Armed with this, legislators and staff can dig into the detailed model legislation and supporting resources to craft a plan for electrification that saves consumers money, reduces environmental damage and meets the particular goals of their state.

Model Legislation and Annotations

Each state has unique circumstances, culture and goals that make a one-size-fits-all legislative approach impractical and impossible. This kit recognizes that some states may be starting from scratch while others have existing legislation. This resource provides model legislation and annotations to allow each state to craft legislative provisions that work best within their environment. This model legislation offers a menu of options for most provisions, allowing legislators to choose a provision that works best for the circumstances in their state. Annotations (set off in text boxes) are interspersed with the model legislative provisions, explaining the pros and cons of the provision and analysis of the various options offered, as well as links to additional information. These model legislative options are meant to provide a variety of approaches to accomplish a legislative goal. Many of the provisions are based on existing legislation from across the U.S. but have been changed or edited to make them more widely applicable.

Fact Sheet and Presentation Slides

This kit also contains a two-page fact sheet and a PowerPoint presentation explaining the legislation and options. Legislators can use these materials as a starting point to explain the issues to their colleagues and constituents.

The full legislative kit is available for download at www.raponline.org/EV-roadmap

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Part I:

Plan Your Destination

Planning

Section 1: Legislative Findings and Intent

Why the provision was included

Legislation in many jurisdictions starts with specific findings and intent. This section provides findings and intent language

from multiple states. The findings are grouped by topic area and provide insight into the different motivations for states enacting legislation on transportation electrification.

Findings Provision

- (a) The Legislature finds and declares electrification of the transportation sector to be in the public interest because it can save consumers and the state money in the long term and reduce negative environmental impacts. The Legislature further finds the following:

State Electric Vehicle Plan Findings

- (1) The economic and social well-being of the residents of [state] will be enhanced by the cost-effective development of electric transportation and access to electricity as a transportation fuel and the ability to share the benefits of this new mode of transportation — regardless of a consumer's specific economic and geographic circumstances.
- (2) Electric transportation can benefit [state] consumers economically over the long run, due to growing availability of lower-cost electric vehicles (EVs) and lower operating and maintenance costs associated with electric vehicles.
- (3) The State has not established goals for the use of plug-in electric vehicles or programs to encourage the use of these vehicles.
- (4) An important part of increasing the use of plug-in electric vehicles is the development of a statewide plug-in electric vehicle charging infrastructure that supports the use of plug-in electric vehicles, as well as policies, regulations and programs to support that development.
- (5) State agencies require clear direction to create and implement the necessary policies, regulations, programs, initiatives and incentives.

State Electric Vehicle Plan Determinations

- (1) It is in the public interest to: establish goals for the increased use of plug-in electric vehicles; pursue attainment of those goals through the development of a statewide plug-in electric vehicle charging infrastructure; and develop this infrastructure by establishing a statewide electric vehicle charging infrastructure plan.
- (2) The following state agencies will participate in the development of a statewide electric vehicle charging infrastructure plan: [relevant state agencies]. [x state agency] shall be responsible for leading this effort, which shall include inviting the participation of the enumerated state agencies, interested stakeholders, consumer advocates, environmental advocates and other subject matter experts in the development and establishment of the plan. Together, these entities shall form the [name of committee].

- (3) The State shall further bolster the increased use of plug-in electric vehicles by providing rebates for the purchase of these vehicles and maximize consumer awareness of the availability of rebates and public plug-in electric vehicle charging infrastructure through statewide public education programs led by [x state agency].

Charging Infrastructure Findings

- (1) The State's dependence on imported fossil fuels costs billions of dollars each year [much of which immediately leaves the State's economy], and ground transportation accounts for approximately [x]% of all imported oil. Accordingly, any increase in the price of imported fuel creates significant burdens on the economy and increases costs to local communities, families and businesses.
- (2) The Legislature notes that alternative vehicles and methods of transportation can help to alleviate the economic and financial burden of fossil fuels. However, in order for local consumers and families to benefit from alternative vehicles and reduce their reliance on vehicles that use fossil fuels, the State must make significant efforts to establish critical electric vehicle infrastructure, including, but not limited to, electric vehicle charging stations.
- (3) Other states and municipalities have set standards for new construction to include "electric vehicle ready," or EV-ready, parking stalls, thus ensuring the efficient implementation of electric vehicle charging stations in the future.
- (4) The majority of electric vehicle drivers currently use their respective homes as the primary site for charging their vehicles. Therefore, in order to increase the use of electric vehicles, the State needs to expand access to electric vehicle charging stations in new state building construction. Estimates show that electric vehicle infrastructure costs account for less than [x]% of the total construction costs of a project, while the cost to retrofit existing buildings can be more than three times this amount.
- (5) Consumer reluctance to purchase electric vehicles often centers on the concern for the availability of charging stations outside the home when needed.
- (6) The current efforts to develop and designate parking spaces and provide charging facilities for electric vehicles are not adequate to meet the charging needs of the State's population.
- (7) It is therefore necessary for the State to implement policies that help catalyze the development of the charging facilities necessary to support the large-scale adoption of electric vehicles.

Grid Management Benefits

- (1) The appropriate management of electric vehicle charging, including through policies such as smart electricity pricing tools, can result in lower electricity costs for the electric grid as well as for the consumer charging the electric vehicle. It will also have positive impacts on the grid while reducing the negative environmental effects of burning fossil fuel-based transportation fuels.
- (2) The development of electric transportation will enable lower-cost grid management and improved flexibility, efficiency and reliability of [state]'s electric power grid due to electric vehicles' (i) operational flexibility with the potential to function as electric load (while charging) and storage (storing energy in batteries for efficient use as transportation fuel or if discharging back to the grid), (ii) embedded communications and technology.
- (3) Electric vehicles and charging infrastructure currently available could assist in grid management and the integration of eligible renewable energy resources while contributing to minimizing curtailment of zero-cost or very low-cost renewable energy.
- (4) Electric vehicles reduce fuel costs for vehicle owners, and time-of-use electric rates can encourage charging that is compatible with electrical grid conditions.

- (5) Programs for the electrification of transportation have the potential to allow electric utilities to optimize the use of electric grid infrastructure, improve the management of electric loads and better manage the integration of variable renewable energy resources. Depending upon each utility's unique circumstances, electrification of transportation programs may provide cost-effective energy efficiency through more efficient use of energy resources and the electric delivery system.
- (6) It is feasible and practicable to adjust the period during which an electric vehicle charges, in part or in full, to reduce its cost impact during periods of peak demand or grid congestion, to utilize available renewable electric generation, to avoid curtailments of renewable electric generation and to provide reliability services.
- (7) Time-of-use rates for customers with electric vehicles can reduce costs or mitigate cost increases for all ratepayers due to increased usage of electric vehicles by incentivizing electric vehicle charging at periods of low demand and low grid congestion.
- (8) It is, therefore, the policy of the State and the intent of the Legislature to maximize net ratepayer and grid benefits from transportation electrification and reduce costs or mitigate cost increases for all ratepayers due to increased usage of electric vehicles by accelerating electric vehicle grid integration and by ensuring that any investments in transportation electrification do not foreclose the electric vehicle grid integration potential of these investments.

Integration of Renewable Energy

- (1) Widespread electric vehicle adoption benefits the public by helping to integrate renewable resources and reducing the need to unnecessarily curtail them. The integration and effective utilization of renewable energy generation reduces the carbon content of electricity and improves the environmental footprint of [state]'s electricity power sector.

Job Creation

- (1) Widespread adoption of electric vehicles should stimulate innovation, competition and increased choices in charging and fueling equipment and charging and fueling networks and should also attract private capital investments and create high-quality jobs in [state].

Low-Income and Disadvantaged Communities

- (1) Barriers to access for low-income customers to zero-emission and near-zero-emission transportation options need to be addressed.
- (2) Low-income communities typically experience more severe health impacts from vehicle tailpipe emissions because these communities are often located near major roadways and transportation hubs. These emissions increase the risks of asthma, cancer and other pollution-related illnesses.
- (3) For a mass transition to clean vehicles to happen, electric vehicles have to be adopted by and made affordable for low-income communities and communities disproportionately impacted by vehicle pollution.

Air Quality and Climate Goals

- (1) It is the policy of [state] and the intent of the Legislature to encourage transportation electrification as a means to achieve ambient air quality standards and the State's climate goals.
- (2) Vehicle electrification offers a wide range of benefits, such as improved air quality, reduced greenhouse gas emissions, and savings in motor vehicle operating costs for vehicle owners. Increased use of plug-in electric vehicles can contribute significantly to the attainment of existing state air pollution and energy goals.
- (3) Electric vehicles can be powered by electricity generated from local, renewable energy resources that offer lower fuel and operating costs and that maintain local jobs. Due to these advantages, electric vehicles must play an important role in helping the State achieve its clean energy goals and commitments.
- (4) The transportation sector is [state's] largest contributor to greenhouse gas emissions and hazardous air pollutants as defined by federal national ambient air quality standards and mobile source air toxics rules.
- (5) Federal Clean Air Act regulations and complementary policies supporting renewable energy generation, energy efficiency and energy conservation are likely to result in further reduction of emissions in electricity and in the combined residential, commercial and industrial sectors.
- (6) State policy can achieve the greatest return on investment in reducing greenhouse gas emissions and improving air quality by expediting the transition to alternative fuel vehicles, including electric vehicles.

Public Vehicle Fleets Findings

- (1) The Legislature finds that electric vehicles, battery technology and grid technology are already sufficiently advanced to transition most of [state's] publicly owned vehicles to electric vehicles.
- (2) The transition to an electrically powered fleet of public vehicles would spur jobs and economic development based on new technologies and would stem the outflow of millions of dollars from [state] taxpayers to foreign oil providers and keep those dollars local.
- (3) The transition to an electrically powered fleet of public vehicles would save [state] taxpayers millions of dollars in fuel and vehicle maintenance costs each year.
- (4) It is the intent of the Legislature that the [relevant department] lead by example and establish a plan and rules for switching to electric vehicles by all public agencies in [state], including, but not limited to, state agencies, public colleges and universities, counties, cities, villages and any unincorporated local government, in a manner that minimizes costs and maximizes benefits for [state's] economy, improves and modernizes [state's] energy infrastructure and maintains electric system reliability.

Local Agency Actions

- (1) It is the intent of the Legislature that local agencies not adopt ordinances that create unreasonable barriers to the installation of electric vehicle charging stations and not unreasonably restrict the ability of homeowners and agricultural and business concerns to install electric vehicle charging stations.
- (2) It is the intent of the Legislature that local agencies comply not only with the language of this section but also the legislative intent to encourage the installation of electric vehicle charging stations by removing obstacles to, and minimizing costs of, permitting for charging stations so long as the action does not supersede the building official's authority to identify and address higher priority life-safety situations.

Miscellaneous

- (1) Electric vehicles provide benefits to the public in terms of noise abatement.

Planning

Section 2: Definitions

- (a) “Charger ready” means the prewiring of electrical infrastructure at a parking space, or set of parking spaces, to facilitate easy and cost-efficient future installation of electric vehicle supply equipment, including, but not limited to, Level 2 and DC fast chargers, and a clearly defined process by which prospective users of vehicle chargers may request and benefit from installation of appropriate electric vehicle supply equipment at the prewired parking space.
- (b) “Charging location” means a publicly accessible parking space or set of parking spaces, with visible signage designating that the parking space or spaces are available for use by the public for charging plug-in electric vehicles.
- (c) “Community location” means a charging location that is not a corridor location and that is established in a town center, commercial area, retail center or other site or near concentrations of multifamily dwellings to provide vehicle charging services to local plug-in electric vehicle drivers near where they live or work.
- (d) “Corridor location” means a charging location located along a travel corridor roadway, or within two miles of that roadway, that is intended to provide access to vehicle charging services for long distance drivers and en-route vehicle charging services for local drivers.
- (e) “DC fast charger” means electric vehicle supply equipment that provides at least 50 kilowatts of direct current electrical power for charging a plug-in electric vehicle through a standardized connector and that is approved for installation for that purpose under the National Electrical Code through Underwriters Laboratories certification or an equivalent certifying organization.
- (f) “Electric vehicle supply equipment” (EVSE) means the equipment, including the cables, cords, conductors, connectors, couplers, enclosures, attachment plugs, power outlets, switches and controls, network interfaces and point of sale equipment and associated apparatus designed and used for the purpose of transferring energy from the electric supply system to a plug-in electric vehicle. EVSE may deliver either alternating current or direct current electricity as determined by industry equipment standards.
- (g) “Essential Public Charging Network” or network means the public charging infrastructure installed as part of a statewide initiative to encourage the plug-in electric vehicle market in the State, which provides a basic level of statewide public charging infrastructure sufficient to minimize range anxiety and meet other public charging needs.
- (h) “Industry equipment standards” means the electric vehicle charging equipment industry standards, including the CHAdeMO standard and the Society of Automotive Engineers Combined Charging System (CCS).
- (i) “Level 1 EVSE” means a supply of single phase 120 VAC (volts of alternating current) electricity, presented as either a standard wall plug into which the charging cord provided with a plug-in electric vehicle can be connected, or EVSE with a standard vehicle plug connector that complies with SAE J1772, or an equivalent standard for 120 VAC charging as may be adopted in the future and accepted by [state agency in charge of standards] and that is approved for installation for this purpose under the National Electrical Code through Underwriters Laboratories certification or an equivalent certifying organization.
- (j) “Level 2 EVSE” means EVSE that provides a plug-in electric vehicle with single phase alternating current electrical power at 208-240 VAC, through a standardized plug connector that complies with SAE J1772 standards, or an equivalent wireless power transfer interface, or equivalent standards for 208-240 VAC charging as may be adopted in the future and accepted by [state agency in charge of standards] and that is approved for installation for this purpose under the National Electrical Code through Underwriters Laboratories certification or an equivalent certifying organization.

- (k) “Light-duty vehicle” means any two-axle, four-wheel vehicle designed primarily for passenger travel or light-duty commercial use and approved for travel on public roads. Light-duty vehicles include, but are not limited to, any vehicle commonly referred to as a car, minivan, sport utility vehicle, crossover SUV or pickup truck.
- (l) “Plug-in electric vehicle” means a vehicle that has a battery or equivalent energy storage device that can be charged from an electricity supply external to the vehicle with an electric plug. A plug-in electric vehicle includes a plug-in hybrid vehicle.
- (m) “Plug-in hybrid vehicle” means a vehicle that can be charged from a source of electricity external to the vehicle through an electric plug but is not exclusively powered by electricity.
- (n) “Travel corridor” means heavily used public roads in the State, as designated by the [relevant agency], which shall include, but need not be limited to, federal interstate highways and the subset of federal or state roads that collectively support the majority of long-distance travel through and within the State as well as the majority of daily travel by local drivers.
- (o) “Public electric vehicle charging station” means an electric vehicle charging station located at a publicly available parking space.
- (p) “Publicly available parking space” means a parking space that has been designated by a property owner or lessee to be available to and accessible by the public and may include on-street parking spaces and parking spaces in surface lots or parking garages; provided, however, that a publicly available parking space shall not include a parking space that is part of or associated with a private residence or a parking space that is reserved for the exclusive use of an individual driver or vehicle or for a group of drivers or vehicles, including employees, tenants, visitors, residents of a common interest development or residents of an adjacent building.
- (q) “Zero-emission vehicle” means a battery electric vehicle, hybrid electric vehicle or range-extended electric vehicle that produces no criteria pollutant, toxic air contaminant or greenhouse gas emissions when stationary or operating.



Planning

Section 3: State Goals

Why the provision was included

Setting and meeting transportation goals¹ is a major force behind state efforts to develop markets for EVs. States have used a variety of ways to articulate clean transportation goals, which in turn drive demand and form the underpinnings of an EV market. Understanding the role that clean transportation goals play is a good starting point for understanding the steps a state might take in developing a market for EVs. A central part of the rationale for setting clean transportation goals is “cross-fuel efficiency,” i.e., the avoided energy use resulting from the electrification of transportation.² States have set goals, either legislatively or by executive order, for: a mandate on auto dealers to sell an increasing amount of EVs; requirements that state and local fleets lease or purchase EVs by increasing amounts; requirements for EV parking in multifamily housing; requirements for increasing numbers of charging stations and types, and so on.

This provision offers a menu of different types of state goals that reflect the particular interests of the state. Setting goals changes EV adoption in a state from business as usual and envisions constant improvement along a defined metric. States that provide more incentives, either at the state or utility level, experience more vehicle sales.³ This provision gives options for the various types of goals a state may wish to pursue for electric vehicles. Such goals should take into account market trends and government (state and federal) incentives. Legislators should keep in mind that the goals should be attainable and may consult experts on realistic goals for the technology and relevant sectors. Currently, many of the provisions focus on light-duty goals, but as mass transit and heavy-duty vehicles and data become more available, states can set these goals as well.

State Goal Provisions

- (a) There are hereby established the following [state] goals for the use of electric vehicles and the development of electric vehicle charging infrastructure in the State for the uses set forth below in paragraphs (1) through (6) of this subsection. The [state agency or agencies in charge] shall establish planning and funding to meet the following [goals]:
- (1) Light-duty vehicles
- (A) At least [x]% of the registered light-duty vehicles in the State should be electric vehicles by [x date].
 - (B) At least [increasing x]% of the registered light-duty vehicles in the State should be electric vehicles by [x date].
 - (C) At least [x]% of all new light-duty vehicles sold in the State should be electric vehicles by [x date].

1 States have articulated these “goals” in a number of ways. A goal can be a nonbinding target, with no specific or enforceable consequences if it is missed. States have also set binding requirements or mandates that require certain actions by state agencies, auto dealers, housing owners, utilities and others. Requirements typically have penalties or other consequences that result if the relevant entity does not comply.

2 Regulatory Assistance Project. (2017, May). *Getting from here to there: Regulatory considerations for transportation electrification*. Montpelier, VT:

Author. Retrieved from <https://www.raponline.org/knowledge-center/getting-from-here-to-there-regulatory-considerations-for-transportation-electrification/>

3 Munoz, F. (2019, April 9). A breakdown of the US EV market by state shows more incentives equals more sales [Blog post]. Jato Dynamics. Retrieved from <https://www.jato.com/a-breakdown-of-the-us-ev-market-by-state-shows-more-incentives-equals-more-sales/>

(2) Fast chargers

- (A) By [x date], at least [x number] DC fast chargers shall be available for public use at no less than [x number] charging locations in the State, in addition to any charging locations or EVSE already in place [current number of DC fast chargers in state] as of [x date]. In meeting this goal, the [state agency in charge] shall ensure to the best of its ability that there is sufficient distribution infrastructure to meet future electrification needs and that:
- (i) for highway corridors, at least [x]% of the charging locations shall be at travel corridor locations, equipped with at least two DC fast chargers per location, each capable of providing at least [x] kilowatts of charging power, and no more than [x] miles between the charging locations; and that
 - (ii) for community centers, at least [x% or fraction] or more charging locations shall be community locations, equipped with at least two DC fast chargers per location, each capable of providing at least 50 kilowatts of charging power or more and 150 kilowatts or more where feasible.
- (B) By [x date], at least [x number Level 2 chargers] shall be available for public use across the State.
- (C) By [x date], at least [x number Level 2 chargers/DC fast chargers] shall be available for every [x number] electric vehicles registered in the State.

(3) Public property parking

- (A) By [x date], 25% of public property in the State shall provide at least two dedicated parking spaces and two charging plugs for either Level 1 or Level 2 EVSE to their employees for routine electric vehicle charging on or near the property.
- (B) By [x date], 50% of public property in the State shall provide parking spaces and electric vehicle charging equipment as described in subparagraph (A) of this paragraph.

(4) State-owned vehicles

- (A) By [x date], at least 50% of state-owned nonemergency light-duty vehicles shall be electric vehicles.
- (B) By [x date] and thereafter, 100% of state-owned nonemergency light-duty vehicles shall be electric vehicles.

(5) State transit authorities

- (A) By the end of calendar year [x], at least [x]% of new bus purchases made by the [state transit authority] shall be electric vehicles.
- (B) The percentage of electric vehicle purchases shall increase to [x]% in [x date], [x]% in [x date], [x]% in [x date], [x]% in [x date], [x]% in [x date] and 100% in [x date] and thereafter, with vehicle electrification prioritized for low-income, urban or environmental justice communities.

(6) By [x date], other benchmarks shall be established by [relevant legislative committee] [relevant state agency] for vehicle electrification and infrastructure development that address medium- and heavy-duty on-road diesel vehicles and associated charging infrastructure, similar to the state goals for light-duty vehicles and consistent with the technology and electric vehicle markets for those vehicle types. Such recommended benchmarks shall be submitted by [relevant legislative body] by [x date] [annually] by [relevant state agency annually] for consideration of further legislation.

Analysis

States that set specific EV goals do so for a variety of reasons including: reduced greenhouse gas emissions, improved air quality, greater end-use energy efficiency, low and stable operating costs, greater energy security, state and regional economic gains, more efficient utilization of the electricity grid, and integration of renewable energy and other grid services.⁴ Setting goals makes it more likely that an EV market, including supporting businesses, will be created sooner and lead to attainment of these benefits of an electrified transportation sector. States have set goals legislatively and by executive order. Some states have included EV goals as part of a larger EV policy plan. These examples are from a variety of states and show the breadth of legislative findings on EVs. These goals are usually tied with other legislative provisions, such as policy plans, state fleet requirements and so on, which are discussed later in this legislative package.

In crafting their goals for the buildout of EVSE, states will need to determine the appropriate type and number of charging stations for different locations and needs. Various

technologies exist for charging electric vehicles. The most common EV charging services fall into three broad categories or levels, described in the table below.

Because EVSE capabilities and drivers' charging needs vary widely, the right type and number of charging stations will vary by region, state, city and neighborhood based on factors such as the types of trips drivers need to take and the population density of a particular location. According to Rocky Mountain Institute's 2017 *From Gas to Grid* report, although it is too soon to tell what the right mix of chargers will be, it's safe to say that a widely available charging network will require a mix of Level 2 and DC fast chargers, and so state deployment plans should include both. Thus far, RMI notes, customers have had to rely on Level 1 or 2 charging at home for the majority of their commuting needs, then call on public DC fast chargers for long-distance trips or for a quick top-off while running a day's errands. As the mix of EV drivers and uses changes over time, the optimal mix of chargers will change. Furthermore, the optimal mix of chargers and the overall need for public charging may change as EV technology itself changes (e.g., increased battery size and vehicle range).

Type	Voltage	Considerations	Use cases
Level 1	120	<ul style="list-style-type: none">• 11 to 12 hours to charge*• Cannot be remotely controlled to charge at certain times (though most EVs can control their charging)• Low cost; does not require installation of EV-specific charging equipment	<ul style="list-style-type: none">• Home and some workplace charging
Level 2	208-240	<ul style="list-style-type: none">• 3 to 8 hours to charge*• Can connect to a telecommunications network and recognize customer charging patterns• Moderate cost; requires installation of additional charging equipment (typically several hundred dollars plus installation)	<ul style="list-style-type: none">• Home charging• Workplace charging• Some public charging
DC fast charger	480-plus	<ul style="list-style-type: none">• 30 to 60 minutes to charge*• Can connect to a telecommunications network and recognize customer charging patterns• High cost to install and operate (typically tens of thousands of dollars)	<ul style="list-style-type: none">• Public charging• High-traffic corridors• Fleet charging• Public transit vehicle charging

* Depending on battery size

Sources: U.S. Department of Energy. (undated). *Vehicle charging* [Webpage]. Retrieved from <https://www.energy.gov/eere/electricvehicles/vehicle-charging>; Maryland EV. (undated). *EV charging* [Webpage]. Retrieved from <https://marylandev.org/charging/>; Fitzgerald, G., & Nelder, C. (2017). *From gas to grid: Building charging infrastructure to power electric vehicle demand*. Boulder, CO: Rocky Mountain Institute. Retrieved from <https://rmi.org/wp-content/uploads/2017/10/RMI-From-Gas-To-Grid.pdf>

4 McCoy, J. J. (2016, January). *Building “good load” to reduce carbon emissions: Getting Northwest utilities more involved in widespread transportation electrification*. Seattle, WA: NW Energy Coalition. Retrieved from <http://nwenergy.org/wp-content/uploads/2016/01/Exec-Sum-Pull-Out-1-27-2016.pdf>

Planning

Section 4: State Electric Vehicle Policy Plan

Why the provision was included

Currently, there are relatively low penetrations of electric vehicles, which makes this an ideal time for decision-makers to put processes in place. Legislation can promote alignment with the public interest (reflecting cost, risk and environmental management) and consider the application of some consumer protection guardrails to inform and safeguard newly assertive customers.⁵ Decision-makers should ensure mechanisms to coordinate among various offices of state government and local jurisdictions that will be affected by increased EV penetration and to involve all potential stakeholders. The absence of a plan doesn't mean that EVs won't be adopted;

it just means that the effects of EV integration will be more prone to unintended consequences for state citizens, electricity customers, the environment and EV owners.

Of the options offered in this section, Options 1 and 2 are variations of comprehensive statewide EV plans. Options 3 through 6 are much narrower provisions and are for states that want to focus more narrowly, or they can be added to an existing state plan that does not address these provisions. In general, a more comprehensive state plan will be more effective at electrifying transportation in a state. Narrower provisions may result in unintended consequences if provisions of a more comprehensive plan are not in place.

Comprehensive Planning Provisions

Option 1: Phased EV Policy Plan

- (a) There is hereby created a Transportation Electrification Council (TEC). In establishing this council, the Legislature directs the following:
 - (1) The mandate of the TEC is to develop a transportation electrification plan for the State of [x].
 - (2) Committee membership shall consist of [a member of] the following state agencies: [relevant state agencies]. Additionally, the TEC shall [include/solicit input from] the following stakeholders, including, but not limited to, [a representative from] the [public utility commission], the [state air agency], electrical corporations, local publicly owned electric utilities, state and local transportation and transit agencies, charging infrastructure companies, environmental groups, consumer advocates, automobile manufacturers and interested members of the public.
 - (3) TEC duties shall include:
 - (A) creating a phased transportation electrification plan for the State by [x date]; and
 - (B) submitting annual reports thereafter on the progress of the transportation electrification plan.
 - (4) The TEC shall have the authority to:
 - (A) convene meetings and solicit comments from stakeholders in order to obtain public input;
 - (B) contract with experts as needed to carry out its authority; and
 - (C) adopt such other authority as may be reasonably necessary to carry out the intent of this legislation.

⁵ Regulatory Assistance Project, 2017.

- (5) The [TEC shall have an annual budget of x] [director of the TEC shall have the authority to request a budget through x agency to support the TEC duties articulated herein].
 - (6) The Governor shall determine within 60 days of the effective date of this legislation which agency director shall lead the TEC.
 - (7) The TEC shall terminate one year after the date of its final report, unless otherwise authorized to continue by the Legislature.
- (b) Recognizing the increasing growth in consumer adoption of transportation electrification, the Legislature directs that the following phased approach is necessary to enable [state] residents to realize the benefits of transportation electrification. Such plan shall incorporate and refine existing EV programs within the State: [indicate necessary revisions to existing statutes]. While this policy plan is being developed, existing programs pertaining to EVs shall be continued. The Legislature directs the TEC to develop a transportation electrification plan consistent with the following guidelines:
- (1) Within 365 days of the passage of this legislation, the TEC shall develop a transportation electrification policy plan, with input from a stakeholder group, that shall include, at a minimum, the following elements:
 - (A) Assess existing state rebates, income tax credits and sales and excise tax exemptions and determine whether such programs are sufficient for [state's] transportation goals. Additionally, the stakeholder group shall consider new programs and outreach efforts that could improve access to incentives among moderate- and lower-income consumers and rural consumers.
 - (B) Articulate uses for Volkswagen settlement money as well as other available funding sources.
 - (C) Provide information on best practices from other states.
 - (D) Analyze barriers to clean mobility in rural and low-income communities and options for addressing them.
 - (E) Identify electrification policies that state agencies can implement immediately.
 - (F) Commission a study on equitable funding of transportation infrastructure in an electrified transportation world. The study shall explicitly consider revenue mechanisms that account for vehicle weight, width and miles driven and the integration of time-varying electric rates with tax design. The study shall examine practices in other countries, regions and states with high penetrations of electric vehicles and shall include input from electric vehicle manufacturers, dealers and trade associations, electric vehicle and fuel cell vehicle manufacturers, electric vehicle charging station manufacturers and hydrogen providers, as well as transportation, environmental and clean energy advocacy groups. The report shall be filed with the [relevant legislative bodies and agencies] not later than [x date].
 - (G) Develop a consumer education and outreach program.
 - (2) [Within 730 days of the enactment of this legislation] [By x date]:
 - (A) State agencies shall commence implementation of the transportation electrification plan, including the adoption of policies identified in the plan that can be implemented immediately.
 - (B) The [public utility commission] shall open dockets on rates, rules and utility investments, as further specified in [cross-reference state statutes; see examples in Section 20].
 - (C) The TEC shall convene a stakeholder-driven process and commission a study on electric vehicle supply equipment needs and priorities within [state]. This shall include an examination of opportunities for rural and low- and moderate-income neighborhoods.
 - (D) The TEC shall commission a study on transportation funding options for [state] and make recommendations on the best options for [state] to implement. This shall include an examination of opportunities for rural and low- and moderate-income neighborhoods.

- (3) By [x date]:
- (A) The relevant agencies shall implement further programs to incentivize electric vehicle supply equipment to address remaining market barriers and any market failures. Such programs shall be accompanied by any new education and outreach programs developed by the stakeholder group.
 - (B) [Relevant state agencies] in coordination with the [public utility commission] shall adopt rules and regulations establishing a transportation climate program to limit and reduce annually the total greenhouse gas emissions released by transportation sources in the State. The rules and regulations shall comply with any regional agreement or memorandum of understanding. Any proceeds recovered from the transportation climate program shall be deposited in [relevant fund].
 - (C) Based upon the study commissioned in year one, a plan shall be developed to phase in EV contributions to state transportation funds.

Option 1 analysis

Many states are grappling with implementing EV policies. As each jurisdiction is different, studies and background information can be helpful to develop a full plan. A staged EV policy plan allows various studies to take place but doesn't stall other steps that can be taken concurrently to advance state EV goals.

It can be difficult for legislation to give detailed requirements to state agencies, particularly about areas that are yet developing. Legislators should be careful to give direction and intent but not be so prescriptive as to become quickly out of date or counterproductive. Administrative flexibility, to deal with rapidly changing circumstances, is a virtue.

Option 2: Simplified State EV Plan

- (a) The Legislature directs that the [relevant state agencies such as: state transportation department/commerce department/energy department/tourism department] and the [public utility commission] shall work with interested stakeholders to develop an electrification plan for [state] that saves consumers money in the long term and reduces negative environmental impacts.
- (b) The electrification plan shall be completed within one year of the effective date of this legislation and shall include a report to the Legislature that addresses the following:
 - (1) Information on all available incentives in this state applicable to electric transportation, including, but not limited to, income tax credits and sales and excise tax exemptions. The report shall include best practices from other states along with recommendations that the Legislature may evaluate in considering further legislation. This can include incentives to individual consumers, local governments for public transportation and private companies engaged in the business of transporting goods or providing transportation as a service.
 - (2) Outreach and education to consumers.
 - (3) Specific recommendations for providing reasonable access to electric transportation for rural and low- and moderate-income families either through public or private transportation modes.
 - (4) Analysis of barriers to clean mobility in rural and low-income communities and options for addressing them, including:
 - (A) recommendations for the funding needed to implement an electric transportation program;
 - (B) recommendations for the establishment of electric vehicle goals;
 - (C) recommendations for developing vehicle charging stations; and
 - (D) any other relevant matters the stakeholder group deems appropriate.

- (c) Within 60 days of the submission of the report the [public utility commission] shall open dockets on rates, rules and utility investments as further specified in [cross-reference state statutes; see examples in Section 20], which shall be completed within 12 months.
- (d) The [state transportation department] shall launch its consumer education and outreach program and report on its progress to the Legislature within 365 days of the effective date of this legislation.
- (e) The legislative committee of the [relevant state agency/department] shall consider the recommendations and draft legislation within six months of receipt of the report. The committee may include any other matters related to transportation electrification it deems necessary.

Option 2 analysis

This is a more concise version that nonetheless requires a state electric vehicle plan that is in the public interest. Unlike Option 1, this provision doesn't require state agencies to take

immediate actions that can help advance EV goals. It puts action on hold until the report is complete. It also requires a report back to the legislature to determine if further actions should be taken legislatively.

Narrower State Planning Provisions

Option 3: Statewide Vehicle Charging Infrastructure Plan

- (a) The Legislature directs that the [relevant state agencies, including: state transportation department/commerce department/energy department/tourism department] and the [public utility commission] work together with interested stakeholders to develop a statewide vehicle charging infrastructure plan. The [relevant agency director] shall lead the group and shall deliver the plan to the Legislature [within 365 days] [by x date]. [option to use Option 1, subsection (a), for more robust stakeholder group].
- (b) The plan shall include:
 - (1) estimates of the quantity and types of electric vehicle charging equipment and infrastructure required to be installed through calendar year [x] to achieve the electric vehicle goals [as stated in this act/other legislation] and a schedule for installation of that charging equipment and infrastructure, including, but not limited to, public DC fast chargers, Level 2 EVSE, workplace charging facilities, overnight charging facilities that are publicly available, fleet charging infrastructure of various types, residential charging for single-family and multifamily homes and charging facilities at highway rest areas and along transportation corridors;
 - (2) strategies for creating general market conditions necessary for long-term development of public electric vehicle charging infrastructure that is spaced along roads in a manner to provide a safe and reliable charging infrastructure, meet routine charging needs, ensure attainment of the goals established by [relevant section or legislation] and establish minimum standards for equitable, reliable and convenient access to highly visible electric vehicle charging infrastructure of all types;
 - (3) methods for monitoring and compiling data on statewide electric vehicle purchases, EVSE use, the percentage of statewide electric vehicle miles traveled, utility distribution system impacts and other statistics for assessing plug-in electric vehicle adoption and developing and maintaining effective charging infrastructure;
 - (4) guidelines to ensure that infrastructure is being made available across all socioeconomic and geographic segments of the State and that programs that support the vehicle electrification needs for low-income, urban or environmental justice communities, including electrified public transportation and innovative electrified advanced mobility solutions, are being implemented;

- (5) public-private partnership program ideas for electric vehicle infrastructure, with guidelines to ensure that infrastructure built by private entities is made available across all socioeconomic and geographic areas of the State; such program ideas should articulate benefits and costs;
- (6) recommended policies, regulations, programs and other initiatives that ensure responsible integration of electric vehicle charging infrastructure with the electric grid and that maximize the beneficial impact of that infrastructure and vehicle charging for the plug-in electric vehicle market and utility ratepayers;
- (7) recommended policies, regulations, programs or other initiatives that may be taken by state agencies, the public electric utilities and other organizations or market participants to achieve the long-term success of the goals of the [relevant legislation];
- (8) statewide consumer awareness campaigns that highlight the availability of electric vehicle charging infrastructure in the State, with a specific focus on addressing consumer concerns about the availability of public charging infrastructure, to be implemented by the government entities represented in the working group; and
- (9) updates on the implementation of the Essential Public Charging Network pursuant to [relevant legislation].
- (c) The working group shall coordinate the development and publication of the statewide vehicle charging infrastructure plan with development and revision of the [state energy master plan], incorporating relevant provisions to ensure that implementation of the plans is consistent.
- (d) The working group shall also study, develop and identify needs, opportunities and strategies for expanding electrification of vehicles beyond private ownership of light-duty plug-in electric vehicles and provide funding and programs to:
 - (1) ensure equitable participation in vehicle electrification benefits and programs by low-income, urban or environmental justice communities and other communities that suffer from deficient mobility options and disproportionate negative environmental impacts;
 - (2) ensure the development of electric advanced mobility solutions and other transportation alternatives that serve those communities; and
 - (3) expand the electrification of the wide range of heavy-duty and medium-duty vehicles typically powered by diesel fuel, which may also benefit from electrification, including, but not limited to, public buses, medium- and heavy-duty trucks, drayage equipment and other off-road transportation, with particular focus on the use of these vehicles and equipment at and around ports.
- (e) The working group may develop any other programs to further the use of electric vehicles in the State and shall incorporate its findings and recommendations into [annual/biennial report to the legislature].

Option 3 analysis

Concern about lack of charging infrastructure is one of the primary barriers to widespread vehicle electrification, both for light-duty vehicles and heavy-duty transport. States wanting to move faster on electric vehicle adoption, especially for state fleets and heavy-duty transport considerations, may want to consider this provision as it

addresses consumer reliability concerns. This provision, based upon a New Jersey assembly bill,⁶ recognizes that there is no “one size fits all” for every state. Accordingly, it directs the relevant state agencies and public utility commission to work with interested stakeholders to develop an infrastructure charging plan that works for the specific state.

6 A.B. 4643, 218th Legislature (N.J. 2018). Retrieved from https://www.njleg.state.nj.us/2018/Bills/A5000/4634_I1.HTM

Option 4: Essential Public Charging Network

- (a) The Legislature directs that the [relevant state agencies including: state transportation department/commerce department/energy department] and the [public utility commission] work together with interested stakeholders to develop an Essential Public Charging Network [based upon statewide vehicle charging infrastructure plan]. The [relevant agency director] shall lead the group and shall deliver the plan to the Legislature [within 365 days] [by x date]. [option to include Option 1, subsection (a), on TEC].
- (b) The Essential Public Charging Network shall:
 - (1) provide sufficient public charging infrastructure to support a significant expansion in the use of plug-in electric vehicles in the State and consumer confidence in using these vehicles;
 - (2) integrate electric vehicle charging with the electric distribution system and the electric transmission system; and
 - (3) provide a reliable level of public charging infrastructure.
- (c) No later than [x date], each public utility [greater than x size] in the State shall submit to the [public utility commission] a proposed plan for the deployment and long-term operation of the Essential Public Charging Network within its service territory. The electric public utility shall implement its essential charging network plan by the least-cost means possible, which can include third-party provision of elements of the Essential Public Charging Network.
- (d) The public utility plan must include:
 - (1) [x number] DC fast charger locations at corridor locations equipped with at least [x number] DC fast chargers per location, each capable of providing at least [x] kilowatts of power, with no more than [x] miles between locations wherever feasible;
 - (2) [x number] DC fast charger locations at community locations equipped with at least [x number] DC fast chargers per location, each capable of providing at least [x] kilowatts of power and up to at least [x] kilowatts wherever feasible; and [x number] publicly accessible Level 2 EVSE; and
 - (3) The option for the owners or operators of EVSE at network locations to install additional EVSE, or a Level 2 EVSE or DC fast charger of [x] kilowatts or above, as considered appropriate.
- (e) Charging station requirements:
 - (1) All network DC fast chargers shall provide at least [x] plug types, compliant with the industry equipment standards as defined at the time of installation and other additional standards as may be introduced based on technology improvements or changes in applicable technical standards and approved for inclusion by the [public utility commission].
 - (2) All network equipment and infrastructure shall be accessible by all plug-in electric vehicles with appropriate adaptors, and the operators thereof, and shall be available for use by the public without unreasonable commercial or technical restrictions.
 - (3) All network charging locations shall be highly visible along public roadways, with standardized signage easily visible on roadways, and the locations shall be posted online in a manner that makes them easy to identify and locate.
 - (4) All network infrastructure development plans shall make use of design innovations, technologies and other methods to:
 - (A) maximize the beneficial impact vehicle charging and charging infrastructure may have on the electric grid; and
 - (B) minimize harmful impact on the electric grid wherever needed and the integration and operation costs.
 - (5) [All network charging stations shall be capable of bidirectional charging once electrical utilities achieve a cost-effective ability to draw electricity from electric vehicles connected to the utility grid. These requirements may not apply if the installations require significant upgrades.]

Option 4 analysis

This provision was inspired by the same New Jersey bill noted above and, like Option 3, recognizes that lack of charging infrastructure is one of the primary barriers to widespread adoption of EVs. This provision essentially determines that electric utilities have the best network to implement a public charging network and determines that the state public utility commission shall have the task of ensuring that a charging network is created in the public interest. However, this option also requires the utility plan shall be implemented at least cost and notes that a least-cost network could include third-party provision of the charging network.

Proponents of this type of provision note that the utilities are familiar with the local electrical grid and have the expertise and engineering background to operate charging stations safely and in a way that does not damage existing power lines or facilities. Potentially, the knowledge held by utilities may allow them to operate more efficient and, therefore, cheaper EV charging stations.⁷

Opponents of utility ownership and operation of EVSE say that allowing the utilities or utility affiliates to own and operate EV charging stations may lead to a lack of retail competition in these states, which could negatively impact EV consumers in the long run.⁸ However, this potential negative impact may be mitigated by the fact that, unlike homeowners, apartment

dwellers or business owners, vehicle owners are not completely captive to a local utility; they often have the ability to travel outside the service territory of their local utility.⁹

States concerned with utility involvement in EVSE ownership could require utility ownership of assets to be sold at public auction once the EV market develops to a certain point. Examples of such limitations can be found in Section 21.

This provision also contains an optional requirement for bidirectional charging between the charging station and the vehicle. M.J. Bradley & Associates reports that:

Under current conditions, the flow of energy between charger and vehicle is generally one directional — the EV plugs in and receives electricity with the sole purpose of charging the vehicle. This is referred to as V1G. Under V1G it is possible for vehicles to act as demand response, reducing or increasing charging level in response to grid signals. Vehicle to grid (V2G), on the other hand, allows for the vehicle to receive signals from the grid to push stored electricity back onto the grid, providing local and system grid services such as frequency regulation. Although this may not be widely feasible with today's grid and EV battery systems, additional standards or platforms could help better manage EV charging and the increased load that will accompany it.¹⁰

7 Young, C.A., Machlin, M.D., & Dressler, E.H. (2016, September). Why your local electric vehicle charging station doesn't (and shouldn't) look like your local gas station. *Pratt's Energy Law Report*, 16(8), 297-304. Retrieved from <https://www.pepperlaw.com/resource/24496/4G0>. Citing New York State Energy Research & Development Authority. (2013, April). *Compilation of utility commission initiatives related to plug-in electric vehicles and electric vehicle supply equipment*. Albany, NY: Author. Retrieved from <https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Transportation/Compilation-Utility-Commission-Initiatives-Plug-acc.pdf>

8 Young et al., 2016.

9 Young et al., 2016.

10 M.J. Bradley & Associates. (2019, May 13). *Electric vehicle charging interoperability*. Concord, MA: Author. Retrieved from <https://mjbradley.com/sites/default/files/MJB%26A%20Interoperability%20Issue%20Brief%20May%202019.pdf>

Option 5: Regional Transportation Planning

- (a) A regional transportation planning organization containing any county with a population in excess of [x] in collaboration with representatives from the [relevant state departments or agencies], local governments [shall/may] create a regional plan for electric vehicle infrastructure. The regional transportation planning organization [may/shall] seek [federal or private funding] [public-private partnership funding] [federal or private funding first, before applying to the state] for the planning for, deployment of or regulations concerning electric vehicle infrastructure. These efforts may include:
- (1) development of short-term and long-term plans outlining how state, regional and local government construction may include electric vehicle infrastructure in publicly available off-street parking and government fleet vehicle parking, including what ratios of charge spots to parking may be appropriate based on location or type of facility or building;
 - (2) consultations with the state building code council and the department of labor and industries to coordinate the plans with state standards for new residential, commercial and industrial buildings to ensure that the appropriate electric circuitry is installed to support electric vehicle infrastructure;
 - (3) consultations with [relevant state agencies] and interested stakeholder groups to ensure reasonable access to electric transportation to low- and moderate-income families either through public or private transportation modes;
 - (4) consultations with the workforce development councils and [state university system/relevant educational agency and other state agencies] to ensure the development of appropriate educational and training opportunities for residents of the State in support of the transition of some portion of vehicular transportation from combustion to electric vehicles;
 - (5) development of an implementation plan for counties with a population greater than [x] with the goal of having public and private parking spaces, in the aggregate, be [x]% electric vehicle ready by [x date]; and
 - (6) development of model ordinances and guidance for local governments for siting and installing electric vehicle infrastructure, in particular battery charging stations, and appropriate handling, recycling and disposal of electric vehicle batteries and equipment.
- (b) These plans and any recommendations developed as a result of the consultations required by this section must be submitted to [relevant legislative body] by [x date] or as soon as reasonably practicable after the securing of any federal or private funding.

Option 5 analysis

This provision takes a different approach to planning for transportation electrification and instead puts the responsibility for planning on regional organizations within a state, specifically counties with more than a certain number of residents. This provision is inspired by a Washington State statute¹¹ that required counties with more than 1 million people to work together with state agencies and local governments to formulate the plan. This provision also allows states to direct where regional planning organizations should seek funding from these programs.

States should consider how proactive they want to be for electrification of transportation. While this provision enables county and local government planning that can be

more targeted to the needs of the community, this level of planning is also difficult to accomplish at the county level in most states and may result in a slower level of transportation electrification than if action is taken at the state level. For states wishing to move faster on transportation electrification, this provision could work well when paired with a state-level plan. It could also work well for states that have certain counties and regional population centers that want to move faster on electrification of transportation than contemplated state-level action. Proponents of this type of provision note that it allows for a greater diversity of options for how electrification of transportation occurs across a state, taking into account the unique composition and requirements of counties within a state.

¹¹ Regional transportation planning organizations — Electric vehicle infrastructure, RCW § 47.80.090, Washington State Legislature (2012). Retrieved from <https://apps.leg.wa.gov/rcw/default.aspx?cite=47.80.090>

Option 6: Sustainable Freight Action Plan

- (a) The [relevant state agencies] and relevant state departments, including the [state transportation department] shall develop a sustainable freight action plan, which establishes targets to improve freight efficiency and transition to [zero-emission technologies] [electrified freight transport]. The plan shall identify state policies, programs and investments to achieve the following targets:
- (1) improve freight system efficiency by [x]% by [x date]; and
 - (2) deploy over [x] [zero-emission/electric/alternative fuel] freight vehicles and associated equipment, maximizing the number of vehicles powered by renewable energy, by [x date].
- (b) The involved parties shall also initiate corridor-level freight pilot projects to integrate advanced technologies, alternative fuels, freight and fuel infrastructure and local economic development opportunities based on the plan.

Option 6 analysis

Medium- and heavy-duty trucks, those primarily used for freight transportation, account for 23% of the U.S. transportation greenhouse gas emissions¹² and a variety of other air toxins.¹³ Planning to electrify freight transportation can reduce air emissions, and jobs connected with transportation electrification have great growth potential.¹⁴ Planning for electrified freight transport can simultaneously reduce air pollution and create jobs.

This provision, inspired by a California executive order,¹⁵ calls for state agencies to create a plan to improve and electrify freight system efficiency. This provision recognizes that freight transport is a large part of the emissions in California and elsewhere. The original provision called for a

25% improvement in efficiency by 2030 and deployment of 100,000 zero-emission freight vehicles. If states are creating or amending an EV policy plan, these provisions could be included within it. If states already have a plan, this is included as an option and can serve as an example for other areas states may want to focus on.

This provision can be incorporated into a state EV plan or added separately if a state already has an EV plan. States should also note that this type of provision could be modified for additional areas, such as rail, port or other specialized areas of transport they wish to focus on. The provision could also be modified to require additional findings of the planning group along the lines of the requirements in Option 3 above (statewide vehicle charging infrastructure plan).

12 U.S. Environmental Protection Agency. (undated). Fast facts on transportation greenhouse gas emissions [Webpage]. *Green Vehicle Guide*. Retrieved from <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

13 Zoyhofski, R.M. (2015, May). *Estimates of emissions from heavy duty diesel vehicles and control strategies related to transport activities supporting high volume hydraulic fracturing wells in the Marcellus Shale Formation*. Rochester, NY: Rochester Institute of Technology. Retrieved from <https://scholarworks.rit.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=10212&context=theses>

14 Chandler, S., Espino, J., & O'Dea, J. (2017, May). *Delivering opportunity: How electric buses and trucks can create jobs and improve public health in California*. Cambridge, MA, and Oakland, CA: Union of Concerned Scientists and Greenlining Institute. Retrieved from <https://www.ucsusa.org/sites/default/files/attach/2016/10/UCS-Electric-Buses-Report.pdf>

15 Office of Governor: Edmund G. Brown Jr. (2015, July). Executive Order No. B-31-15. State of California. Retrieved from <https://www.ca.gov/archive/gov39/2015/07/17/news19046/index.html>

Planning

Section 5: Electrification of State Fleets

Why the provision was included

In 2015 the Federal Highway Administration reported over 4 million state fleet vehicles, including light-duty vehicles, buses and motorcycles.¹⁶ Some states are putting into place plans and requirements for some portion of these vehicles to be electric vehicles by specific dates. There are a variety of options for how states are pursuing this transition. Four options, which are inspired by state legislation, are discussed below.

States will need to consider their particular needs, the scope of state fleet electrification, and the type of provision that will work best for their state. Each provision requires state agencies or local governments to purchase either EVs, hybrids or alternative fuel vehicles, or high gas mileage internal combustion (ICE) vehicles. Each provision also recognizes that there are some uses for which EVs or alternative fuel vehicles are not suited and offers exceptions to the requirement. And all of the provisions require some

sort of agency planning and reporting so that the appropriate legislative bodies are updated concerning the progress of a provision or its unanticipated hurdles.

States should consider the degree to which they want an official determination that an electric vehicle is not appropriate for its intended use. Options 1 and 4 require the relevant department to make an official determination. The other two provisions do not require an official determination. States should also consider how much information they want to specify should be included in a report from the agency tasked with this program. Options 1 and 3 articulate information that can be useful to the legislature and to other agencies. For example, information about the amount of fuel not used as a result of using electric vehicles or alternative fuels will enable air and environmental agencies to calculate the amount of carbon and air pollution reductions achieved. States could also incorporate the priority order of vehicle types into the other options.

Option 1: Targets and Planning

- (a) State agency fleet vehicles
 - (1) [All/x%] passenger and light-duty vehicles of model year [x] or later operated by agencies of the State of [x] must be electric vehicles.
 - (2) [All/x%] medium- and heavy-duty vehicles of model year [x] or later operated by agencies of the State must be electric vehicles, except as provided in subsection (x) of this section.

¹⁶ Federal Highway Administration. (2017, January). *State motor-vehicle registrations — 2015* [Table]. Retrieved from <https://www.fhwa.dot.gov/policyinformation/statistics/2015/mv1.cfm>

- (b) Local government fleet vehicles
 - (1) [All/x%] passenger and light-duty vehicles of model year [x] or later operated by local governments of the State of [x] must be electric vehicles.
 - (2) [All/x%] medium- and heavy-duty vehicles of model year [x] or later operated by local governments of the State of [x] must be electric vehicles, except as provided in subsection (x) of this section.
- (c) Subsections (a) and (b) of this section are exempted for police, fire, emergency response and other vehicles upon a determination by [relevant department or agency] that no adequate electric vehicles are available in the market to meet the specific criteria for those vehicles. This determination must be made annually and must be accompanied by an updated assessment of market options in the preceding year.
- (d) The [relevant department or state agency] shall adopt rules as necessary for the implementation of this section.
- (e) Scoping plan for fleet vehicles
 - (1) On or before [x date], the [relevant state department or agency] shall complete a scoping plan for achieving the state electric vehicle goals as set out in Sections 1 and 2 above.
 - (2) In developing the scoping plan, the [relevant state department or agency] shall consult with state agencies with jurisdiction over public passenger and light-duty vehicles, including the [other state agencies that should be consulted].
 - (3) The scoping plan shall assume implementation of the requirements set forth in paragraph (1) of this subsection, and shall include:
 - (A) predicted number of publicly owned electric vehicles and internal combustion engine vehicles registered in [state] during the transition period, broken down by year, vehicle type, state agency, counties, cities and special purpose districts; and
 - (B) predicted number, type, year of installation and location profile of electric vehicle fueling stations needed to provide prompt, efficient and cost-effective fueling of [state] publicly owned electric vehicles during the transition period and an estimate of the yearly and aggregate cost to the public in building out said fueling stations:
 - (i) an analysis of the electrical generation, transmission and distribution upgrades and build-out required to provide prompt, efficient and cost-effective fueling of [state] publicly owned electric vehicles during the transition period and an analysis of the investment required to implement said upgrades;
 - (ii) an estimate of the cost differential between the purchase price of new electric and internal combustion engine fleet vehicles during the transition period;
 - (iii) an estimate of the lifetime cost of ownership of electric and internal combustion engine fleet vehicles during the transition period;
 - (iv) predicted yearly decrease in gasoline and diesel sales in [state], the savings to taxpayers therefrom and the fuel dollars retained in [state] that would have otherwise been expended elsewhere;
 - (v) identification of financing mechanisms that could be utilized to finance the transition of publicly owned vehicles to electric vehicles; and
 - (vi) recommendations concerning exceptions to the electric vehicle requirement for those classes of vehicles for which no reasonable electric vehicle option exists, potentially including police, fire and other emergency response vehicles, determined and issued by the [relevant state department or agency].

- (4) In developing said scoping plan, the [relevant state department or agency] shall
- (A) consult with [relevant state and local governments] and other appropriate entities;
 - (B) consider relevant information pertaining to vehicle fleet programs in other states, localities and nations; and
 - (C) evaluate the total potential costs and total potential economic and noneconomic benefits of the plan for shifting to a public fleet of electric vehicles to [state]’s economy, using the best available economic models, emission estimation techniques and other scientific methods.

Option 1 analysis

The State of Washington,¹⁷ the inspiration for this section, requires 100% of light-duty state fleet vehicles model year 2023 and beyond to be electric and 100% of medium- and heavy-duty fleet vehicles model year 2026 and beyond to be

electric. The scoping plan is to be submitted by 2021. States may choose to start at a lower percentage and increase the percentage in the future. Information from the scoping plan, and from other states’ experiences, will also help inform states on the costs, savings and other relevant information.

Option 2: Procurement and Management

- (a) When purchasing a motor vehicle, a state agency must select an electric vehicle if the total life-cycle cost of ownership is less than or comparable to that of a gasoline-powered vehicle. If upon a determination by [relevant department or agency] that no adequate electric vehicles are available in the market to meet the specific criteria for those vehicles, a state agency must purchase a gasoline-powered vehicle with a fuel economy rating that exceeds 30 miles per gallon (mpg) in the city and 35 mpg on the highway.
- (b) A committee of representatives from the [relevant state agencies for natural resources, energy, pollution control, commerce, etc.] will implement a state fleet reporting and information management system. The committee will submit findings to the Governor and appropriate legislative committees on a biennial basis with recommendations for goals, directives or legislative initiatives to meet these objectives.

Option 2 analysis

This option, based upon Minnesota law,¹⁸ requires state agencies to purchase an electric vehicle if the total cost of ownership is less than that of a comparable ICE vehicle. The total cost of ownership of EVs versus ICE vehicles will vary depending upon the financial incentives for EVs, but as technology costs decrease, the total cost of EVs will also decrease.¹⁹ Even if the current calculation requires purchase of an ICE vehicle, this provision requires the ICE

vehicle to have a high fuel economy rating, which ultimately decreases fuel costs for the state. This option also requires relevant state agencies to create a state fleet reporting and information management system and to provide a report on recommendations for achieving the goals of this provision. Whereas Options 1 and 3 require the state agencies to create the reporting system and report to the legislature, this option requires the committee, with multiagency participation, to do these tasks.

¹⁷ An act relating to the electrification of the Washington public vehicle fleet, H.B. 1832, 66th Washington State Legislature, 2019 Regular Session (Wash. 2019). Retrieved from <http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/House%20Bills/1832.pdf>

¹⁸ State purchasing of electric and plug-in hybrid electric vehicles, Minn. Stat., § 16C.138 (2019). Retrieved from <https://www.revisor.mn.gov/statutes/cite/16C.138>

¹⁹ Palmer, K., Tate, J.E., Wadud, Z., & Nellthorp, J. (2018, January). Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan. *Applied Energy*, 209, 108-119. Retrieved from <https://www.sciencedirect.com/science/article/pii/S030626191731526X?via%3Dihub>

Option 3: Procurement — Specific Guidance, Reporting

- (a) When purchasing or leasing new motor vehicles, the [state agency] shall purchase or lease electric or hybrid vehicles [cross-reference to definitions] to the maximum extent feasible and consistent with the ability of such vehicles to perform their intended functions, at a rate of not less than [x]% annually for all new motor vehicle purchases or leases so that, taking into account the existing number of such vehicles owned and operated by the State of [x], not less than [x]% of the motor vehicles owned and operated by [state] shall be electric or hybrid electric vehicles by the year [x].
- (b) The [relevant state agency or agencies] shall develop a system of protocols for the acquisition of [electric/hybrid vehicles], including identifying the potential for acquisition of heavy-, medium- and light-duty vehicles, based on the anticipated mileage and usage of such vehicles and the effectiveness of single-fuel or dual-fuel alternative fuel vehicles for the particular purpose identified.
- (c) The [relevant state agencies] shall submit to the [relevant legislative bodies] an annual statement on or before [x date] each year detailing the progress in meeting the requirements of this section. This report shall include the percentage of fuel used for the alternative fuel vehicles owned and operated by the State that qualifies as alternative fuel and the amount and cost of nonalternative fuel forgone as a consequence of the use of alternative fuel.

Option 3 analysis

This provision, based upon Massachusetts law,²⁰ requires state agencies to purchase electric and hybrid vehicles “to the maximum extent feasible.” This allows the agencies to have discretion with determining which vehicles should be electric or hybrid and which vehicles must currently be ICE

vehicles. This provision also specifies a “rate” of purchase of electric, hybrid or alternative fuel vehicles. This provision was inspired by a Massachusetts provision that required 5% of all new motor vehicles be alternative fuel vehicles, so that by 2018, no less than 50% of the state fleet vehicles would be zero-emission vehicles.²¹

²⁰ An act relative to green communities, Chapter 169, 191st General Court, (Mass. 2008). Retrieved from <https://malegislature.gov/laws/sessionlaws/acts/2008/chapter169>

²¹ An act relative to green communities, 2008.

Option 4: Procurement Targets, Included Vehicles

- (a) State and county agencies must purchase or lease light-duty vehicles that reduce petroleum consumption and meet the needs of the agency. The priority to be used for purchasing such vehicles is as follows:
 - (1) electric vehicles
 - (2) plug-in electric vehicles
 - (3) hydrogen or fuel cell vehicles
 - (4) hybrid electric vehicles
 - (5) vehicles identified as top performers for fuel economy in the U.S. Environmental Protection Agency's annual Automotive Trends report
- (b) Exemptions may apply upon a determination by [relevant department or agency] that no adequate electric vehicles are available in the market to meet the specific criteria for those vehicles. This determination must be made annually. State agencies must purchase [electric vehicles] [alternative fuels and ethanol-blended gasoline] when available, [evaluate a purchase preference for biodiesel blends] and promote the efficient operation of vehicles.

Option 4 analysis

This option, based upon Hawaiian legislation,²² is a variation of a state fleet requirement that has many aspects similar to the other provisions. It provides a “priority order” for state

fleet options that states could alter to suit their needs and preferences. The original Hawaiian legislation prioritized fleet vehicles in order from fully electrified vehicles (highest priority) to hybrid vehicles to fuel-efficient ICE vehicles (lowest priority).



²² Light-duty motor vehicle requirements, Haw. Rev. Stat., § 103D-412 (2013). Retrieved from <https://law.justia.com/codes/hawaii/2013/title-9/chapter-103d/section-103d-412>

Planning

Section 6: Statewide Assessments

Why the provision was included

The electrification of transportation is in its infancy, but the spread of EVs is expected to grow rapidly.²³ Recognizing this phenomenon, some states have required various forms of

statewide assessments so that legislatures can be apprised of progress toward state goals, data collected by the state agencies in charge and any new developments that would be relevant for legislators to know.

Option 1: Periodic Assessment of EV Adoption

- (a) On or before [x date] of each odd-numbered year, the [state energy department] shall submit to the [Governor/Legislature/legislative committee] a report on adoption of electric vehicles in the State and the progress the State is making to achieve reductions in greenhouse gas emissions in the transportation sector. The report shall provide:
- (1) a review, using existing studies, market reports, polling data or other publicly available information, of the market in [state] for electric vehicles and any barriers to adopting electric vehicles in the State;
 - (2) an assessment of the State's progress in promoting the goals set forth in this [act/other legislation];
 - (3) the date on which the State is predicted to meet the goals set forth in this [act/other legislation];
 - (4) an assessment of the State's progress under this [act/other legislation] that focuses on commercially available, or near commercially available, electric vehicle technology, to the extent possible, relying on existing studies, data and analysis, and evaluates whether the transportation sector is on course to reduce the share of greenhouse gas emissions from motor vehicles;
 - (5) an assessment of the availability and reliability of public and private electric vehicle charging infrastructure needed to support the targets for electric vehicles in the State (only if the [state energy department] requests and obtains information on reliability from providers of electric vehicle charging infrastructure);
 - (6) the incremental purchase cost difference, before and after federal and state incentives, between the purchase cost of an electric vehicle and the purchase cost of a comparable vehicle powered by an internal combustion engine;
 - (7) the electric vehicles that are available for purchase in all market segments;
 - (8) an assessment of citizen awareness of motor vehicle options, the benefits of owning zero-emission vehicles and the true costs of motor vehicle ownership;
 - (9) the carbon intensity of fuel consumed by the [state] transportation sector as a whole;
 - (10) the general progress toward electrification of all fossil fuel-based transportation modes;
 - (11) opportunities to minimize impacts to the electric grid from transportation electrification, including rate design, managed charging, vehicle-to-grid services and electricity conservation techniques;

23 International Energy Agency. (2019). *Global EV outlook 2019*. Paris, France: Author. Retrieved from <https://www.iea.org/reports/global-ev-outlook-2019>

- (12) opportunities for and progress upon policies, regulations, programs and other initiatives that ensure responsible integration of electric vehicle charging infrastructure with the electric grid and that maximize the beneficial impact of that infrastructure and vehicle charging for the plug-in electric vehicle market and utility ratepayers; and
- (13) recommendations for promoting reduction of greenhouse gas emissions, as required by this section, including recommendations for further legislation, if the [state energy department] determines the State is not on course to meet the goals set forth in this [act/other legislation].

Option 2: Periodic Inventory of EVSE

- (a) The [state transportation agency], working with the [state air agency] and the [public utility commission], shall prepare a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the State to meet its goals. The statewide assessment shall be submitted to the [Governor/Legislature/legislative committee] every [year/two years] by [month/day].
- (b) The assessment shall expand on the [public utility commission]'s electric vehicle infrastructure projections to consider all necessary charging infrastructure, including, but not limited to, the chargers, make-ready electrical equipment and supporting hardware and software; all vehicle categories; road, highway and off-road electrification; port and airport electrification; and other programs to accelerate the adoption of electric vehicles to meet the goals described in [relevant section or legislation]. The assessment shall examine existing and future infrastructure needs throughout the State, including in low-income communities.
- (c) The [state transportation department] shall regularly seek data and input relating to electric vehicle charging infrastructure from stakeholders, including, but not limited to, the [public utility commission], the [state air agency], electrical corporations, local publicly owned electric utilities, state and local transportation and transit agencies, charging infrastructure companies, environmental groups and automobile manufacturers.
- (d) The [state transportation department] shall update the assessment at least once every two years. The assessment shall be made public on the [state transportation department]'s website. The [state transportation department] shall also maintain an up-to-date webpage that tells consumers the location of charging stations in the State.



Option 3: Assessment of Charging Infrastructure Deployment

- (a) The [relevant state agencies and/or public utility commission] shall assess:
- (1) the optimum public charging infrastructure for the State, taking into account population density, geographical area or population income level, including low-, middle- and high-income levels; and
 - (2) whether public charging station infrastructure is disproportionately deployed by population density, geographical area or population income level, including low-, middle- and high-income levels, including whether public DC fast charger stations are disproportionately distributed and whether access to these charging stations is disproportionately available.
- (b) Upon making a finding that public charging station infrastructure has been disproportionately deployed, the [relevant agency or agencies] shall use [relevant state fund] as well as other mechanisms, including incentives, to more proportionately deploy new charging station infrastructure, unless the [relevant state agency] makes a finding that the disproportionate deployment is reasonable and furthers state energy or environmental policy as articulated by the [relevant state agency].

Analysis

All of the provisions call for some form of statewide assessment but are targeted differently. The first option is inspired by Oregon legislation²⁴ and, unlike the other two options, focuses broadly on the progress of electrification transportation in the state according to the state goals. A state could use this example and articulate the data necessary to track progress toward its goals. Option 2 is inspired by California²⁵ and focuses more on EVSE installations, hardware and programs

and assessments of future needs from relevant departments.

Option 3, also derived from California law,²⁶ could be either a stand-alone provision or a specific add-on to an existing EVSE requirement (or Options 1 and 2 as well). It specifically requires an assessment to determine if EVSE is disproportionately deployed. This assessment will then help states determine if legislative intervention is necessary to reach all segments of the population.

²⁴ An act relating to transportation electrification, S.B. 1044, 80th Oregon Legislative Assembly (Ore. 2019). Retrieved from <https://olis.leg.state.or.us/liz/2019R1/Downloads/MeasureDocument/SB1044/Enrolled>

²⁵ An act to add Section 25229 to the Public Resources Code, relating to electric vehicles, A.B. 2127, 2017-2018 Legislative Session (Cal. 2018). Retrieved from https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2127

²⁶ An act to add Section 65850.9 to the Government Code, to add Section 25231 to the Public Resources Code, and to add Section 740.15 to the Public Utilities Code, relating to transportation electrification, S.B. 1000, 2017-2018 Legislative Session (Cal. 2018). Retrieved from https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1000

Planning

Section 7: Future Transportation Funding Source Plans

Why the provision was included

Investment in roads, highways and other transportation modes has historically been paid for in large part from the dedicated fuel taxes, levied per gallon of gasoline or diesel sold. At the federal level, these taxes have not been raised for 25 years and have been increasingly supplemented by more general revenue sources.²⁷ Perceiving that nongasoline vehicles don't pay their fair share of transportation funding, several states have adopted new kinds of taxes and fees to ensure that EVs contribute.²⁸

It is clear in the long run that significant EV adoption will require new transportation revenue sources other than existing gasoline and diesel taxes. However, the size of the issue currently in most states is minimal. In addition, the solution adopted to date by many states — fixed annual registration fees specifically targeting battery electric vehicles and plug-in hybrids — is neither efficient nor equitable. States should consider more efficient and equitable options, such as per-kWh electricity fueling fees or registration fees tiered by miles driven and vehicle size.

(Note, this section is included with Option 1 in Section 4 above. If a state uses that provision, it can be omitted here.)

Option 1: Narrower Study Provisions

- (a) The [relevant government agencies] shall conduct a study examining the advisability and feasibility of assessing equitable surcharges, levies or other assessments to offset projected gas tax revenue loss from inflation, increasing highway costs and fuel efficiency and the operation of electric vehicles. The study may examine practices in other countries, regions and states and shall consider vehicle weight, width and miles driven. It shall include input from electric vehicle manufacturers, dealers and trade associations, electric vehicle and fuel cell vehicle manufacturers, electric vehicle charging station manufacturers and hydrogen providers, as well as transportation, environmental and clean energy advocacy groups. The report shall be filed with the [relevant legislative bodies and agencies] not later than [x date].

²⁷ Farnsworth, D., & Lazar, J. (2019, February). *Revisiting the gas tax*. Montpelier, VT: Regulatory Assistance Project. Retrieved from <https://www.raponline.org/knowledge-center/revisiting-the-gas-tax/>

²⁸ Spector, J., & Pyper, J. (2017, July 5). *Updated: 17 states now charge fees for electric vehicles*. Greentech Media. Retrieved from <https://www.greentechmedia.com/articles/read/13-states-now-charge-fees-for-electric-vehicles>

Option 2: Broader Study Provisions

- (a) The [relevant government agencies] shall conduct a study on equitable funding of transportation infrastructure in an electrified transportation world. The study shall explicitly consider revenue mechanisms that account for vehicle weight, width and miles driven and the integration of time-varying electric rates with tax design. The study shall examine practices in other countries, regions and states with high penetrations of electric vehicles and shall include input from electric vehicle manufacturers, dealers and trade associations, electric vehicle and fuel cell vehicle manufacturers, electric vehicle charging station manufacturers and hydrogen providers, as well as transportation, environmental and clean energy advocacy groups. The report shall be filed with the [relevant legislative bodies and agencies] not later than [x date].

Analysis

There is no one-size-fits-all solution to this issue, and because states vary in how they are currently paying for roadway costs, solutions will vary from state to state. The provisions offered here require that the relevant government agencies conduct a study on how to equitably increase revenue to maintain roadways. Both specify multiagency involvement and broad stakeholder input into how to address this issue. Option 1 follows a more traditional approach to transportation funding

studies and requires an analysis of surcharges or levies.

Option 2 requires a consideration of revenue mechanisms that may be broader than a gas tax or fees on electric vehicles and requires consideration of vehicle weight, width and miles driven as a method of assessing costs. This recognizes that traffic volume, vehicle weight and vehicle length are primary drivers of highway construction and maintenance costs. An equitably designed charge could impose costs on different vehicle types consistent with their roadway impact ratio.²⁹



²⁹ Farnsworth & Lazar, 2019.

Planning

Section 8: Bus and Medium- and Heavy-Duty Vehicles

Why the provision was included

Electrification of bus fleets and heavy-duty vehicles can have significant economic and health implications. In many locations, the total life-cycle cost of running electric buses is lower than fossil-fueled buses, and decreasing battery prices will continue to decrease the cost.³⁰ Fuel savings and lower maintenance costs are of interest to many cities and school districts.³¹ For states interested in air pollution issues, studies have found that electrifying medium- and heavy-duty

(i.e., diesel) vehicles resulted in greater air quality benefits than electrifying light-duty (gasoline-powered) vehicles: a 33 times greater reduction in nitrogen oxides and a 7.5 times greater reduction in particulate matter per mile.³² Idling from buses and heavy-duty vehicles has significant health and lost-fuel impacts, and as a result many states, cities and other municipalities have enacted anti-idling laws. A few jurisdictions have turned to electrification of buses and heavy-duty vehicles as a way to address these concerns.

Option 1: Low Emissions or Electric Acquisition Requirement

- (a) All [buses][shuttles][medium-duty vehicles][heavy-duty vehicles] purchased after the effective date of this legislation by the [state transit authority] must be [zero-emission][electric][hybrid] vehicles.
- (b) If the [state transit authority] is unable to meet the purchase requirement or makes a determination that no adequate electric vehicles are available in the market to meet the specific criteria for those vehicles, the organization must submit a report to the [relevant legislative or state agency] detailing the reasons and the [state legislature or agency] may grant an exemption. Thereafter, the [state transit authority] shall either purchase vehicles in accordance with subsection (a) or reapply for an exemption on a biennial basis.
- (c) If the [state transit authority] is unable to comply with subsection (a) and receives an exemption through subsection (b), all [buses][shuttles][medium-duty vehicles][heavy-duty vehicles] purchased after [x date] shall [be equipped with improved pollution controls that reduce particulate emissions][and use between 5% and 20% biodiesel].

30 Tong, F., Hendrickson, C., Biehler, A., Jaramillo, P., & Seki, S. (2017, December). Life cycle ownership cost and environmental externality of alternative fuel options for transit buses. *Transportation Research Part D: Transport and Environment*, 57, 287-302. Retrieved from <https://www.sciencedirect.com/science/article/pii/S136192091630476X#f0025>

31 Casale, M., & Mahoney, B. (2018). *Paying for electric buses: Financing tools for cities and agencies to ditch diesel*. U.S. PIRG Education Fund. Retrieved

from <https://uspig.org/sites/pirg/files/reports/National%20-%20Paying%20for%20Electric%20Buses.pdf>

32 Lowell, D., Saha, A., & Van Atten, C. (2018, October). *Decarbonizing transportation: The benefits and costs of a clean transportation system in the Northeast and mid-Atlantic region*. Concord, MA: M.J. Bradley & Associates. Retrieved from https://www.ucsusa.org/sites/default/files/attach/2018/10/UCS_Final_Report_FINAL_11Oct18.pdf

Option 2: Public Transit Bus Requirement

- (a) By [x date], all public transit agencies must transition to [x]% [zero-emission][electric][hybrid] bus fleets. Transit agencies must purchase or operate a minimum number of [zero-emission][electric][hybrid] buses according to the following schedules:

	Large Transit Agency [operates x buses annually]	Small Transit Agency [operates x buses annually]
January 1, 20__	25% of the total number of new bus purchases in each calendar year must be [zero-emission][electric][hybrid] buses	No requirement
January 1, 20__	50% of the total number of new bus purchases in each calendar year must be [zero-emission][electric] buses	25% of the total number of new bus purchases in each calendar year must be [electric][hybrid] buses
January 1, 20__	All new bus purchases must be [zero-emission][electric] buses	All new bus purchases must be [zero-emission][electric] buses

- (b) Each transit agency will submit a plan demonstrating how it will purchase clean buses, develop infrastructure, train personnel and other required details. Large transit agencies must submit a plan in [x date], and small agencies must submit a plan in [x date].

Analysis

The two provisions offered are inspired by New Jersey³³ and California.³⁴ Options 1 and 2 apply to state transit authorities and require a transition (either phased or by a certain date) for electric, hybrid, alternative fuel or high fuel efficiency vehicles, depending on the preference of the state. All of these

provisions could be modified to either direct other agencies to take action or to specify electrification of other medium- or heavy-duty vehicles as viable options become available. States could also provide incentives, under Part II below, to encourage private businesses to electrify their fleets.



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33 Preparation, submission of reports, N.J. Rev. Stat., § 27:1B-22 (2013). Retrieved from <https://law.justia.com/codes/new-jersey/2013/title-27/section-27-1b-22/>

34 Zero-emission bus requirements, 13 Cal. Code of Regulations, § 2023.1 (2020). Retrieved from [https://govt.westlaw.com/calregs/Document/190F8170D7C5C44AA9AD6379448D6F4F7?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/calregs/Document/190F8170D7C5C44AA9AD6379448D6F4F7?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default))

Part II:

Drive Investment With Incentives

Incentives

Section 9: Financial Incentives

Why the provision was included

States can create a wide range of incentives to encourage private individuals and companies to electrify specific end uses. These incentives can be financial inducements, such as rebates and tax credits, which have proven to be effective policy tools. Of the top nine states in EV market share in 2018, eight had purchase rebates or tax credits of \$1,500 or more.³⁵ Incentives can also improve the driver experience, such as EV parking incentives, access to high-occupancy vehicle (HOV) lanes and others. As noted in the policy guide accompanying this model legislation, financial incentives work best when they apply at the point of purchase, are transparent and are durable. The goal is to craft an incentive so that states get the most additional sales of electric vehicles per dollar spent. Care should be taken to ensure that the incentive isn't encouraging actions people would take anyway, without the incentive. Incentives should target groups of people that are on the margin between buying and not buying an EV, where an incentive can make the difference. For example, a rebate of \$5,000 on a \$40,000 car decreases the cost by over 12% and can make a customer more responsive to the incentive, whereas a \$5,000 rebate on an \$80,000 car is less likely to drive the desired behavior.³⁶

Similar consideration needs to be given to the type of

incentive. A rebate happens close in time to the sale of the vehicle and applies to all tax brackets regardless of income. Tax incentives, however, may not apply for low- or moderate-income individuals who may not pay taxes.³⁷ Tax incentives may, however, be a much more attractive incentive for businesses if a state wants to encourage private workplace charging, electrification of fleets and so on. Many states also have rebates that apply not only to new vehicles but also to used and leased vehicles.

Incentives can apply to the following:

- Price (new, used, leased) of the vehicle, especially for low-income, rural and disadvantaged communities.
- Electrification of private company fleets.
- Electrification of private bus and transportation fleets.
- Location of EV infrastructure, especially in hard-to-serve areas.
- Private workplace charging infrastructure.
- Car-sharing programs.

States have developed various types of incentives to address these specific areas:

- Electric vehicle financial incentives: Most states have some sort of financial incentive for individuals to purchase EVs.³⁸ Some states, including California,³⁹ Washington⁴⁰

35 Rogotzke, M., Eucalitto, G., & Gander, S. (2019, September). *Transportation electrification: States rev up*. Washington, DC: National Governors Association Center for Best Practices. Retrieved from <https://www.nga.org/wp-content/uploads/2019/09/2019-09-15-NGA-White-Paper-Transportation-Electrification-States-Rev-Up.pdf>

36 Leard, B. (2019, October 9). Targeting subsidies to get more electric vehicles on the road. *Resources Magazine*. Retrieved from <https://www.resourcesmag.org/archives/targeting-subsidies-get-more-electric-vehicles-road/>. This is not to say that higher-priced vehicles warrant higher incentives but rather that incentives need to be thoughtfully designed.

37 Farrell, C. (2009, March 5). Tax credit and tax rebate [Blog post]. Marketplace Money. Retrieved from <https://www.marketplace.org/2009/03/05/tax-credit-and-tax-rebate/>

38 Hartman, K., & Dowd, E. (2017, September 26). *State efforts to promote hybrid and electric vehicles*. National Conference of State Legislators. Retrieved from <https://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx>

39 For more information on California incentives see Clean Vehicle Rebate Project. (undated). *Drive clean and save* [Website]. Retrieved from <https://cleanvehiclerebate.org/eng>

40 For more information on Washington incentives, see Washington State Department of Licensing. (undated). *Alternative fuel vehicle and plug-in hybrids Washington State tax exemptions* [Webpage]. Retrieved from <https://www.dol.wa.gov/vehicleregistration/altfuel exemptions.html>

and Oregon,⁴¹ are incentivizing EVs contingent on either consumer incomes or vehicle purchase price to limit using scarce resources to support buyers who would buy EVs without incentives anyway and to broaden access.⁴²

- Financial incentives for EV supply equipment: States provide incentives,⁴³ grants,⁴⁴ financing, rebates or loans to reduce the cost of constructing electric vehicle supply equipment, like electric vehicle charging stations.
- Decreased licensing fees for EVs: The majority of states have created another barrier to EVs by increasing their licensing, registration or road use fees, but a few states have decreased these fees as an incentive.⁴⁵

- Fleet incentives: States are using incentives to encourage public and private fleets to electrify.⁴⁶
- Car-sharing programs: A 100% EV car-sharing program in Los Angeles is geared toward low-income residents. Members are not required to return the vehicle to the same place they picked it up.⁴⁷

As noted above, incentives do not need to be financial to have an effect. The following sections describe examples of nonfinancial inducements for consumer purchases of EVs: high-occupancy vehicle lane use for EVs and EV-targeted parking provisions.

References for State Incentive Provisions

States have a lot of experience with encouraging the adoption of EVs through state incentives, rebates and other fiscal policy options. Rather than reproduce these efforts here, we instead refer legislative drafters to other sources listed in the footnotes here, and below for a listing of these policies.

- Sierra Club and Plug In America. (2018, June). *AchiEVe: Model state and local policies to accelerate electric vehicle adoption*. Retrieved from <https://www.sierraclub.org/sites/www.sierraclub.org/files/program/documents/EV%20Policy%20Toolkit.pdf>
- U.S. Department of Energy. (undated). State laws and incentives. *Alternative Fuels Data Center*. Retrieved from <https://afdc.energy.gov/laws/state>

41 For more information on Oregon incentives see Go Electric Oregon. (undated). *Incentives & rebates* [Webpage]. Retrieved from <https://goelectric.oregon.gov/incentives-rebates>

42 Rogotzke et al., 2019.

43 Massachusetts provides a variety of incentives for workplace charging, public EVSE, fleets and multiunit dwellings. See Massachusetts Department of Environmental Protection. (undated). *Apply for MassEVIP workplace charging incentives* [Webpage]. Retrieved from <https://www.mass.gov/how-to/apply-for-massevip-workplace-charging-incentives>

44 The State of Vermont is offering a grant for installation of EVSE. See Vermont Agency of Commerce and Community Development. (undated). *EVSE grant program* [Webpage]. Retrieved from <https://accd.vermont.gov/community-development/funding-incentives/electric-vehicle-supply-equipment-evse-grant-program>

45 Connecticut, the District of Columbia, Iowa, Illinois and Vermont all offer reduced fees for electric vehicles. See also Plug In America. (undated). *Reduced registration fee for electric vehicles template*. Retrieved from https://pluginamerica.org/wp-content/uploads/2018/05/Reduced-Registration-Fee-for-Electric-Vehicles-Template_2018.docx

46 See Section 5 for examples of public EV fleet mandates, or see Massachusetts Electric Vehicle Incentive Program for an example of private fleet incentives at <https://www.mass.gov/how-to/apply-for-massevip-fleets-incentives>. See also Plug In America. (undated). *Fleet vehicle mandates template*. Retrieved from <https://pluginamerica.org/wp-content/uploads/2017/08/Vehicle-Fleet-Mandates-Template.docx>

47 For more information see the BlueLA website: <https://www.bluela.com/>

Incentives

Section 10: High-Occupancy Vehicle Lane Use for EVs

Why the provision was included

Under current federal law, public authorities, such as states, may choose to exempt any type of plug-in electric vehicle or alternative fuel vehicle from high-occupancy vehicle or high-occupancy toll lane restrictions.⁴⁸ Hybrid electric vehicles are able to access these lanes via a reduced toll or program fee through 2019. State interpretation of this authorization varies: To promote certain fuels and technologies, many states allow only specific types of alternative fuel vehicles to use this exemption. Some states exempt only plug-in electric vehicles and allow hybrid electric vehicles discounted access, particularly those areas with limited alternative fuel infrastructure. Other exemptions apply to qualified natural gas vehicles, propane vehicles and fuel cell electric vehicles.⁴⁹

Given the congestion on roadways in some jurisdictions, expanding access to high-occupancy vehicle lanes to electric vehicles is a real incentive. States that led the way in adopting HOV lane exemptions for specific vehicle types, such as Arizona, California and Virginia, found the incentive encouraged drivers to acquire hybrid electric vehicles and reached their maximum planned quota for these vehicles earlier than anticipated. These states have already limited or eliminated hybrid electric vehicle eligibility for some HOV roadways. The success in incentivizing acquisition of these vehicles has led other states to review opportunities to add HOV lane exemptions for electric and other alternatively fueled vehicles.⁵⁰

Option 1: Short Form

- (a) Electric vehicles [including hybrid electric vehicles] may use the high-occupancy vehicle lanes, regardless of the number of occupants in the vehicle. Vehicles must display the [relevant permit or sticker]. [This exemption expires on [x date]].

Option 2: Permit Stickers

- (a) Electric and plug-in hybrid electric vehicles meeting [relevant state or federal standards] and affixed with a [relevant permit or sticker] may use high-occupancy vehicle lanes regardless of the number of occupants in the vehicle.
- (b) [Permits/stickers] are valid through the following dates:
- (1) Stickers issued for model year 2004 or earlier vehicles, regardless of the issue date, expire on [x date].
 - (2) Stickers issued before [x date] expire on [x date].
 - (3) Stickers issued between [x dates] expire on [x date].

⁴⁸ U.S. Department of Energy. (undated). Alternative fuel vehicles and high occupancy vehicle lanes. *Alternative Fuels Data Center*. Retrieved from <https://afdc.energy.gov/laws/HOV>

⁴⁹ U.S. Department of Energy, undated.

⁵⁰ U.S. Department of Energy, undated.

- (c) The [state motor vehicles department] may issue stickers on or after [x date], only for applicants that have a household income at or below 80% of the state median income, which will expire on [x date].
- (d) The [state transportation department] must publish a report by [x date/annually], detailing the number of stickers issued under this program.

Analysis

The two provisions here were inspired by New York and California⁵¹ legislation. States may choose the type of vehicles they want to allow into HOV lanes, such as electric vehicles, hybrid vehicles or alternative fuel vehicles. States

may consider the types of vehicles they want to encourage, such as fully electric, hybrids or alternative fuels. States may also consider the speed with which they want to encourage transition to electric vehicles and can utilize a phased approach similar to California.



Tdorante10/Wikimedia Commons. Licensed under <https://creativecommons.org/licenses/by-sa/4.0/deed.en>

⁵¹ Display of Plates, Tabs, and Stickers, Cal. Vehicle Code § 5205.5 (2018). Retrieved from https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=VEH§ionNum=5205.5

Incentives

Section 11: EV Parking

Why the provision was included

Many state agencies, cities, towns, municipalities and private individuals have installed electric vehicle charging already. However, absent legislation ensuring that only electric vehicles are allowed to park and charge, EV owners can find themselves unable to park in the relevant spot because an ICE vehicle is parked there instead. The following three options, taken from various states, offer ways states can tackle this issue.⁵²

All of these options offer states various ways to enforce EV-specific parking and penalize violations and for local jurisdictions to enforce the provisions. Option 3 is the only provision that doesn't encourage local jurisdictions to enact their own ordinances but does allow them to increase the fine amount. Option 2 specifies that fines incurred under the provision should go to an EVSE build-out fund. States may add similar provisions to any of the options contained herein. Option 2 is the most specific on obstructions to the EV parking spaces and has more specific instructions on signage.

Option 1: Permit Local Ordinance (short form)

- (a) A city, village or town or unincorporated political subdivision may regulate the parking of vehicles by requiring that certain areas be restricted for the parking of electric vehicles. An ordinance, bylaw, order, rule or regulation pursuant to this subsection may contain a penalty of not more than \$[x] for violation of the ordinance. Local governments are authorized and encouraged to adopt ordinances requiring a minimum percentage of EVSE-ready parking spaces in existing, new or reconstructed residential and commercial parking structures and to incorporate goals encouraging electric vehicles into local plans.

Option 1 analysis

This provision provides specific authorization to cities, towns and unincorporated subdivisions to enforce electric vehicle parking restrictions. It simultaneously encourages (but does

not require) local governments to adopt ordinances requiring a minimum percentage of EVSE-ready parking spaces. It also encourages local governments to incorporate EV goals into local plans.

⁵² For more legislative options on electric vehicle parking, see PlugInSites. (undated). *Legislation reference: Reserved parking for plug-in vehicle*

charging [Webpage]. Retrieved from <https://pluginsites.org/plug-in-vehicle-parking-legislation-reference/>

Option 2: Permit Local Ordinance (long form)

(a) Authority

- (1) A local authority, by ordinance or resolution, and a person in lawful possession of an off-street parking facility may designate stalls or spaces in an off-street parking facility owned or operated by that local authority or person for the exclusive purpose of charging and parking a vehicle that is connected for electric charging purposes.
- (2) The owner or person in lawful possession of a privately owned or operated off-street parking facility may cause the removal of a vehicle from a stall or space designated in the facility to the nearest public garage if the vehicle is not connected for electric charging purposes.
- (3) The local authority owning or operating an off-street parking facility may cause the removal of a vehicle from a stall or space designated in the facility to the nearest garage that is owned, leased or approved for use by a public agency if the vehicle is not connected for electric charging purposes.
- (4) The posting required for an off-street parking facility owned or operated either privately or by a local authority shall consist of a sign not less than 17 by 22 inches in size with lettering not less than one inch in height that clearly and conspicuously states the following:
 - (A) “Unauthorized vehicles not connected for electric charging purposes will be towed away at owner’s expense. Towed vehicles may be reclaimed at [address] or by telephoning [number of local law enforcement agency].”
- (5) The sign shall be posted in either of the following locations:
 - (A) immediately adjacent to, and visible from, the stall or space; or
 - (B) in a conspicuous place at each entrance to the off-street parking facility.
- (6) This section does not interfere with existing law governing the ability of local authorities to adopt ordinances related to parking programs within their jurisdiction, such as programs that provide free parking in metered areas or municipal garages for electric vehicles.

(b) Penalties

- (1) A person shall not park or leave standing a vehicle in a space designated for electric vehicle charging unless the vehicle is connected for electric charging purposes.
- (2) A person shall not obstruct, block or otherwise bar access to parking stalls or spaces described herein.
- (3) A person who is found responsible for a violation of this section is subject to a civil penalty of at least \$[x]. The civil penalties collected pursuant to this subsection shall be deposited in the state EVSE build-out fund.

Option 2 analysis

This provision, based on California legislation,⁵³ provides a broader grant of authority for EV parking enforcement than Option 1, by stating that a local authority or “a person in lawful possession of an off-street parking authority” may enforce EV parking restrictions. This allows validly enacted parking garages to enforce EV parking rules, in addition to

local governments. As a result, this provision includes much more detail about the types of notice to motorists that is necessary prior to enforcement of these parking restrictions. Like Option 1, it also provides unambiguous authority to local governments to enforce EV parking restrictions and to adopt local ordinances in their jurisdiction.

53 Parking: exclusive electric charging and parking on public streets, A.B. 1452, Chapter 635, California Legislature (Cal. 2017).

Option 3: Guidance for Local Ordinances, General Requirements for EV Parking

- (a) Restrictions. No person shall park in a space equipped with an electric vehicle charging station located on public or private property, unless such person is operating a plug-in hybrid electric vehicle or battery electric vehicle.
- (b) Signage. A space designated as an electric vehicle charging station must be indicated by signage:
 - (1) identifying the station as an electric vehicle charging station and indicating that it is only for electric vehicle charging; and
 - (2) consistent with [state regulations on signage].
- (c) Penalty. Any person who commits a violation of subsection (a) of this section shall be guilty of an infraction and a fine of \$[x].
- (d) Local jurisdictions. Municipalities may authorize by ordinance additional prohibited conduct for parking in a space designated as an electric vehicle charging station and may also authorize higher penalties than those set out in this section.
- (e) Enforcement. This section shall be enforced by state, county, city and other municipal authorities in their respective jurisdictions in the same manner as is used to enforce other parking laws and ordinances.

Option 3 analysis

This provision is extremely spare and to the point. It does not allow anyone to park an internal combustion engine vehicle in a parking spot equipped with EVSE. Unlike the

other provisions, it does not provide a penalty or specifically articulate who can enforce the provision. It also does not encourage local governments to enact or pursue their own ordinances and plans.



Part III:

Remove Roadblocks

Roadblocks

Section 12: Building Codes to Accommodate EV Charging

Why the provision was included

Retrofitting existing residential and commercial buildings with charging equipment is often more costly than equipping buildings with the necessary electrical circuitry and other charging infrastructure at the time of construction.⁵⁴

Requiring new construction to be EVSE-ready is a proactive measure states can take that can have far-reaching long-term positive impacts on growth of the EV market.

Each state has the ability to adopt code amendments to

facilitate EVSE readiness in new construction, as well as during renovation or alteration of existing structures. Code provisions can require a very basic level of readiness, as in construction of a “raceway” to accommodate future installation of a dedicated circuit for EV charging, or a more advanced level, which might include installation of a minimum number of ready-to-use charging stations, along with conductors, circuit breakers and additional panel capacity to support projected future demand for charging.⁵⁵

Option 1: Requirement on State Agency or Local Governments

- (a) Notwithstanding any general or special law to the contrary, the [state agency in charge of building codes][local governments, towns and municipalities] shall, within six months of the effective date of this legislation, establish minimum requirements for electric vehicle charging for residential buildings, including multiunit dwellings, and appropriate commercial buildings, as amendments to the [state/local/town/municipal] building and electric code for new buildings and major renovations. The requirements may include separate specifications for installed electric vehicle charging stations and for maintaining the capability to install electric vehicle charging stations. [Any government entity subject to these minimum requirements may establish requirements that exceed the minimum requirements, and any entity developing or constructing residential buildings, including multiunit dwellings, and commercial buildings may choose to exceed these requirements.]

Option 2: Requirement on Permitting Authority

- (a) On or after [x date], no building permit shall be issued for a new multifamily residential building that has [x number] or more parking stalls, or a new commercial building that has [x number] or more parking stalls, unless at least [x]% of the building’s parking stalls are electric vehicle charger ready, as defined in this [title/chapter], provided that this section shall not apply to building permits issued pursuant to applications initiated prior to [x date].

54 Northeast States for Coordinated Air Use Management. (2018, May 16). *Northeast corridor regional strategy for electric vehicle charging infrastructure 2018-2021*. Boston, MA: Author. Retrieved from <https://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/>

55 Northeast States for Coordinated Air Use Management, 2018. Option 3 is based on: Higher efficiency new construction residence, H.B. 20-1155, 72nd

General Assembly (Col. 2020). Retrieved from <https://leg.colorado.gov/bills/hb20-1155>. Options 4 and 5 are based on various legislative provisions collected at PlugInSites. (undated). *Legislation reference — recharging equipment at multi-unit housing* [Webpage]. Retrieved from <https://pluginsites.org/legislation-reference-recharging-equipment-at-multi-unit-housing/>

Option 3: Requirement on Builders

- (a) Electric vehicle charging prewire option
 - (1) Every person that builds a new residence for which a buyer is under contract shall offer the buyer the opportunity to have the residence's electrical system include one of the following:
 - (A) an electric vehicle charging system;
 - (B) upgrades to the wiring planned by the builder to accommodate future installation of such a system; or
 - (C) a chase or conduit or both, constructed to allow ease of future installation of the necessary wiring for such a system.
 - (2) The offer required by paragraph (1) of subsection (a) of this section shall be made in accordance with the builder's construction schedule for the residence. In the case of prefabricated or manufactured homes, "construction schedule" includes the schedule for completion of prefabricated walls or other subassemblies.
 - (3) Nothing in this section precludes a person that builds a new residence from:
 - (A) subjecting electric vehicle charging system upgrades to the same terms and conditions as other upgrades, including charges related to upgrades, deposits required for upgrades, deadlines and construction timelines;
 - (B) selecting the contractors that will complete the installation of electric vehicle charging system upgrades; and
 - (C) stipulating in the purchase agreement or sales contract that electric vehicle charging system upgrades are based on such technology available at the time of installation and such upgrades may not support all electric vehicle charging systems installed at a future date and that the person that builds a new residence is not liable for any additional upgrades, retrofits or other alterations to the residence that may be necessary to accommodate an electric vehicle charging system installed at a future date.

Option 4: Multifamily Units Right to Charge

- (a) Any covenant, restriction or condition contained in any deed, contract, security instrument or other instrument affecting the transfer or sale of any interest in a common interest development and any provision of a governing document that either effectively prohibits or unreasonably restricts the installation or use of an electric vehicle charging station within an owner's unit or in a designated parking space, including, but not limited to, a deeded parking space, a parking space in an owner's exclusive use common area or a parking space that is specifically designated for use by a particular owner, or is in conflict with this section is void and unenforceable.
- (b) This section does not apply to provisions that impose reasonable restrictions on electric vehicle charging stations. However, it is the policy of the State to promote, encourage and remove obstacles to the use of electric vehicle charging stations. For purposes of this section, "reasonable restrictions" are restrictions that do not significantly increase the cost of the station or significantly decrease its efficiency or specified performance.
- (c) An electric vehicle charging station shall meet applicable health and safety standards and requirements imposed by state and local authorities and all other applicable zoning, land use or other ordinances or land use permits.
- (d) If approval is required for the installation or use of an electric vehicle charging station, the application for approval shall be processed and approved by the association in the same manner as an application for approval of an architectural modification to the property and shall not be willfully avoided or delayed. The approval or denial of an application shall be in writing. If an application is not denied in writing within 60 days from the date of receipt of the application, the application shall be deemed approved, unless that delay is the result of a reasonable request for additional information.

- (e) If the electric vehicle charging station is to be placed in a common area or an exclusive use common area, as designated in the common interest development's declaration, the following provisions apply:
- (1) The owner first shall obtain approval from the association to install the electric vehicle charging station and the association shall approve the installation if the owner agrees in writing to do all of the following:
 - (A) comply with the association's architectural standards for the installation of the charging station;
 - (B) engage a licensed contractor to install the charging station;
 - (C) provide, within 60 days of approval, a certificate of insurance that names the association as an additional insured under the owner's insurance policy in the amount of [x]; and
 - (D) pay for both the costs associated with the installation of and the electricity usage associated with the charging station.
 - (2) The owner and each successive owner of the charging station shall be responsible for all of the following:
 - (A) costs for damage to the charging station, common area, exclusive use common area or separate interests resulting from the installation, maintenance, repair, removal or replacement of the charging station;
 - (B) costs for the maintenance, repair and replacement of the charging station until it has been removed and for the restoration of the common area after removal;
 - (C) cost of electricity associated with the charging station; and
 - (D) disclosing to prospective buyers the existence of any charging station of the owner and the related responsibilities of the owner under this section.
 - (3) The owner of the charging station, whether located within a separate unit or within the common area or exclusive use common area, shall, at all times, maintain a liability coverage policy. The owner that submitted the application to install the charging station shall provide the association with the corresponding certificate of insurance within 60 days of approval of the application. That owner and each successor owner shall provide the association with the certificate of insurance annually thereafter.
 - (4) A homeowner shall not be required to maintain a homeowner liability coverage policy for an existing National Electrical Manufacturers Association standard alternating current power plug.
- (f) Except as provided herein, installation of an electric vehicle charging station for the exclusive use of an owner in a common area that is not an exclusive use common area shall be authorized by the association only if installation in the owner's designated parking space is impossible or unreasonably expensive. In such cases, the association shall enter into a license agreement with the owner for the use of the space in a common area, and the owner shall comply with all of the requirements in subsection (e).
- (g) The association or owners may install an electric vehicle charging station in the common area for the use of all members of the association, and in that case, the association shall develop appropriate terms of use for the charging station.
- (h) An association may create a new parking space where one did not previously exist to facilitate the installation of an electric vehicle charging station.
- (i) An association that willfully violates this section shall be liable to the applicant or other party for actual damages and shall pay a civil penalty to the applicant or other party in an amount not to exceed one thousand dollars (\$1,000).
- (j) In any action by a homeowner requesting to have an electric vehicle charging station installed and seeking to enforce compliance with this section, the prevailing plaintiff shall be awarded reasonable attorney's fees.

Option 5: Renters Right to Charge

- (a) For any lease executed, extended or renewed on and after [x date], a lessor of a dwelling shall approve a written request of a lessee to install an electric vehicle charging station at a parking space allotted for the lessee that meets the requirements of this section and complies with the lessor's procedural approval process for modification to the property.
- (b) This section does not apply to residential rental properties where:
 - (1) electric vehicle charging stations already exist for lessees in a ratio that is equal to or greater than [x]% of the designated parking spaces;
 - (2) parking is not provided as part of the lease agreement;
 - (3) there are fewer than five parking spaces; or
 - (4) a dwelling is subject to the residential rent control ordinance of a public entity.
- (c) A lessor shall not be obligated to provide an additional parking space to a lessee in order to accommodate an electric vehicle charging station.
- (d) If the electric vehicle charging station has the effect of providing the lessee with a reserved parking space, the lessor may charge a monthly rental amount for that parking space.
- (e) An electric vehicle charging station and all modifications and improvements to the property shall comply with federal, state and local law and all applicable zoning requirements, land use requirements and covenants, conditions and restrictions.



- (f) A lessee's written request to make a modification to the property in order to install and use an electric vehicle charging station shall include, but is not limited to, his or her consent to enter into a written agreement that includes, but is not limited to, the following:
- (1) compliance with the lessor's requirements for the installation, use, maintenance and removal of the charging station and installation and use and maintenance of the infrastructure for the charging station;
 - (2) compliance with the lessor's requirements for the lessee to provide a complete financial analysis and scope of work regarding the installation of the charging station and its infrastructure;
 - (3) a written description of how, when and where the modifications and improvements to the property are proposed to be made consistent with [any other state code handbook];
 - (4) obligation of the lessee to pay the lessor all costs associated with the lessor's installation of the charging station and its infrastructure prior to any modification or improvement being made to the leased property, which shall include, but are not limited to, the cost of permits, supervision, construction and, solely if required by the contractor, consistent with its past performance of work for the lessor, performance bonds;
 - (5) obligation of the lessee to pay as part of rent for the costs associated with the electrical usage of the charging station and cost for damage, maintenance, repair, removal and replacement of the charging station and modifications or improvements made to the property associated with the charging station; and
 - (6) obligation of the lessee to maintain in full force and effect a lessee's general liability insurance policy in the amount of one million dollars (\$1,000,000) and to name the lessor as a named additional insured under the policy commencing with the date of approval of construction until the lessee forfeits possession of the dwelling to the lessor.

Analysis

These options provide a variety of ways for how EV-ready construction requirements are applied. They apply to either state agencies or local municipalities in charge of codes, permit authorities, builders, multiunit dwelling associations and landlords. Of the options provided, requiring an update to state or local building codes (Option 1) accompanied by a requirement on the permitting authority (Option 2) until the code is updated, may have the most immediate effect. It is important for states to also consider Options 4 and 5, which

act on housing associations and landlords, to enable charging at multiunit and rental housing. It is important to provide EV charging in both new buildings (residential and commercial) and in existing buildings (residential, commercial, multiunit dwellings). In order to remove barriers to new and existing residences and buildings, it is likely states will need to both update building codes for new and retrofitted buildings and also impose direct requirements on multiunit dwelling associations and landlords for existing buildings.

Roadblocks

Section 13: Standards for Open Access and Payment Systems

Why the provision was included

There are several elements of interoperability standards when it comes to EVs and EVSE, but they generally fall into three categories:

- Billing and payment system interoperability and open access for EV drivers.
- The physical connection between the EVSE and vehicle.
- Data and communications protocols (i.e., network interoperability).

According to Advanced Energy Economy:

charging networks that have been deployed to date with public funds have too often lacked true payment system interoperability, meaning that it is often difficult and confusing for EV drivers to pay for charging services from

public stations. For example, some require customers using a network to have a membership in a private network in order to pay for charging their vehicle. The EV driver then needs to pay not only the cost of the charge, but also the network membership fee in order to charge. The resulting balkanized system makes it difficult for drivers to move from a charging station in one network to a station in another network. Requiring that payment systems for publicly funded EVSE have standardized options, at the minimum having the ability to use credit cards via a card reader or mobile device option, will ensure that no EV driver has the experience of pulling up to a public charging station only to find themselves unable to charge their vehicle.⁵⁶

Option 1

- Persons desiring to use a public electric vehicle charging station that requires payment of a fee shall not be required to pay a subscription fee in order to use the station and shall not be required to obtain membership in any club, association or organization as a condition of using the station. The total actual charges for the use of an electric vehicle charging station, including any additional network roaming charges for nonmembers, shall be disclosed to the public at the point of sale. An electric vehicle charging station that requires payment of a fee shall allow a person desiring to use the station to pay via credit card or mobile technology.
- Notwithstanding subsection (a), an electric vehicle charging station may offer services on a subscription- or membership-only basis provided those electric vehicle charging stations allow nonsubscribers or nonmembers the ability to use the electric vehicle charging station through the payment options detailed in subsection (a) of this section.
- The service provider of electric vehicle supply equipment at an electric vehicle charging station or its designee shall disclose to the United States Department of Energy National Renewable Energy Laboratory database or other publicly available database designated by the [relevant department] the electric vehicle charging station's geographic location, a schedule of fees, accepted methods of payment and the amount of network roaming charges for nonmembers, if any.

⁵⁶ Advanced Energy Economy. (2018, September). *EVs 101: A regulatory plan for America's electric transportation future*. Washington, DC: Author. Retrieved from <https://info.aee.net/advanced-energy-policy-brief-ev-101>

- (d) Electric vehicle charging stations shall be labeled in accordance with Part 309 of Title 16 of the Code of Federal Regulations and, where commercially reasonable and feasible, may be clearly marked with appropriate directional signage in the parking area or facility where they are located.

Option 2

- (a) A person shall not be required to pay a subscription fee to use a publicly accessible electric vehicle charging station or be required to obtain a membership in a club, association or organization as a condition of using the station; provided, however, that owners and operators of public electric vehicle charging stations may have separate price schedules conditional on a subscription or membership.
- (b) The owner or lessee of a publicly available parking space, whose primary business is not electric vehicle charging services, may restrict the use of that parking space, including by limiting use to customers and visitors of the business.
- (c) The owner or operator of a public electric vehicle charging station shall provide payment options that allow access by the general public, such as the ability to pay via credit card or mobile technology.
- (d) The owner or operator of a public electric vehicle charging station or a designee shall disclose on an ongoing basis to the United States Department of Energy National Renewable Energy Laboratory, or other publicly available database designated by the [relevant department], the station's geographic location, hours of operation, charging level, hardware compatibility, schedule of fees, cost to achieve a complete charge, accepted methods of payment and the amount of network roaming charges for nonmembers, if any.

Analysis

State guidance on interoperability issues is crucial to ensuring that a fair and open charging system develops. These provisions offer various levels of guidance to charging providers on what fees may be imposed for charging services. These provisions:

- direct a state agency to either adopt relevant national or international billing standards or, in their absence, to develop standards for the state;
- require transparency and disclosure of any network roaming fees at the point of sale; and
- require public disclosure on a database of the charging station's geographic location, a schedule of fees, accepted

methods of payment and the amount of network roaming charges for nonmembers.

The options also allow for various treatment of subscription fees. Both Options 1 and 2 clarify that EV drivers should not have to pay a subscription fee to use the charging station or be required to join a subscription or membership organization. Likewise, drivers must be able to pay via mobile device or credit card. The provisions also clarify that charging stations may offer different prices. Therefore, while they may not charge a subscription fee, they are free to offer a lower price per charge to subscribers.

Roadblocks

Section 14: Standards for Physical Charger Connections

Why the provision was included

This provision, inspired by Minnesota statute 32 F.185, was included to illustrate legislative language on EV charging equipment uniformity. States can decide if they want the provision to apply to all chargers or only publicly available chargers in the state.

Today it is possible for various types of EVs to be able to plug into charging stations by a standard plug, and the physical connection between vehicle and charger is rarely a barrier. Level 2 chargers commonly use the standardized SAE J-1772 connectors, which are widely compatible with different

vehicles, leading to strong consumer-facing interoperability across this segment of the market.⁵⁷ There is more variation in standards for direct current fast chargers. There are currently differences between a Charge de Move (CHAdeMO) connector and an SAE Combined Charging System (CCS), which features a double plug that allows drivers to charge DC fast charger or a J1772 plug.⁵⁸ Tesla also uses its own proprietary connector, though it is providing CCS adapters for all vehicles. Plug adapters and dual plug chargers for non-Tesla chargers, however, are becoming more commonplace, thus decreasing the charging device interoperability challenges that plagued the EV market early on.⁵⁹

Physical Connection Provision

- (a) [All/Publicly funded] electric vehicle supply equipment installed in the State must:
- (1) be able to be used by any make, model or type of electric vehicle with commercially available appropriate adaptors; and
 - (2) comply with state safety standards and standards set by the Society of Automotive Engineers.

Analysis

This provision requires all charging equipment in the state to be able to be used by any make and model of electric vehicle. It essentially forbids any proprietary charging infrastructure.

While most EV manufacturers have moved to standardized plug options for market reasons, there are no national or international standards requiring this.

57 M.J. Bradley & Associates, 2019.

58 M.J. Bradley & Associates, 2019.

59 M.J. Bradley & Associates, 2019. This provision is based on Minn. Stat., § 325F.185 (2009). Retrieved from <https://www.revisor.mn.gov/statutes/cite/325F.185>

Roadblocks

Section 15: Standards for Billing and Network Communications

Why the provision was included

There are two areas of concern for network communications. First there is the data communication between the charging stations and the central control system (e.g., a charging network provider or utility) that supports them. Data communication allows network providers and site hosts to better manage chargers and charging activity, ultimately enhancing flexibility and increasing charger utilization.⁶⁰ The second area is network-to-network communication and the ability of networks to coordinate and share data among charging providers. This is called network “roaming” and

without coordination can lead to roaming charges and fees for EV drivers when they utilize a charging station outside their network.

There has been some industry consolidation around the Open Charge Point Protocol for communications between the charging station and the central control systems. Likewise, there is some consolidation around Open Charge Point Interface for bilateral communications between networks. Of the three areas of interoperability, consensus on network communications is currently the least certain.

Option 1: State Agency to Adopt Standards

- (a) The [relevant department or state agency] shall adopt interoperability billing standards for network roaming payment methods for electric vehicle charging stations within one year of the effective date of this legislation. If the [relevant department or state agency] adopts interoperability billing standards, electric vehicle charging stations that require payment shall meet those standards within one year. The standards adopted shall consider interoperability standards adopted by a national standards organization, if any, and other governmental or industry-developed interoperability billing standards. The department may adopt interoperability billing standards promulgated by an outside authoritative body.

⁶⁰ M.J. Bradley & Associates, 2019.

Option 2: Work Group to Create Standards

- (a) This [statute] shall create a Network Interoperability Work Group staffed with members of [relevant state agencies] and the [public utility commission]. Such a work group shall agree on network interoperability requirements for publicly funded EVSE intended for public use and shall consider the establishment of regulatory frameworks for broader standardization of EVSE interoperability. The standards adopted shall consider interoperability standards adopted by a national standards organization, if any, and other governmental or industry-developed interoperability network standards. The department may adopt interoperability network standards promulgated by an outside authoritative body.

Analysis

Recognizing the uncertainty surrounding network communication standards, this provision calls for the establishment of a work group among state agencies to agree on network interoperability requirements for charging stations and

networks in the state and for establishment of regulatory frameworks to standardize charging station interoperability. State action to establish these standards will give certainty to charging station operators and EV drivers and will help to advance the EV market.



Roadblocks

Section 16: Local Approval of Electric Vehicle Supply Equipment

Why the provision was included

This provision is inspired by California Government Code § 65850.7 (2016) and provides guidance to city, county and local municipalities on criteria for approval or rejection of

EV charging stations. Consistency in requirements across a state can help ensure that a robust EV charging network is developed.

City and County EVSE Approval

- (a) A city (for incorporated areas) or county (for unincorporated areas) shall administratively approve an application to install electric vehicle charging stations through the issuance of a building permit or similar nondiscretionary permit. Review of the application to install an electric vehicle charging station shall be limited to the building official's review of whether it meets all health and safety requirements of local, state and federal law. The requirements of local law shall be limited to those standards and regulations necessary to ensure that the electric vehicle charging station will not have a specific, adverse impact upon the public health or safety. However, if the building official of the city or county makes a finding, based on substantial evidence, that the electric vehicle charging station could have a specific, adverse impact upon the public health or safety, the city or county may require the applicant to apply for a use permit.
- (b) A city or county may not deny an application for a use permit to install an electric vehicle charging station unless it makes written findings 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 shall include the basis for the rejection of potential feasible alternatives for preventing the adverse impact.
- (c) The decision of the building official pursuant to subsections (a) and (b) may be appealed to the planning commission of the city or county.
- (d) Any conditions imposed on an application to install an electric vehicle charging station shall be designed to mitigate the specific, adverse impact upon the public health or safety at the lowest cost possible.
 - (1) An electric vehicle charging station shall meet applicable health and safety standards and requirements imposed by state and local permitting authorities.
 - (2) An electric vehicle charging station shall meet all applicable safety and performance standards established by the [relevant state board], 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 utility commission] regarding safety and reliability.

- (e) On or before [x date], every city and county with a population of [x number] or more residents and, on or before [x date], every city and county with a population of less than [x number] residents, shall, in consultation with the local fire department or district and the utility director, if the city or county operates a utility, adopt an ordinance, consistent with the goals and intent of this section, that creates an expedited, streamlined permitting process for electric vehicle charging stations. In developing an expedited permitting process, the city or county shall adopt a checklist of all requirements with which electric vehicle charging stations shall comply to be eligible for expedited review. An application that satisfies the information requirements in the checklist, as determined by the city or county, shall be deemed complete. Upon confirmation by the city or county of the application and supporting documents being complete and meeting the requirements of the checklist and consistent with the ordinance, a city or county shall, consistent with subsection (b), approve the application and issue all required permits or authorizations. However, the city or county may establish a process to prioritize competing applications for expedited permits. Upon receipt of an incomplete application, a city or county shall issue a written correction notice detailing all deficiencies in the application and any additional information required to be eligible for expedited permit issuance. An application submitted to a city or county that owns and operates an electric utility shall demonstrate compliance with the utility's interconnection policies prior to approval.
- (f) The checklist and required permitting documentation shall be published on a publicly accessible internet website, if the city or county has an internet website, and the city or county shall allow for electronic submittal of a permit application and associated documentation and shall authorize the electronic signature on all forms, applications and other documentation in lieu of a wet signature by an applicant. If a city or county determines that it is unable to authorize the acceptance of an electronic signature on all forms, applications and other documents in lieu of a wet signature by an applicant, the city or county shall state, in the ordinance required under this subsection, the reasons for its inability to accept electronic signatures and acceptance of an electronic signature shall not be required.
- (g) A city or county shall not condition approval for any electric vehicle charging station permit on the approval of an electric vehicle charging station by an association.

Analysis

States will want to consider the direction they want to provide cities, towns and municipalities on the application process and approval for EV charging stations. In particular:

- The reviewing authority. The California provision required building permit offices to approve EV charging station applications.
- The scope of the review. This sample provision limits the scope of the review to local, state and federal laws on public health and safety.
- Standard for rejection. This provision states that a permit may not be rejected unless there is a written finding based upon substantial evidence of an adverse impact on public health or safety.
- Appeal process for a rejection.
- Conditions for installation. This sample provision articulates the public health and safety standards that should apply, including various professional agencies, state boards and the public utility commission.
- Requirements for a streamlined application process and transparent documentation requirements. Some cities, towns or municipalities will receive numerous applications for EV charging stations, which can be expedited by development of a streamlined application process specifically for EV charging stations. State legislators may want to require cities, towns or municipalities above a certain size to proactively develop this process and transparent documentation requirements, to aid the development of an EV market and EVSE providers.

Roadblocks

Section 17: State Studies

Why the provision was included

EVs are projected to rapidly increase over the coming years for both passenger vehicle use and other aspects of electrified transportation. BloombergNEF predicts that by 2040, 57% of all passenger vehicle sales will be electric.⁶¹ The company also predicts that 56% of light commercial vehicle sales and 31% of medium commercial vehicles will be electric within the same time period.⁶² Currently, EV

sales are just over 2% for passenger vehicles.⁶³ As states experience greater levels of EVs across all transportation market segments, new questions will emerge and new studies will be necessary to develop sound policy. Solutions will also vary from state to state. Some states have included legislative requirements for studies to help state agencies develop the appropriate policies for the issue at hand and that fit the dynamics of a particular state.

Option 1: Low-Income Barriers Study

- (a) On or before [x date], the [state transportation department], with input from the [public utility commission] and [relevant state agencies] and the public, shall conduct and complete a study on the following:
 - (1) barriers for low-income customers and disadvantaged communities to electric transportation options; and
 - (2) opportunities and recommendations on how to increase access to electric transportation resources.
- (b) On or before [x date], the [state transportation department], with input from the [public utility commission] and [relevant state agencies] and the public, shall develop and publish a study on barriers for low-income customers to electric transportation options, including those in disadvantaged communities, as well as recommendations on how to increase access to electric transportation options for low-income customers, including those in rural and disadvantaged communities.

Option 2: Study on EV Infrastructure Support Options

- (a) The [relevant state agencies], in collaboration with the [state transportation department] and [state utility industry], shall commission a study of EV charging infrastructure to evaluate costs and benefits associated with different options for EV infrastructure support to be completed no later than 180 days following the effective date of this legislation.

⁶¹ BloombergNEF. (2019). *Electric vehicle outlook 2019*. Retrieved from <https://about.bnef.com/electric-vehicle-outlook/#toc-viewreport>

⁶² BloombergNEF, 2019.

⁶³ McDonald, L. (2019, January 12). *US EV sales surpass 2% in 2018 — 9 EV sales charts*. CleanTechnica. Retrieved from <https://cleantechnica.com/2019/01/12/us-ev-sales-surpass-2-for-2018-8-more-sales-charts/>

Analysis

The two provisions included here are inspired by California and Iowa, respectively.⁶⁴ The original California provision SB 350 directed the state Public Utilities Commission to study barriers to renewable energy and energy efficiency for low-income populations. The commission is following up with a study on barriers to electrified transportation.⁶⁵

The Iowa-inspired example is much broader and, like the above example, can be modified to a state's particular

requirements for information. The Iowa study focused on assessing options for financing EV infrastructure.

States may want to consider studies on areas of interest or particular application within their state. Such areas can include financing and incentive options, barriers to EV adoption in low-income or rural communities, methods to increase access to electrified transportation, electrified mass transit options, medium- and heavy-duty electrified transport and so on.



64 Clean Energy and Pollution Reduction Act of 2015. S.B. 350. 2015-2016 Legislative Session. (Cal. 2015). Retrieved from https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB350. And from Iowa: An act modifying various provisions relating to public utilities, providing for a study of electric vehicle infrastructure support, and including effective date provisions. Senate File 2311. 2018 Legislative Session. (Iowa 2018). Retrieved from <https://www.legis.iowa.gov/docs/publications/LGE/87/SF2311.pdf>

65 Farnsworth, D., Shipley, J., Sliger, J., & Lazar, J. (2019, January). *Beneficial electrification of transportation*. Montpelier, VT: Regulatory Assistance Project. Retrieved from <https://www.raponline.org/knowledge-center/beneficial-electrification-of-transportation/>

Part IV:

Empower Regulators

Regulation

Section 18: Regulatory Status of EV Charging Station Owners and Operators

Why the provision was included

The determination of whether the owners and operators of EV charging stations are public utilities or competitive electricity suppliers can significantly impact the levels of private (non-ratepayer-funded) investment in EV charging or rule out beneficial payment models, such as per-kWh pricing. These provisions explicitly allow a narrow exemption to laws and rules in order to stimulate private investment and allow payment model flexibility. Many states have already made such a determination at the public utility commission or enacted a similar explicit statutory exemption.⁶⁶

In many states, the issue is whether nonutility EV charging stations are “reselling electricity,” which could be forbidden as a violation of utility monopoly franchises or trigger burdensome regulation of the owners or operators of the charging station. Some public utility commissions have determined that EV charging stations are not “selling electricity” within the meaning of the relevant statutes because they are providing a more specific service using specialized equipment — sometimes termed as “charging services” — analogizing to many other businesses that use electricity as a major input but provide a nonregulated service. States that have made this determination have generally made these rulings narrow, to avoid opening any loopholes in the more general utility, energy and environmental regulations, by treating EV charging stations (or the site hosts) as customers of the electric utility in question. This still allows public utility commissions to have jurisdiction over rate design for these customers, as well

as charging management programs or other measures to control grid impacts of EV charging.

It has only been rarely argued that all EV charging station owners and operators should be fully regulated as public utilities. However, partial application of such rules has been considered in some states. In principle, it could be possible to have full regulation of charging stations by a public utility commission where any payment is required. However, this could mean that all such investment would necessarily run through existing public utilities, which would mean significant rate-based investments and weighty new regulatory burdens and responsibilities on public utility commissions.

EV charging stations are often regulated by other state agencies, such as more general consumer protection rules, weights and measures regulations⁶⁷ and sometimes more specific EV charging station regulations, such as the “open access” rules discussed later in this document. The National Institute of Standards and Technology, part of the U.S. Department of Commerce, has issued two sets of weights and measures rules for electric vehicle fueling: (1) device code requirements under Handbook 44 and (2) method of sale regulations under Handbook 130.⁶⁸ In some states, these rules are adopted automatically once issued, but many states require explicit action to adopt these rules. In either case, implementation and enforcement of these rules may require additional resources for the relevant state agency.

Consideration of whether utilities should be allowed to own and operate EVSE will be discussed in Section 21.

66 A 2019 report by the Iowa Economic Development Agency identified 21 states that have implemented legal or policy changes to address this issue. Iowa Energy Office. (2019, February). *Charging forward: Iowa's opportunities for electric vehicle infrastructure support*. Des Moines, IA: Author. Retrieved from https://www.iowaeconomicdevelopment.com/userdocs/news/IEDA_EVRpt_022019.pdf

67 The Weights and Measures Division promotes uniformity in U.S. weights and measures laws, regulations and standards to achieve equity between buyers and sellers in the marketplace.

68 See National Institute of Science and Technology. (undated). *Electric vehicle fueling and submetering: U.S. National Work Group on Measuring Systems*. Retrieved from <https://www.nist.gov/pml/weights-and-measures/legal-metrology-devices/electric-vehicle-fueling-and-submetering>

Option 1: Status Based on Entity Actions

- (a) Unless otherwise specifically provided by any other federal or state law, an entity owning, controlling, operating or managing an electric vehicle charging station shall not be deemed an electric public utility solely because of that ownership, control, operation or management. The charging of an electric vehicle shall be deemed a service and not a sale of electricity by an electric power supplier or basic generation service provider.

Option 2: Status Based on Utility Definition

- (a) A corporation or individual not otherwise regulated as an electric utility that owns, controls, operates or manages a facility that supplies electricity to the public exclusively to charge battery electric and plug-in hybrid electric vehicles, compressed natural gas to fuel natural gas vehicles or hydrogen as a motor vehicle fuel is not defined as a public utility.

Options 1 and 2 analysis

All of the options use various language to exempt EVSE providers from classification as utilities. Option 2 does this by clarifying the definition of a public utility. Option 1 focuses

on the actions of the entity to make this clarification and specifies that charging of an electric vehicle shall be deemed a service and not a sale of electricity by a power supplier or generator.

Option 3: Alternative Regulatory Oversight

- (a) The provision of electric vehicle charging to the public by an entity not otherwise regulated as an electric utility is not the retail sale of electricity for the purposes of this [title/chapter]. The rates, terms and conditions of electric vehicle charging services by a nonutility are not subject to regulation under this [title/chapter]. This section does not affect the ability of individuals, businesses or governmental entities to acquire, install or use an electric vehicle charger for their own vehicles.
- (b) [Relevant lead weights and measures agency] shall adopt rules to provide definitions, methods of sale, labeling requirements and price-posting requirements for electric vehicle charging stations to allow for consistency for consumers and the industry within [x time] of the enactment of this legislation. [Relevant lead weights and measures agency] shall consider the recommendations of [relevant agencies] during the rulemaking process. Such rules shall provide for notice of charging station locations to utilities, so that they can be incorporated into distribution system plans.

Option 3 analysis

Option 3 clarifies that the services offered by an EVSE provider shall not be considered a retail sale of electricity. This would correspond with the definition of a utility provider in the state. After clarifying that EVSE providers are not utilities, and thus would not be regulated by the state public

utility commission, Option 3 also designates a state agency or department to oversee EVSE providers and to develop rules for providers to protect consumers. It also requires some notice to utilities so that planned charging stations can be integrated into utility distribution system planning.

Regulation

Section 19: Integrated Planning

Why the provision was included

Many states have existing planning policies for utility resources, and it will be useful for states to consider how their policies affect opportunities associated with current innovations in the transportation sector. For example, states could use utility integrated resource planning or a policy like it (known as integrated planning), electric distribution system planning or transmission planning to envision the potential for transportation electrification and its effects on the state's and region's power system. An integrated planning process provides state agencies of transportation, environment and air quality, public utilities and public participants the opportunity to take an in-depth look at the energy demands over an agreed-upon planning horizon, such as 10 to 20 years. Fundamental to the success of an integrated planning process is credible modeling of projected demand trajectories. As states consider their ability to accommodate different types of EV charging needs, projecting various EV deployment scenarios to gain a better sense of that demand will be important.⁶⁹

States may consider amending existing planning statutes to require consideration of electrified transportation in the plan and the requisite cooperation among various state agencies. States could also consider enacting a new planning requirement, as electrified transportation may span more agencies

than current planning processes contemplate.

State legislators may want to consider the following:

- Whether an existing planning process, such as an integrated resource plan, considers all existing resources.
- Whether the requirement should be solely on electric utilities or electric distribution companies.
- Whether other state agencies should be involved in the planning process.
- The length of the planning horizon required (typically 10 to 20 years).
- The frequency of filing requirement (typically every two to three years).
- Whether the planning process (new or existing) requires utilities to utilize all cost-effective energy efficiency, demand response and renewable energy to meet EV charging needs.
- Whether the plan requires utilities to make use of charging to meet flexible demand. EV load is flexible when customers receive price signals through time-of-use rates; therefore, utilities can influence when drivers charge their cars, encouraging them to charge when cheap renewable energy is abundant.
- Whether utilities should be required to consider utilizing the storage capability of EVs.

Option 1: Integrating Electric Vehicles Into the Power Grid

- (a) [Electric utilities/electric distribution companies] shall recognize the prospects for and expected effects of electrification of transportation and other end-uses in their regularly filed plans, including integrated resource plans and integrated distribution plans. If a utility is not required to file either an integrated resource plan or an integrated distribution plan, it shall file a resource plan with the [public utility commission] every two years that takes into account expected electrification of end-uses in the utility's service territory, over a planning horizon of a minimum of 10 years.

69 Farnsworth et al., 2019.

- (b) In determining whether new load from electrification is brought on and managed in ways that are consistent with the principles of least-cost integrated resource planning [cross-reference with appropriate state law], the [public utility commission] will take into consideration, among other things, the following:
- (1) whether pricing and product offerings related to charging reflect underlying economics of the overall system;
 - (2) whether the utility plan will utilize electric vehicle charging for grid benefit, including increased use of variable renewable energy, grid flexibility, reliability and efficiency;
 - (3) whether increases in load are anticipated and a plan to address the increased load using least-cost principles; utilities shall consider the effect on electricity rates for utility plans for meeting increased load due to electric vehicles, and such plans must explicitly utilize all cost-effective energy efficiency, demand response and renewable energy options. Such utility plans for increased load must also consider whether direct load control and dynamic pricing are operationally appropriate; and
 - (4) whether the utility plan will utilize the potential of electric vehicle charging load to provide grid services, including demand response and both unidirectional and bidirectional charging and storage.

Option 2: Electric Vehicle Market Planning

- (a) The [relevant state agencies or departments of energy, environment, transportation, utility regulation, air quality, commerce], in consultation with the [electric utilities][electric distribution companies], must deliver a plan to the [relevant legislative committee/Governor/department] that analyzes, among other things, the potential for electric vehicles to provide energy storage and other services to the electric grid. The report shall also identify strategies to ensure that the grid is prepared to support increased EV charging based on projections of sales of EVs. Such strategies shall consider all cost-effective energy efficiency, demand response and increased renewable energy as a means to meet increased load. [Electric utilities/electric distribution companies] shall integrate the plan into their regular planning process. The report must be delivered biennially.

Option 3: Sales Forecasting and Distribution Planning

- (a) Each [electric utility/distribution company] shall integrate EV charging load projections into its distribution planning. Projections will be based on the number of EVs registered in the State as well as on projected fluctuation in EV sales. Electric distribution companies must publish an annual report detailing the EV charging load projections for the company's distribution planning, which shall be filed with the [public utility commission].

Analysis

Each of the options provides various elements of the decisions listed above. Options 2 and 3 were inspired by Connecticut statutes and were enacted together. Option 2, inspired by Connecticut General Statutes 16a-3a, focuses on planning between state agencies and utilities, and Option 3,

based upon Connecticut General Statutes 16-19fff, requires the utilities to plan for the increased EV load within their distribution planning. Option 1 provides requirements for EV load to be fully integrated into the utility distribution system by considering ways EV load can utilize renewable energy and ways EV load can store energy.

Regulation

Section 20: Tariff Design

Why the provision was included

Perhaps the most important direction state legislators can provide to utilities and state public utilities commissions is on implementing dynamic rate design with electrified transportation. Studies and real-world experience show that (1) if EV charging is not controlled it can cause increased costs to the grid⁷⁰ and (2) if EV charging is controlled, all grid customers' benefits increase.⁷¹

As EV charging load increases demand on power grids, legislators, regulators and utilities have the opportunity to ensure that existing grid resources are managed to optimize this increased demand and that all ratepayers share equitably in the economic benefits of smart grid management. Providing EV customers with clear price signals through rate design is one key to achieving this. Well-designed rate structures will lead to EV charging that is aligned with grid needs, help increase utilization of existing

resources and reduce costs for all ratepayers. In contrast, poorly designed rates may lead to increased system costs, which can result in higher rates for customers.⁷²

Rate design should recognize the following critical points:

- There are a few critical hours when the grid is stressed, and EV charging can be shifted to avoid those hours.
- There are many hours when the grid is lightly loaded, and EV charging can be shifted to take advantage of those hours.
- By avoiding high-cost hours and focusing on low-cost hours, EV charging can be managed to avoid the cost of expensive new resources, like new generation plants and storage, and save consumers money.
- EVs can help integrate renewable energy by charging when this energy is abundant.
- Future technology may enable EVs (particularly electric school buses) to be a resource to the grid.

⁷⁰ A case study from the Norwegian Water Resources and Energy Directorate (Norges vassdrags- og energidirektorat, or NVE) looking at the city of Drammen estimates that, with smart charging behavior, the city's current grid capacity could handle future charging. On the other hand, uncontrolled charging could require grid investments of 1 billion to 2 billion Norwegian kroner — or around 100 million to 200 million euros — related to on-peak EV charging. Bjelland Eriksen, A. (2018, October 19). *Regulatory experiences: From volumetric- to capacity-based tariffs* [Presentation]. Retrieved from <https://www.ceer.eu/documents/104400/-/-/9ad78f1a-c528-289a-a213-6a8f95c9d51f>

⁷¹ Time-differentiated, off-peak EV charging reduces the need for system upgrades, providing additional net benefits to all utility customers by shifting EV charging to hours when the grid is underutilized and the cost of electricity is low. Five state analyses indicated that annual utility customer benefits will be 30% to 60% greater if EV owners charge off-peak, compared to plug-in electric vehicle owners plugging in and starting to charge as soon as they arrive home. M.J. Bradley & Associates. (2017, March 14). *Electric vehicle cost-benefit analyses*. Conducted for the Natural Resources Defense Council. Concord, MA: Author. Retrieved from https://mjbradley.com/sites/default/files/NE_PEV_5_State_Summary_14mar17.pdf

⁷² Farnsworth et al., 2019.

Option 1: Time-of-Use Rate

- (a) On or before [date], each [distribution company/utility] shall offer to residential and small commercial and industrial customers at least one option for a time-of-use rate, including differentials for energy supply, transmission and distribution, designed to reflect the cost of providing electricity at different times of the day and year. Each [distribution company/utility] shall provide each customer, not less than once per year, a summary of available rate options with a calculation of expected bill impacts under each. Options for a time-of-use rate shall be posted prominently on the website of each [distribution company/utility], including the ability to opt into such a rate online, and additional educational material. Should a customer opt into a time-of-use rate, the [distribution company/utility] shall install all necessary equipment within 60 days of request. A customer may choose a different rate schedule after one year.

Option 2: Time-of-Use Rate for Electric Vehicle Charging

- (a) By [x date], each public utility [larger than x size] selling electricity at retail must file with the [public utility commission] a tariff that allows a customer to purchase electricity [for the purpose of charging an electric vehicle][for the entire site]. The tariff must:
- (1) offer rates and rate design elements that reveal the time-varying and, where appropriate, location-varying value of consumption, including time-varying rates and load management programs by either the utility or a third party, consistent with the findings of this legislation; and
 - (2) offer to each customer class the option to purchase electricity:
 - (A) from the utility's current mix of energy supply sources; or
 - (B) entirely from renewable energy sources, as defined in [relevant state statute].
- (b) The [public utility commission] shall, and after notice and opportunity for public comment, approve, modify or reject the tariff. The [public utility commission] may approve the tariff if the public utility has demonstrated that the tariff:
- (1) appropriately reflects off-peak versus peak cost differences in the rate charged;
 - (2) includes a mechanism to allow the recovery of costs reasonably necessary to comply with this section, including costs to inform and educate customers about the financial, energy conservation and environmental benefits of electric vehicles and to publicly advertise and promote participation in the customer-optional tariff;
 - (3) provides for clear and transparent customer billing statements including, but not limited to, the amount of energy consumed under the tariff;
 - (4) incorporates the necessary costs of metering or submetering within the rate charged to the customer; and
 - (5) is consistent with the general purposes of this legislation.
- (c) Within [x] days of [public utility commission] approval of a public utility's tariff filed under this section, the public utility shall make the tariff available to customers. The utility may at any time propose revisions to a tariff filed under this section based on changing costs or conditions by filing an application before the commission for approval.
- (d) Data reporting. Each public utility providing a tariff under this section shall periodically report to the commission, as established by the commission, and on a form prescribed by the commission, the following information, presented on a per-quarter basis:
- (1) the number of customers who have arranged to purchase electricity under the tariff;
 - (2) the total amount of electricity sold under the tariff; and
 - (3) other data required by the commission.

- (e) **(PROVISION FOR RESTRUCTURED STATES ONLY)** Within 60 days of the effective date of this legislation, the commission will initiate a proceeding for the purposes of reaching an agreement among electric utilities and competitive generation suppliers regarding the design of a time-of-use and/or other time-varying rates that can be applied uniformly to a customer who receives its generation service from a competitive supplier, such that the rates charged for distribution, transmission and generation together fall within the same time bands. The proceedings will address any barriers that currently impede the ability of competitive suppliers to offer time-varying rates.

Option 3: Transit Bus Rate

- (a) On or before [x date], the [public utility commission] shall direct a [utility][utility with more than x customers] that does not have an approved or proposed rate tariff that meets the goals of this section as of that date to file a rate design application that supports and accelerates the deployment of electric transit buses.
- (b) A [utility with x customers] or fewer service connections may file a rate design application that supports and accelerates the deployment of electric transit buses.
- (c) A rate design proposed by a [utility] pursuant to this section shall seek to minimize overall costs and maximize overall benefits and shall not shift costs to nonparticipating customers. The rate design shall include time-varying rate design, a time-of-day, off-peak rate or utility control over charging with an economic rate to best align charging with system needs. The commission shall approve, or modify and approve, a rate design application if it is consistent with this section and in the interests of ratepayers and shall otherwise reject the application.
- (d) This section applies to an application to the commission for rate design if one of the following conditions is met:
 - (1) The application is filed on or after [x date].
 - (2) The application is filed before [x date], but has an evidentiary hearing scheduled on or after [x date].

Option 4: Rate Design for EVSE Charging Stations

- (a) On or before [x date], the [public utility commission] shall direct a [utility] to file a rate design application that supports and accelerates the deployment of electric vehicle charging stations.
- (b) A rate design proposed by an electrical corporation pursuant to this section shall seek to minimize overall costs and maximize overall benefits and shall not shift costs to nonparticipating customers. In particular, such a rate design shall:
 - (1) limit or eliminate any demand charges for EV charging stations;
 - (2) contain a time-of-day rate, off-peak rate or utility control over charging with an economic rate; and
 - (3) reflect system costs and incentivize grid benefits.
- (c) The commission shall approve, or modify and approve, a rate design application if it is consistent with this section and in the interests of ratepayers and shall otherwise reject the application.

Analysis

All of the options include a requirement for time-varying rates. This is in contrast to most residential rates, which apply a flat energy charge — that is, one that does not vary over the course of the day or year. Flat pricing does not give EV drivers a clear signal to charge in a way that reflects grid conditions. Rather, customers will likely charge whenever it is easiest for them because the cost is the same during all hours. Time-varying rates, by contrast, communicate through price signals that some times during the day are more expensive to produce power and grid assets are stressed (higher rates) and that at certain times EV charging would be beneficial to grid management because it would increase utilization of existing assets during otherwise low-usage hours (lower rates).⁷³

The options differ, though, in their focus. State legislators may want to consider the following:

- Whether time-varying rates should apply to all users or whether an EV-specific rate should be developed.
- Whether specific electrified transportation use sectors need a separate rate design, such as transit buses, EV charging stations, electrified port vehicles, and so on.

Option 4 also addresses demand charges. These charges are common across the United States in rates for larger commercial and industrial customers. Typically, these charges, measured in kilowatts, are based on the highest 15- or 30-minute noncoincident peak⁷⁴ for a customer across an entire month. Demand charges were historically justified as a proxy for a customer's contribution to the overall system

peak, for generation capacity as well as transmission and distribution. However, this proxy was always weak because it was not linked to system peaks that drive costs. This was arguably necessary given that metering technology could not capture sufficient data to use time-varying rates.

However, given the evolution of metering, including advanced metering infrastructure, these historic constraints no longer apply. It is far fairer and more efficient to develop smart time-varying rates for the vast majority of electric system costs, including generation, transmission and shared distribution. Demand charges should be limited to the recovery of costs for site infrastructure, particularly dedicated transformers for commercial and industrial customers.⁷⁵ This level of demand charges could be in the range of \$1 to \$3 per kilowatt, far lower than most commercial and industrial demand charges across the country.

Demand charges pose a particular challenge for public DC fast charging and other high-power-draw EV applications. These types of charging stations typically are placed on rates with demand charges by default. At the present stage of EV adoption, public DC fast chargers have relatively low utilization rates but easily trigger a high demand charge in one charging session. This leads to extremely high bills for these stations, with an effective per-kWh rate many times higher than a typical residential rate. Reforming high demand charges would greatly aid the buildout of public DC fast charging and can be done in the broader context of efficient rate design reform.

73 For more information on rate design, see Lazar, J., & Gonzalez, W. (2015, July). *Smart rate design for a smart future*. Montpelier, VT: Regulatory Assistance Project. Retrieved from <https://www.raponline.org/knowledge-center/smart-rate-design-for-a-smart-future/>; and Colgan, J., Delattre, A., Fanshaw, B., Gilliam, R., Hawiger, M., Howat, J., Jester, D., LeBel, M., & Zuckerman, E. (2017, July 15). *Guidance for utilities commissions on time of use rates: A shared perspective from consumer and clean energy advocates*. (Electricity rate design review paper No. 2.) Retrieved from <https://uspirg.org/sites/pirg/files/reports/TOU-Paper-7.17.17.pdf>

74 A customer's maximum energy demand during a billing period or a year, even if it is different from the time of the system peak demand.

75 See Linvill, C., Lazar, J., Dupuy, M., Shipley, J., & Brutkoski, D. (2017). *Smart non-residential rate design*. Montpelier, VT: Regulatory Assistance Project. Retrieved from <https://www.raponline.org/knowledge-center/smart-non-residential-rate-design/>; and Lazar & Gonzalez, 2015.

Section 21: Utility Provision of EVSE

Why the provision was included

States will need to decide whether investor-owned utilities should be permitted to provide residential or commercial charging stations either as part of their regulated operations or as nonutility operations. State legislators will need to determine if it is in the public interest for EV charging infrastructure to be deployed and thus for ratepayers to shoulder the cost burden. In the traditional utility model, regulated utilities build infrastructure and recover from ratepayers the costs of that infrastructure plus a reasonable rate of return. Whether this model can or should be extended to electric vehicle charging stations is a topic of debate.⁷⁶

Proponents of utility involvement in providing electric vehicle supply equipment articulate the following benefits:

- Utilities have a long planning horizon.
- Utilities have the ability to make capital expenditures.
- Utilities have the ability to manage demand.
- Utilities have considerable electric system expertise.
- Utilities are closely regulated.
- Utilities can identify best practices for charging station deployment.
- Utilities are uniquely positioned to choose appropriate charging locations.⁷⁷

Opponents of utility involvement in electric vehicle supply equipment cite the following concerns:

- Utility involvement can suppress development of a competitive market. Many independent EV charging providers allege that the operation of charging stations as part of a regulated service gives utilities an unfair advantage and discourages competition. Even in situations where utility ownership or operation of EV charging is segregated from utility operations, they argue, a utility's pervasive presence may still provide unfair competitive advantage.⁷⁸
- Utilities have a bias to inefficiently high levels of capital investment and little incentive to control costs of a charging station build-out.
- Utilities do not have incentives to efficiently manage demand.
- Many other entities are better situated to identify policies in the public interest for efficient and effective charging station deployment.
- Utilities may have relevant knowledge with respect to the electric system for charging station siting but lack the necessary knowledge of transportation planning and driving patterns.

76 Sangi, E. (2013, September 25). PUCs: Are EV charging stations utilities? [Blog post]. Advanced Energy Economy. Retrieved from <https://blog.aee.net/pucs-are-ev-charging-stations-utilities>

77 Electronic investigation of commission jurisdiction over electric vehicle charging stations, Case No. 2018-00372, Kentucky PSC Order (2019). Retrieved from https://psc.ky.gov/order_vault/Orders_2019/201800372_06142019.pdf

78 Sangi, 2013.

States may want to consider a range of different options for utilities in electric vehicle supply equipment. Advanced Energy Economy and Rocky Mountain Institute have articulated five potential roles.⁷⁹

1. Utility as facilitator. The utility treats EV charging like any other potential load, providing nondiscriminatory electric service when and where requested but not engaging directly in the business of vehicle charging.
2. Utility as enabler. The utility deploys additional infrastructure up to the point of connection to the charging infrastructure to proactively build out capacity in key areas to enable project development — also called the make-ready option — but does not take a direct role in installing, owning or operating the EV charging station.
3. Utility as manager. In addition to delivering electric service to the location of the vehicle charger, the utility manages the charging operation to better integrate charging with grid capabilities and grid needs.

4. Utility as provider (may include manager role). The utility delivers electric service to the charging equipment, which the utility owns and is able to earn a return on, and the utility provides charging services.
5. Utility as exclusive provider (may include manager role). Vendors other than the utility are prohibited from reselling electricity to the public, which could be inclusive of charging service, effectively extending the utility monopoly functions to plug-in EV charging and the deployment of charging infrastructure.

With the exception of the last, utility as exclusive provider, all of these options can serve the public interest. The option that state legislators choose will depend upon an assessment of benefits and risks with utility involvement in providing electric vehicle supply equipment.

Option 1: Limited Utility Investment

- (a) Each electric utility may file, or the [public utility commission] may direct an electric utility to file, an application to create a program to support transportation electrification for [make-ready investments for electric vehicle supply equipment][utility investment] in a form and manner prescribed by the [public utility commission]. Such programs shall only be approved if the [public utility commission] determines that utility involvement and investment is necessary to meet needs that are not met by the current market. [The [public utility commission] will ensure that the costs of charging infrastructure and charging services will, to the greatest extent possible, be borne only by the users of the electric vehicle supply equipment.]
- (b) The commission shall also develop a code of conduct to ensure that the electric utility does not have a competitive advantage over other nonmonopoly competitive enterprises seeking to engage in the same or similar business and require, at a minimum, functional separation in the offering of these services.
- (c) When considering transportation electrification programs and determining the utility role in providing EVSE and making other expenditures related to such programs proposed by an electric utility, the [public utility commission] shall consider whether the investments and other expenditures are:
 - (1) in the public interest;
 - (2) designed to provide reasonable access to electric transportation to low- and moderate-income families either through public or private transportation modes; and
 - (3) designed to reach areas that commercial third-party vendors are unlikely to serve.

79 Advanced Energy Economy, 2018.

- (d) Once utility involvement is approved, if the [public utility commission] determines that the transportation electrification market is competitive, it shall:
 - (1) supervise the transfer of utility assets into the competitive market;
 - (2) ensure that assets are transferred in a manner such that the utility can recover its investment and ratepayers are appropriately compensated; and
 - (3) find that serving disadvantaged communities and remote areas is not compromised by such transfer of assets.

Option 2: Utility-Managed Electric Vehicle Charging

- (a) No later than one year after the effective date of this [act], each public utility in the State shall submit to the [public utility commission] a proposed plan for the construction and long-term operation of an electric vehicle charging supply equipment network within its service territory. The proposed charging network plan shall:
 - (1) establish a process and timeframe for identifying site hosts, third-party providers and potential locations for EVSE at corridor locations and community locations and for the publicly accessible EVSE;
 - (2) outline the terms of the agreements and contracts to be entered into by the electric public utility and each of the site hosts and third-party providers in order to install the components of the network by [x date], which may include a variety of approaches for owning and operating the network, including: site host owned and operated EVSE, third-party provider or electric public utility owned and operated EVSE, or mixed arrangements whereby multiple entities are involved in owning and operating the locations and EVSE;
 - (3) provide cost estimates for the installation and operation of the required network components; and
 - (4) provide methods for the development, installation and operation of the network locations, EVSE and electrical infrastructure and for financing its installation and operation, including, but not necessarily limited to:
 - (A) financing plans, financial incentives, new rate designs, tariffs and how the costs of any programs offered in the proposal shall be recovered fully and in a timely fashion through a separate utility rate clause as approved by the board;
 - (B) partnership programs with local government units or other parties, managed charging or demand response programs, streamlined processes and programs to facilitate interconnection;
 - (C) marketing and other programs to build consumer awareness; and
 - (D) technology trials or other programs that support the goals of this legislation.
- (b) No later than 90 days after the effective date of this legislation, the [public utility commission] shall make a determination whether any [utility] proposed charging network plan submitted within 18 months prior to the effective date of this bill fulfills the requirements of subsection (a) of this section. The [public utility commission] shall notify the electric public utility immediately:
 - (1) if the proposed charging network plan is determined to be inconsistent with the goals and requirements of this section; and
 - (2) of the date by which the electric public utility shall be required to submit a new proposed charging network plan in compliance with this section.
- (c) No later than 180 days after receipt of a proposed charging network plan pursuant to subsection (a) or (b) of this section, the [public utility commission] shall review and issue a determination approving, approving with modifications or rejecting the proposed charging network plan. The board shall apply the following criteria for this review and determination:
 - (1) The proposed charging network plan is consistent with and supports attaining the goals of this section.
 - (2) The expenditures estimated and set forth in the proposed charging network plan are reasonable for attaining the goals of this section.
 - (3) The proposed charging network plan is likely to accomplish the installation of the required elements of the network in a timely manner.

- (d) The [public utility commission] order approving, or approving with modifications, an electric public utility's proposed charging network plan shall provide for and approve full and timely recovery of all reasonable costs through a separate utility rate clause, which may be included in the electric public utility's rate base as either a capital or regulatory asset. The electric public utility shall implement its charging network plan by using funding sources other than recovering electric public utility expenditures through customer rates whenever feasible.
- (e) Upon approval of a charging network plan pursuant to this section, the electric public utility shall implement the charging network plan and may enter into any necessary agreements or contracts with site hosts or third-party providers.
 - (1) An electric public utility charging network plan that provides for network locations developed by site hosts or third-party providers shall:
 - (A) use a competitive process, wherever feasible, to engage site hosts or third-party providers, as applicable, in developing projects, providing EVSE and services, and owning and operating the locations and EVSE for public use;
 - (B) leverage private investment wherever possible;
 - (C) provide reasonable access to electric transportation to low- and moderate-income families through either public or private transportation modes;
 - (D) be reasonably expected to support innovation, competition and customer choice in charging services;
 - (E) maximize net benefits for ratepayers;
 - (F) avoid unfair limits on the involvement of nonutility market participants; and
 - (G) maximize public benefit by
 - (i) ensuring universal access,
 - (ii) encouraging the use of open standards,
 - (iii) promoting interoperability and network roaming,
 - (iv) providing a consistent consumer experience,
 - (v) providing appropriate consideration of future infrastructure needs, and
 - (vi) promoting development of a competitive market for continued growth in public charging infrastructure beyond the network.
 - (2) An electric public utility charging network plan that provides for utility ownership and operation of locations or EVSE as part of the network, as approved by the [public utility commission], shall:
 - (A) use a competitive process to engage site hosts or third-party providers for EVSE and services, as applicable;
 - (B) provide customer choice in equipment;
 - (C) optimize net benefit for ratepayers;
 - (D) provide reasonable access to electric transportation to low- and moderate-income families either through public or private transportation modes;
 - (E) avoid unfair limits on the involvement of nonutility market participants; and
 - (F) maximize public benefit by
 - (i) ensuring universal access,
 - (ii) encouraging the use of open standards,
 - (iii) promoting interoperability and network roaming,
 - (iv) providing a consistent consumer experience,
 - (v) providing for appropriate consideration of future infrastructure needs, and
 - (vi) promoting development of a competitive market for continued growth in public charging infrastructure beyond the network.

- (3) The electric public utilities shall propose tariffs, incentive programs or other methods that ensure electricity costs for public charging facilities are not restrictive during early market conditions when utilization is low, as determined by the [public utility commission], including consideration of demand charge impacts, and the costs of such tariffs, programs or methods shall be recovered fully and in a timely fashion through a separate utility rate clause as approved by the board. The tariffs, programs or other methods may be approved for EVSE that is part of the network, or for any other EVSE that is available for public use and that meets any additional requirements deemed necessary by the board.
- (4) Electric public utilities may propose other programs, incentives, tariffs or initiatives to support the development of vehicle charging infrastructure of all types, including, but not limited to:
 - (A) workplace EVSE programs for use by employees;
 - (B) EVSE programs for lodging establishments for use by overnight guests;
 - (C) EVSE programs for residential use in multifamily and single-family housing;
 - (D) EVSE for fleet operators;
 - (E) EVSE for mass transit;
 - (F) marketing and consumer awareness campaigns;
 - (G) innovative market or technology trials;
 - (H) solutions addressing demand charge implications on electricity costs;
 - (I) programs that facilitate renewable energy and electricity storage integration;
 - (J) programs that first utilize all cost-effective energy efficiency and demand response to meet EV load;
 - (K) programs that encourage vehicle charging at optimal times of day; and
 - (L) programs or technologies that enable interactive use of plug-in electric vehicles as distributed energy resources that support and enhance operation of the public grid through two-way exchanges of electricity.



Option 3: Broad Utility Provision of EVSE

- (a) No later than [x date], and on or before [x date] every [x] years thereafter, an electric public utility shall file with the [public utility commission] an application for a program for regulated activities to support widespread transportation electrification within the area covered by the utility's [certificate of public convenience and necessity].
- (b) To comply with this subsection (a), an application must seek to minimize overall costs and maximize overall benefits and may include:
 - (1) investments or incentives to facilitate the deployment of customer-owned or utility-owned charging infrastructure and associated electrical equipment that supports transportation electrification;
 - (2) investments or incentives to facilitate the electrification of public transit and other vehicle fleets;
 - (3) rate designs or programs that encourage vehicle charging that supports the operation of the electric grid, including increased use of variable renewable energy, grid flexibility, reliability and efficiency; and
 - (4) customer education, outreach and incentive programs that increase the awareness of the programs and of the benefits of transportation electrification and encourage greater adoption of electric vehicles.

Analysis

The legislative options fall along the range of roles articulated above. Option 1 has multiple options for limiting utility involvement in EV charging. Limitations in this provision include:

- Limiting utility involvement to the “make-ready” stage, in which the utility has the role of facilitator and enabler. States can choose to limit the utility role to the manager role as well.
- Limiting recovery of the charging infrastructure to the costs recovered through EV charging rates.
- Limiting the duration of utility involvement by requiring utilities to exit the EV charging services business once a

robust EV market has developed, as determined by the state public utility commission.

States more comfortable with utility involvement can consider Option 2, which also contains a menu of options legislators may consider that could reflect state goals, or Option 3, which places few restrictions on utility provision of EVSE. Option 2 envisions the utility as manager, and Option 3, based upon a Colorado bill,⁸⁰ contemplates the utility as provider. Since utilities are regulated entities, the legislature and state regulatory commissions are able to direct involvement in certain areas that EV charging station providers in the open market would otherwise not find appealing without incentives.

⁸⁰ Electric motor vehicles public utility services, S.B. 19-077, 72nd General Assembly (Col. 2019). Retrieved from <https://leg.colorado.gov/bills/sb19-077>

Regulation

Section 22: Cost Recovery for Utility Investment in EVSE

Why the provision was included

If states decide to allow utilities to own and operate EV charging stations, utilities will be able to ask for cost recovery of utility investment in infrastructure. States have used utility involvement in EV charging stations as an opportunity to ensure that access to charging is equitable, as they are

able to direct utility efforts to specific areas that may be underserved by the market.

As electrified transportation technology and capabilities develop, states may find that they want to focus utility efforts toward other areas of interest.

Cost Recovery Considerations

- (a) The [public utility commission] may consider applications by electric utilities for a recovery of costs made on make-ready infrastructure for transportation electrification. The [public utility commission] may require:
- (1) a minimum of [x]% of the infrastructure budget to serve transit agencies;
 - (2) a minimum of [x]% of the infrastructure budget to serve forklifts;
 - (3) a minimum of [x]% of the infrastructure budget to serve vehicles operating at ports and warehouses;
 - (4) a minimum of [x]% of the infrastructure budget to serve interstate rest areas or essential travel corridors;
 - (5) a minimum of [x]% of the infrastructure budget to serve areas with high-density multiunit dwellings;
 - (6) a minimum of [x]% of the infrastructure budget to serve rural communities;
 - (7) a minimum of [x]% of the infrastructure budget to serve communities without off-street parking and/or neighborhoods located near commuting travel corridors within metropolitan areas, to serve long distance and local EV drivers, including EVs in taxi and ride sharing/hailing fleets;
 - (8) a minimum of [x]% of the program budget to be invested in low- and moderate-income and disadvantaged communities;
 - (9) rebates of up to [x]% of the cost of the EVSE for sites in disadvantaged communities and sites that support electric transit and school buses;
 - (10) direct current fast charging stations located in disadvantaged communities to receive a \$[x] rebate, not to exceed the full costs, for the charging equipment; and
 - (11) direct current fast charging stations to be publicly accessible and support equipment of 150 kilowatts or larger.

Analysis

There is only one provision offered here, but it contains a menu of options that states may choose from as they determine the appropriate level of cost recovery and any specific areas of focus to meet state goals. Note that the options vary from requiring a certain percentage of a utility's

EV infrastructure budget to focus on certain areas, to requiring that utilities offer rebates for third parties to install charging equipment. Both options use ratepayer money to finance the charging equipment, but the first allows the utility to retain ownership of the charging equipment, whereas rebates allow third-party ownership of the infrastructure.

Section 23: Performance-Based Regulation Incentives

Why the provision was included

Some states are adding performance-based regulation incentives to existing cost-of-service regulation or using performance regulation as a method to focus utility attention

on state goals. Utility performance toward achieving these goals is articulated in a series of metrics. This reflects a management best practice that we manage best what we measure.

Option 1: Simple Performance Incentive

- (a) A public utility may propose, and the [public utility commission] may approve, approve with modification or reject, financial incentives through the ratemaking process for [make-ready][utility investment in] infrastructure for electric vehicle supply equipment that is deployed for the benefit of ratepayers.
- (b) An incentive rate of return on investment under this section may be allowed only if the company chooses the least-cost course of action in providing electric vehicle supply equipment, particularly where third-party provision of the equipment is the least-cost option.
- (c) Financial incentives on investment under this section may be allowed provided that the company can demonstrate that it is providing service to an underserved community for which no other low-cost option is competitively available.

Option 2: Detailed Performance Incentive

- (a) The Legislature finds that utilities, which are traditionally responsible for understanding and engineering the electrical grid for safety and reliability, must be fully empowered and incentivized to be engaged in electrification of our transportation system. Therefore, the Legislature intends to provide a clear policy directive and financial incentive to utilities for electric vehicle infrastructure build-out.
 - (1) In establishing rates for each electrical company regulated under this [title/chapter], the [public utility commission] may allow performance incentives on investment for [make-ready] [utility procurement of] infrastructure for electric vehicle supply equipment that is deployed for the benefit of ratepayers [provided that the capital expenditures do not increase costs to ratepayers in excess of [x]%. The [public utility commission] must consider and may adopt other policies to improve access to and promote fair competition in the provision of electric vehicle supply equipment.
 - (2) An incentive authorized under this section may be allowed only if the company chooses the least-cost procurement of electric vehicle supply equipment particularly where third-party provision of electric vehicle supply equipment is the lower cost option rather than utility investment.
 - (3) The [public utility commission] shall ensure that any incentives shall be allocated only for excellent performance, after timely implementation, and on budget. The [public utility commission] may also allocate penalties.

- (4) The incentive authorized in paragraph (2) of this subsection applies only to projects that have been installed after [x date] and that are reasonably expected, at the time they are placed in the rate base, to result in real and tangible benefits for ratepayers.
- (5) By [x date], the [public utility commission] must report to the appropriate committees of the Legislature with regard to the use of any incentives allowed under this section, the quantifiable impacts of the incentives on actual electric vehicle deployment and any recommendations to the Legislature about utility participation in the electric vehicle market.
- (6) The [public utility commission] may require electric vehicle supply equipment infrastructure to be located in areas and implemented in a manner that can be reasonably expected to attain the following state objectives:
 - (A) ensure carbon emissions savings;
 - (B) provide equitable access to electric vehicle supply equipment;
 - (C) meet rural transportation needs;
 - (D) meet state objectives on electrified [airport service vehicles] [ports] [state transit authorities];
 - (E) support electrified transportation in areas with high-density multiunit dwellings;
 - (F) support electrified transportation needs in communities without off-street parking and/or neighborhoods located near commuting travel corridors within metropolitan areas, to serve long distance and local EV drivers, including EVs in taxi and ride sharing/hailing fleets;
 - (G) support electrified transportation needs in low- and moderate-income and disadvantaged communities; and
 - (H) support state air quality goals through establishment of charging stations to support electric transit and school buses.
- (b) The [public utility commission] shall develop metrics to measure progress toward the above goals and shall condition incentives and penalties on utility attainment of the goals.

Analysis

The two options offered here explicitly authorize the public utility commission to set incentives and penalties for utility performance on performance metrics. Both options allow for specification of the level of utility involvement allowed and should correspond with other legislative direction on the role of the utility in EV charging. Both options also allow for incentives to be set on utility investment. It is important to note, however, that the utility earnings need not be limited to return on capital investment. One goal of a performance-based regulation framework could be to reduce or eliminate

the earnings-driven bias that favors capital investment over operational expenditure when noncapital spending can provide a superior (and more cost-effective) solution. Under a performance regulation framework that rewards utilities for truly least-cost outcomes, utilities will consider a broader array of potential solutions, knowing that those that don't require capital investment (e.g., contracts for third-party provision of EVSE) can also provide earnings opportunities.⁸¹

Like the cost recovery provisions outlined earlier, Option 2 also contains various areas where states can focus utility attention.

81 Advanced Energy Economy. (2018, June 5). *Performance-based regulation: Aligning utility incentives with policy objective and customer benefits*.

Washington, DC: Author. Retrieved from <https://info.aee.net/hubfs/PDF/PBR.pdf>



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