

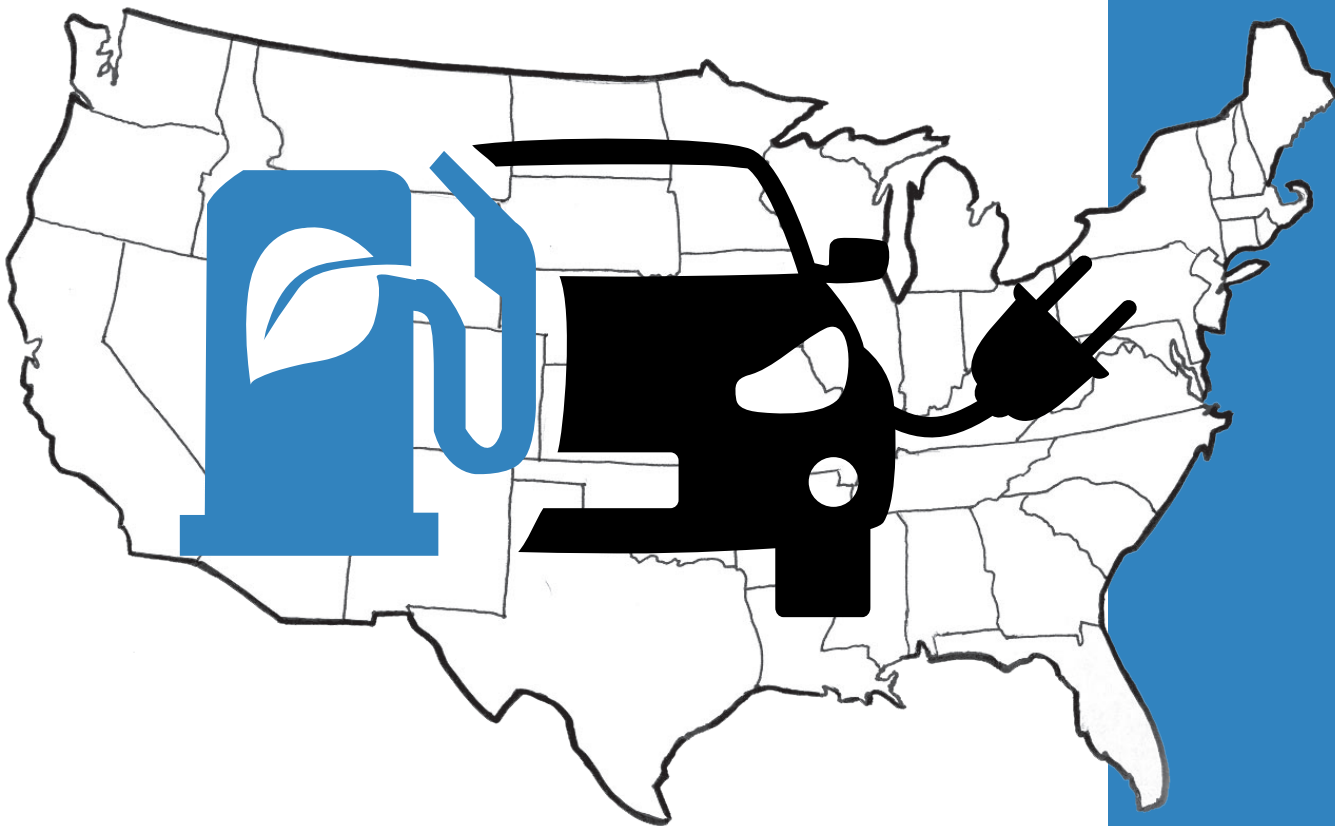
UCLA Luskin School of Public Affairs

**Luskin
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FOR INNOVATION

State of the States' Plug-in Electric Vehicle Policies

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ABSTRACT

Plug-in electric vehicles (PEVs) entered the U.S. market in 2010, and a variety of policy instruments have been introduced at the state level to spur their market growth. State governments have provided a wide range of incentives to encourage vehicle adoption and expand charging infrastructure. Most of these instruments provide financial incentives such as rebates and tax credits to reduce the costs associated with new technology adoption. Other incentives include providing access to parking spots with charging stations to PEV owners at retail services and other publicly accessible locations and giving PEV owners access to HOV lanes regardless of the number of passengers in the vehicle.

ABOUT

UCLA Luskin Center for Innovation

The UCLA Luskin Center for Innovation translates world-class research into real-world policy and planning solutions. Based in the UCLA Luskin School of Public Affairs and organized around initiatives, the Luskin Center addresses pressing issues of energy, transportation and sustainability in collaboration with civic partners.

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I. Executive Summary

Plug-in electric vehicles (PEVs) entered the U.S. market in 2010, and a variety of policy instruments have been introduced at the state level to spur their market growth. State governments have provided a wide range of incentives to encourage vehicle adoption and expand charging infrastructure. Most of these instruments provide financial incentives such as rebates and tax credits to reduce the costs associated with new technology adoption. Other incentives include providing access to parking spots with charging stations to PEV owners at retail services and other publicly accessible locations and giving PEV owners access to HOV lanes regardless of the number of passengers in the vehicle.

This report is a comprehensive assessment of these incentives, and we explore them in these dimensions:

- **Cost reduction for PEVs:** The most common policy instruments used to reduce the purchase price of PEVs are rebates and tax credits. Other instruments include sales tax exemptions, grants, and loans. These incentives are most commonly available for individual adopters, but some states also provide financial assistance to businesses and public entities to replace their fleets. There are 22 states that provide incentives to reduce the cost of PEV acquisition for individual consumers and commercial and public fleet operators.
- **Expansion of electric vehicle supply equipment (EVSE) accessibility:** Similar to the instruments used to reduce costs for PEV purchases, states have introduced rebates, tax credits, loans, and grants to incentivize EVSE installations for individuals, businesses, and public entities. In addition, states can enter into agreements to help expand charging networks on interstate freeways. To remove barriers for multi-unit dwelling installation, some states have passed regulations to bar common interest associations from preventing residents' installations in their parking spots. There are 28 states that provide incentives for EVSE installations in residences, retail services, workplaces, and public agencies. Eight states have entered into the ZEV Program Implementation Task Force with the goal to deploy 3.3 million PEVs by 2025. California, Oregon, and Washington are continuing their efforts to electrify the Interstate 5 freeway.
- **Transportation incentives:** Some states have provided incentives to enhance PEV owners' driving experience. The most common incentive is giving PEV drivers access to HOV lanes regardless of the time of day or the number of passengers in the vehicle. Other incentives include free parking at spots with charging stations, privileged access to charging stations, and toll exemptions. In addition, states can also invest in public demonstration programs to promote the use of various types of electric vehicles.

2. Introduction

When plug-in electric vehicles (PEVs) entered the U.S. market in 2010, both the federal government and state governments sought to spur the commercial success of PEVs and the charging infrastructure that supports the technology. Their efforts are reflected in the number of policies that have been implemented in the past few years, from a variety of financial incentives to grants and initiatives that support research and development of cheaper and better battery technologies. As sales increase and new knowledge is generated as part of the diffusion process, state policies become an exciting laboratory for policymakers to revisit and learn from one another to improve existing PEV policies to reflect the changing landscape.

There is a wide range of policy instruments that state governments can adopt to reduce regulatory barriers and accelerate PEV adoption and market expansion. These policies can:

- Reduce the vehicle purchase price for individual consumers, businesses, and public agencies through instruments such as tax credits and rebates.
- Provide incentives to expand the charging infrastructure network, such as direct rebates or reduced electricity rates.
- Give PEV owners and fleets prioritized access to HOV lanes and parking spots.
- Promote the adoption of PEVs through government fleet demonstration projects.

This report surveys the range of currently available state policies and programs that concern the acquisition, infrastructure, and usage of PEVs. While there are other entities that have also played a role in expanding the PEV market, such as utilities, metropolitan planning organizations, and local municipalities, this report focuses on statewide policies and collaboration between states. The goal of this report is to provide a snapshot of the state of statewide PEV policies, which can enable policymakers, researchers, advocates, and other PEV stakeholders to compare policies and conduct further research.

2.1 Why Should States Care About PEV Policies?

States are setting various goals to scale PEV adoption and expand infrastructure coverage, and policies are needed to achieve these goals. Expanding the PEV market requires consumer to purchase new vehicles and change fueling behaviors. Without financial incentives, there are some significant hurdles to adoption—PEVs' upfront costs are higher than their internal combustion engine (ICE) equivalent models', and battery electric vehicles (BEVs) can induce range anxiety when electric charging infrastructure is not yet extensively accessible.

There have been policy efforts to simultaneously leverage the benefits of PEVs and to address obstacles facing diffusion of the technology. Financial incentives for vehicle acquisition reduce the purchase price to make PEVs more affordable for more consumers, while publicly accessible charging infrastructure development enhances the convenience of re-fueling.

3. Reducing the Purchase Price of PEVs

3.1 Types of Incentives

There are six basic financial incentives the government can provide to reduce the purchase price of PEVs:

- **Rebates:** After purchasing PEVs, consumers can fill out rebate forms and send them to designated processing centers to obtain a pre-determined amount of rebate. Rebates can also be administered at the point-of-sale, in which case the car dealer would directly deduct the rebate amount from the purchase price of the vehicle.
- **Tax credit:** Consumers who have purchased qualified PEVs can file for a deduction against their income tax or property tax, dependent on the statute, for up to a certain amount or certain percentage of the vehicle's purchase price.
- **Loans:** Some states provide low-interest loans for individuals and/or businesses to purchase new vehicles or to convert their ICE vehicles to alternative fuel vehicles.
- **Grants:** To help transition large commercial or public sector fleets from gasoline to alternative fuel vehicles, some state governments provide grants to incentivize these entities to replace their vehicles. These entities usually are required to submit an application prior to the purchase. Once the application is approved, the entity will purchase the vehicles and submit proof of purchase to receive reimbursements.
- **Sales tax exemption or reduction:** State government can exempt sales tax from PEV purchases, or reduce the percentage of the sales tax, to make PEVs more attractive to consumers.
- **Fee exemptions or reduced fees:** In states where drivers have to pay vehicle registration fees, the government can exempt or reduce those fees for PEV owners.

There are features that make some incentives more attractive than others and can induce more uptakes:

- **Magnitude:** The choice of incentive instrument can limit the magnitude of the incentive. Fee exemption and reduction usually reduces the PEV purchase price by an amount smaller than tax credit and rebates. Without rebates or tax credits, these policy instruments may not be able to entice consumers to purchase PEVs.
- **Eligibility:** Some entities or individuals may be excluded from certain incentives. For instance, non-profit organizations and public agencies cannot take advantage of the tax credit for PEVs or charging stations because they do not have tax burdens. Loans and grants with fleet and vehicle requirements may exclude entities that have fleets that are either too small or large for the incentives.
- **Temporal availability:** In general, consumers are more likely to be enticed to purchase PEVs when the incentive is administered at the point of sale, such as rebates and sales

tax exemption and reduction. The longer it takes for consumers to obtain the monetary value of the incentives, the less likely that consumers can take advantage of them.

3.2 States with Incentives for PEV

There are 22 states that provide at least one type of incentive to reduce PEV purchase price currently. Among these states, tax credit is the most common incentive given to individuals and fleet owners, followed closely by rebate. Fee exemption and reduction and sales tax exemption and reduction are the least common incentives provided to PEV purchasers.

Figure 3-1: Incentives to Reduced PEV Purchase Price (U.S.)

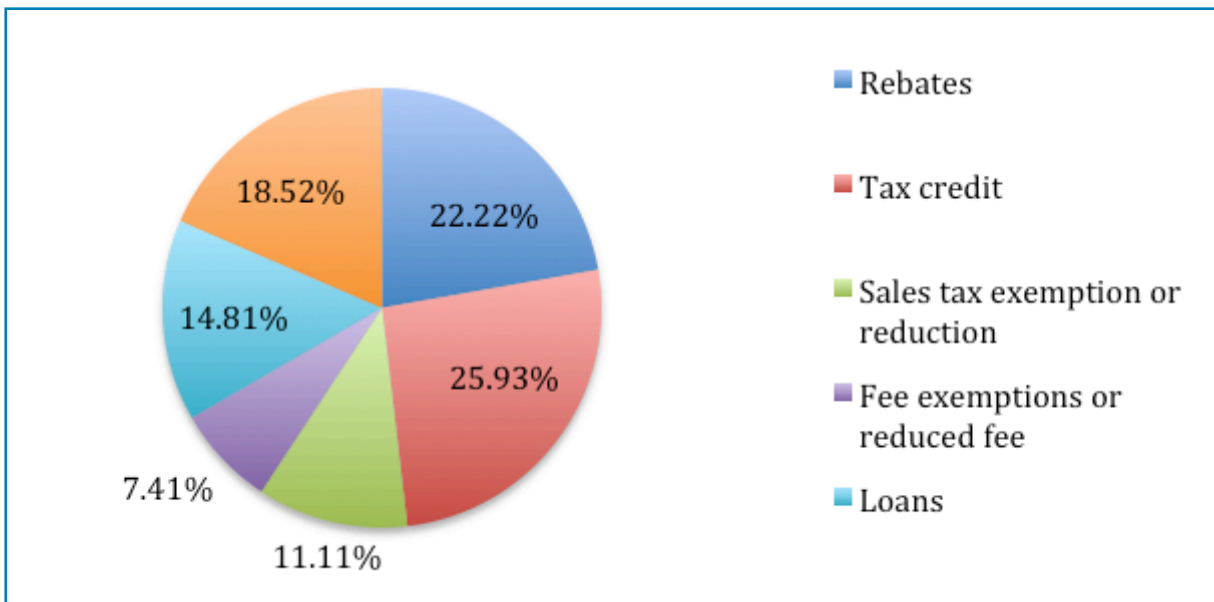


Table 3-1: States with PEV Price Reduction Policy Instruments

Price Reduction Instrument	States
Rebates	CA, IL, MA, NY, PA, TX
Tax credit	CO, GA, LA, MD, SC, UT, WV
Sales tax exemption or reduction	CO, NJ, WA
Fee exemptions or reduced fee	AZ, IL
Loans	NE, OK, OR, VA
Grants	CT, MD, NY, NC, UT

3.3 Rebates

3.3.1 Individual Consumers

The states that offer rebates to consumers are California, Illinois, Massachusetts, Pennsylvania, and Texas. To receive the rebates, consumers are required to fill out an application and submit it to the appropriate processing centers with proof of payment, vehicle registration information, and the vehicle purchase receipt. Both Massachusetts and California have chosen the Center for Sustainable Energy to manage the rebate process. In Illinois, Pennsylvania, and Texas, rebate applications are processed by the state's Department of Environmental Protection.

Table 3-2: States with PEV Rebate Programs

Vehicle Rebate Program	CA	IL	MA	PA	TX
Max Rebate for PHEV	\$1,500	\$4,000	\$2,500	\$2,000	\$2,500
Max Rebate for BEV	\$2,500	\$4,000	\$2,500	\$2,000	\$2,500
How is it determined?	Fixed, by fuel type	10% of MSRP, up to \$4,000 for eligible models	Fixed, by model	Based on battery capacity	Fixed for eligible models (upcoming)

Rebate policy structures in these states vary. In California, qualified PHEVs receive \$1,500, and BEVs receive \$2,500. These amounts are fixed, and fueling type is the only factor that differentiates the rebate amount.¹ Massachusetts determines amount by model; all BEVs are eligible for \$2,500 in rebate, and PHEVs like Chevrolet Volt and Cadillac ELR that have longer battery range are also eligible for the higher rebate amount of \$2,500. Other PHEVs, such as Honda Accord and Toyota Prius that have smaller electric battery capacity, are eligible to receive \$1,500 for their purchase.²

Illinois' rebate amount is dependent upon the vehicle sales price for qualified models; consumers can receive a rebate amount equal to 10% of the purchase price, up to \$4,000, and need to submit a copy of the manufacturer's MSRP window sticker or other forms of proof from the dealership with the rebate application.³ In Pennsylvania, BEVs and PHEVs with battery capacity equal to or greater than 10 kWh are eligible for \$2,000 in rebate, while those with battery capacity lower than 10 kWh receive \$1,000.⁴

1 "Clean Vehicle Rebate Project." Center for Sustainable Energy. July 2014. <https://energycenter.org/clean-vehicle-rebate-project>

2 "Eligible Vehicle List." Massachusetts Offers Rebates for Electric Vehicles. <https://mor-ev.org/eligible-vehicles-list>

3 "Vehicle Rebate Information." Illinois Environmental Protection Agency. <http://www.illinoisgreenfleets.org/rebates/vehicle>

4 "Alternative Fuels Incentive Grant Program: Alternative Fuel Vehicle (AFV) Rebates." Alternative Fuel Vehicle Rebate Program. Pennsylvania Department of Environmental Protection, 2014. <http://www.portal.state.pa.us/>

All BEVs and PHEVs on the eligible vehicle list determined by the Texas Commission on Environmental Quality’s Light Duty Motor Vehicle Purchase or Lease Incentive Program are eligible for \$2,500 in rebate. The list is updated at least annually, and the current list includes vehicle makes like BMW, Cadillac, Chevrolet, Ford, Kia, Mercedes-Benz, Mitsubishi, Nissan, and Porsche.

3.3.2 Commercial and Public Sector Fleets

Illinois and New York provide rebates to help commercial or public sector fleet owners and operators finance fleet vehicle replacements. In Illinois, business owners and government units are also eligible for the same vehicle rebates available for individual consumers. The rebate amount is also determined by the MSRP, and each business or governmental unit can apply for up to a total of 300 rebates until the program sunsets, and each location can receive up to 150 rebates.⁵

The New York Truck Voucher Incentive Program (NYT-VIP) offers \$60,000 for each Class 3 to Class 8 truck that run on alternative fuels, including all battery electric trucks and hybrid electric trucks. The vehicle purchaser can choose vehicles from an approved list and purchase the vehicles from a state-approved vendor. The vendor then submits a voucher request form. After the vehicles are delivered to the fleet owners, the vendor fills out the reimbursement form with receipt from the sale to obtain the voucher.⁶

Table 3-3: States with Rebate Programs for Electric Fleet Purchases

Fleet Rebate	IL	NY
Max Rebate for PHEV	\$4,000	\$60,000
Max Rebate for BEV	\$4,000	\$60,000
Fleet Limit	Max 300 vehicles during the program, no more than 150 vehicles in one location	No limit
Eligibility	Vehicle eligibility list	Class 3 to Class 8 trucks; Vendor needs to obtain approval from the state

portal/server.pt/community/alternative_fuels_incentive_grant/10492/alternative_fuel_vehicles/553206

5 “Vehicle Rebate Information.” Illinois Environmental Protection Agency. <http://www.illinoisgreenfleets.org/rebates/vehicle>

6 “How does NYT-VIP work?” New York Truck Voucher Incentive Program, NYSEDA. <https://truck-vip.ny.gov/HowDoesNYT-VIPwork.php>

3.4 Tax Credit

3.4.1 Individual Consumers

Seven states offer a tax credit for individuals who have purchased a PEV, and each state has a different formula that determines the amount of tax credit for which a consumer is eligible.

Table 3-4: States with Tax Credit for PEV Purchases

Tax Credit	CO	GA	LA	MD
Max Rebate for PHEV	\$6,000	\$0	\$3,000	\$3,000
Max Rebate for BEV	\$6,000	\$5,000	\$3,000	\$3,000
How is it determined?	A formula of purchase price (deducting federal tax credit) times battery capacity in kWh	120% of purchase price or \$5,000, whichever is less	10% of the vehicle purchase price, or \$3,000, whichever is less	\$125 per kWh battery capacity

Tax Credit	SC	UT	WV
Max Rebate for PHEV	\$2,000	\$605	\$7,500
Max Rebate for BEV	\$0	\$605	\$7,500
How is it determined?	Base tax credit is \$667 for a car that has 4 kWh batteries. Each add'tl kwh receives another \$111	Fixed	35% against purchase price up to \$7,500

In Georgia,⁷ Louisiana,⁸ and West Virginia,⁹ consumers can apply for a tax credit that is a pre-determined percentage of the vehicle purchase price, up to a maximum amount. PHEVs are not eligible for tax credit in Georgia, while consumers who purchased BEVs can receive 20% of the vehicle purchase price or \$5,000 in tax credit, whichever is less.¹⁰ In Louisiana, both PHEV and BEV purchasers can receive the lower amount, between \$3,000 or 10% of the vehicle purchase price.¹¹ Consumers of PEVs in West Virginia can apply for tax credit worth 35% of the purchase price, up to \$7,500.¹²

Colorado, Maryland, and South Carolina determine the tax credit amount based on battery capacity of the purchased vehicle. In Colorado, the tax credit is determined by a formula of multiplying the battery capacity in kilowatt-hours by the vehicle purchase price, deducting the federal tax credit amount, then dividing the amount by 100. Consumers can receive up to \$6,000 in tax credit for both PHEVs and BEVs.¹³ In Maryland, the maximum tax credit amount is \$3,000, and each buyer receives \$125 in tax credit for each battery kilowatt-hour.¹⁴ Only PHEVs are eligible for tax credit in South Carolina, and the amount is calculated based on a formula with the base at \$667 for a car that has a minimal battery capacity of 4 kilowatt-hours. For each additional kilowatt-hour, the consumer can receive an additional \$111, up to \$2,000.¹⁵

Utah has a fixed amount of tax credit of \$605 for both PHEVs and BEVs that are eligible.¹⁶

7 "Alternative Fuel Vehicle (AFV) Tax Credit." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/5424>

8 "Alternative Fuel Vehicle (AFV) and Fueling Infrastructure Tax Credit." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/6603>

9 "Alternative Fuel Vehicle (AFV) Tax Credit." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/9152>

10 Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) Tax Credit. Green Driver State Incentives in Georgia. DMV.org. <http://www.dmv.org/ga-georgia/green-driver-state-incentives.php>

11 Louisiana, State Hybrid and Electric Vehicle Incentives. National Conference of State Legislatures. November 15, 2013. <http://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx>

12 "West Virginia's new alternative-fuel vehicles and infrastructure tax credit." West Virginia Division of Energy. <http://www.wvcng.com/information/WV2011.pdf>

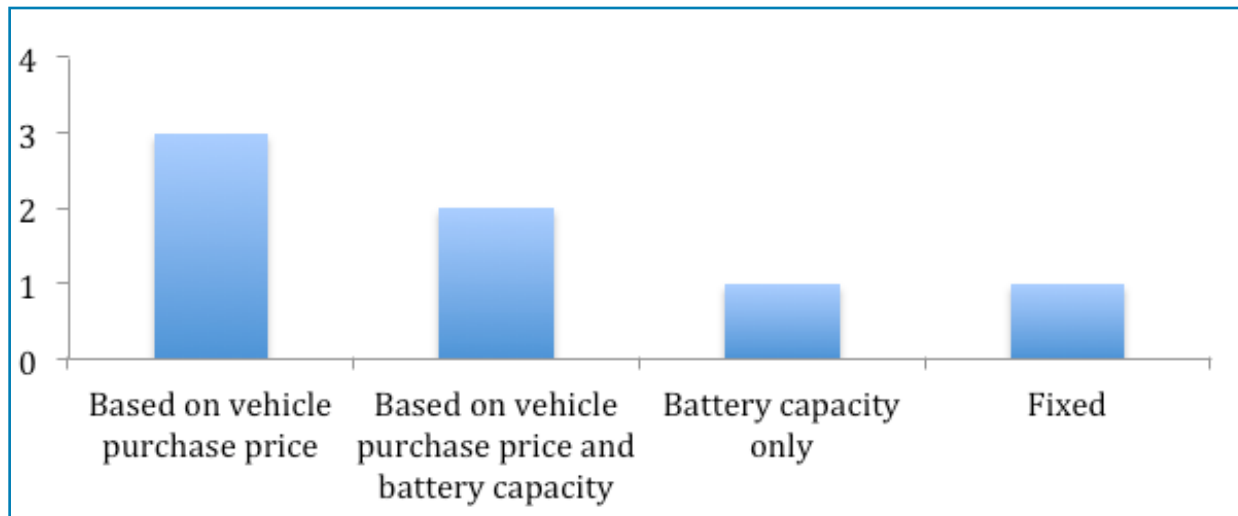
13 Colorado Tax Credits. The Electric Ride Colorado. http://electricridecolorado.com/get_set/my_home/ready-your-home/colorado-tax-credits

14 Maryland Laws and Incentives. Alternative Fuels Data Center, Office of Energy Efficiency & Renewable Energy. US Department of Energy. <http://www.afdc.energy.gov/laws/all?state=MD#State%20Incentives>

15 "Plug-in Hybrid Electric Vehicle (PHEV) Tax Credit." Alternative Fuels Data Center, Office of Energy Efficiency & Renewable Energy. US Department of Energy. <http://www.afdc.energy.gov/laws/10252>

16 "Clean Fuel Tax Credit." Clean Fuels Program, Mobile Sources and Transportation Section, Division of Air Quality, Utah Department of Environmental Quality. December 18, 2013. <http://www.cleanfuels.utah.gov/taxcredits/after2014/after2014.htm>

Figure 3-2: How States Determine Tax Credit Amount for PEV Owners



3.4.2 Commercial and Public Sector Fleets

Georgia is the only state that offers a tax credit for businesses to purchase commercial vehicles. Businesses can receive up to \$12,000 for eligible medium-duty vehicles between 8,500 lbs to 26,001 lbs, and up to \$20,000 for eligible heavy-duty vehicles above 26,001 lbs. Each business can apply up to \$250,000 in tax credit.¹⁷

3.5 Loans

In states that provide loans for alternative vehicle purchases and conversions, the beneficiaries are largely public sector fleets, which include school buses. These loans usually have low-interest rates, and a time horizon for when the loans should be paid back, which is dependent on the size of the loan.

¹⁷ “Commercial Alternative Fuel Vehicle (AFV) Tax Credit.” Laws and Incentives, Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/11420>

Table 3-5: States that Provide Loans for Fleet Conversion and Replacement

	NE	OK	OR	VA
Use	Replacement and purchase of new vehicles; fueling facility and equipment	Vehicle conversion and new vehicle purchase	Vehicle conversion and new vehicle purchase	Vehicle conversion and new vehicle purchase
Primary Recipients	Local governments, businesses	Businesses	Local governments, businesses, tribes	State agencies
Interest Rate	Varies, 2.5% to 5%	3%	0% to market rate	N/A
Limit	750,000 per borrower	N/A	\$100,000	N/A
Administration	Nebraska Energy Office	Oklahoma Department of Commerce	Oregon State Energy Loan Program	Department of General Services

Oklahoma provides businesses a loan with a 3% interest rate to convert gasoline vehicles to alternative fuel vehicles, and businesses can also use the loans to pay for the incremental costs incurred from purchasing new alternative-fuel vehicles.¹⁸ Nebraska,¹⁹ Oregon,²⁰ and Virginia²¹ provide low-interest loans to fund vehicle conversion and replacements, and local government, state agencies, and school districts are also eligible for loans in these states. In addition to providing loans for vehicles, local governments and businesses in Nebraska can also apply for the loans to install electric vehicle supply equipment (EVSE).

3.6 Sales Tax Exemption

Three states currently exempt sales and use tax for low-emission and zero-emission vehicles: Colorado, New Jersey, and Washington. The sales tax exemption applies to commercial vehicles that weigh over 10,000 lbs in Colorado.²² In New Jersey and Washington, the sales and use tax exemption applies to passenger vehicles. The exemption only applies to vehicles that run

18 “Alternative Fuel Vehicle (AFV) Low Interest Loans.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/4668>

19 Dollar and Energy Saving Loans. Nebraska Energy Office, State of Nebraska. <http://www.neo.ne.gov/loan/>

20 “Alternative Fuel Vehicle (AFV) Loan Program.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/11063>

21 Alternative Fuel Grants and Loans.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/8313>

22 “Low Emission Vehicle (LEV) Sales Tax Exemption.” Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/202>

exclusively on electricity.^{23 24}

Table: 3-6 States that Exempt Sales and Use Taxes for PEV Purchases

	CO	NJ	WA
Exemption	Sales tax	Sales and use tax	Sales and use tax
Eligibility	Low-emission vehicles with GVWR over 10,000 lb.	Zero-emission vehicles, list updated by NJ Department of Environment of Protection Commissioner annually (excluding PHEVs)	Vehicles that run exclusively on electricity, natural gas, propane, and other alternative fuels
Amount Saved for LEAF (\$29,010/2015 model)	\$0	\$2,030.70 (7% sales tax) ^a	\$87.03 (0.3% sales tax) ^b
Amount saved for Volt	\$0	\$0	\$0

a “Instructions for NJ Residents to Title and Register a Vehicle While Temporarily Located Out of State.” New Jersey Motor Vehicle Commission, State of New Jersey. http://www.state.nj.us/mvc/pdf/About/GU30_Revised.pdf

b “Motor vehicle sales/use tax.” Department of Revenue, Washington State. http://dor.wa.gov/content/findtaxesandrates/othertaxes/tax_motorvehicle.aspx

The sales tax exemption has a much larger effect in New Jersey than in Washington because of the differences in percentage of tax collected. In Washington, the sales tax exemption translates into roughly \$87.03 in savings because the motor vehicle sales tax is only 0.3%.²⁵ In comparison, PEV drivers in New Jersey incur a much greater amount of savings of \$2,030.70 because the vehicle sales tax there is higher.²⁶

23 “Zero Emissions Vehicle (ZEV) Tax Exemption.” Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/5778>

24 “Alternative Fuel Vehicle (AFV) Tax Exemption.” Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/8260>

25 “Motor Vehicle Sales /Use Tax.” Department of Revenue, Washington State. http://dor.wa.gov/content/findtaxesandrates/othertaxes/tax_motorvehicle.aspx

26 “Instructions for NJ Residents to Title & Register a Vehicle While Temporarily Located Out of State.” New Jersey Motor Vehicle Commission, State of New Jersey. http://www.state.nj.us/mvc/pdf/About/GU30_Revised.pdf

3.7 Fee Exemptions or Reduced Fees

Arizona and Illinois are the only states that offer vehicle registration fee reduction or exemption for PEV drivers. In Arizona, drivers pay an annual license tax, and this tax is reduced for vehicles that run on alternative fuels, including electricity.²⁷ In Illinois, the standard vehicle registration fee is \$99, while the fee is capped at \$18 for electric vehicles.²⁸

27 “Reduced Alternative Fuel Vehicle (AFV) License Tax.” Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/4179>

28 “Electric Vehicle (EV) Registration Fee Reduction.” Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. <http://www.afdc.energy.gov/laws/8904>

4. Spurring the Growth of Electric Charging Infrastructure

Expanding charging infrastructure is an important step in scaling the adoption of PEVs. Accessibility to different kinds of charging infrastructure can help ease range anxiety, which is often cited as the most common barrier for widespread PEV adoption.

There are three types of charging infrastructure available for consumers today:

- **Level 1 charging:** This option provides the lowest power draw and the slowest rate of charge. The power draw is typically about 1.4 kW, 120V at 12A. Level 1 does not require special electric vehicle supply equipment (EVSE). Consumers can plug the cord set equipped with the vehicle into a standard single-phase household outlet, and the vehicle can be fully charged overnight. This option is the most cost-effective for charging scenarios with long dwell time, meaning that cars are parked for an extended period of time.
- **Level 2 charging:** This option allows different power draws, 3.3 kW, 6.6 kW, and 19.2 kW. The limit is 240V at 80A. To achieve the faster charging rate, Level 2 requires additional EVSE. PHEVs can be fully charged between 1.4 to 3 hours and 3.5 to 7 hours for BEVs.
- **DC fast charging:** This is the fastest charging option, and a BEV can be charged up to 80% of its capacity between 20 to 30 minutes. The power draw is about 45 kW, and can charge 50 to 60 miles per hour.

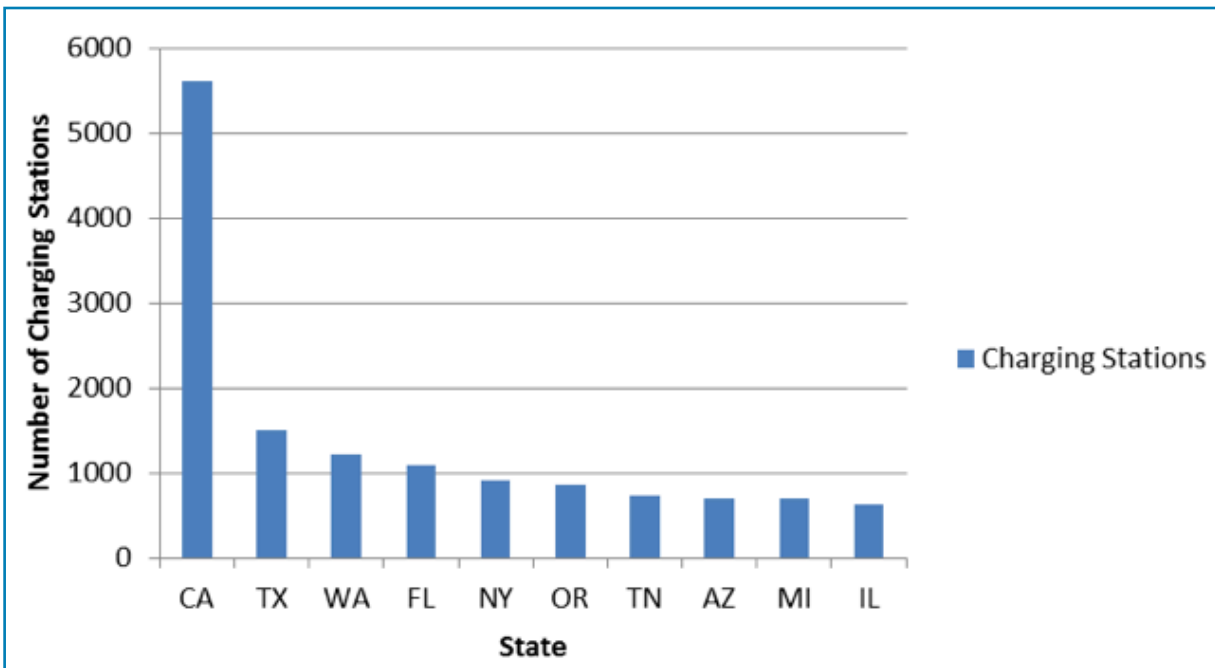
Common charging places include:

- Single-family residences
- Multi-unit dwellings (MUDs)
- Workplace
- Publicly accessible charging stations
- Public sector buildings

4.1 Public Charging Stations in 50 States

Electric vehicle supply equipment (EVSE), or charging stations, is an important complementary good to electric vehicles. Widespread accessibility of EVSE can reduce PEV drivers' range anxiety, and could help spur PEV adoption. California is currently leading other states in the number of public charging outlets installed at 5,614, followed by Texas' 1,511 outlets. Washington and Florida have installed charging stations that supply over 1,000 outlets.

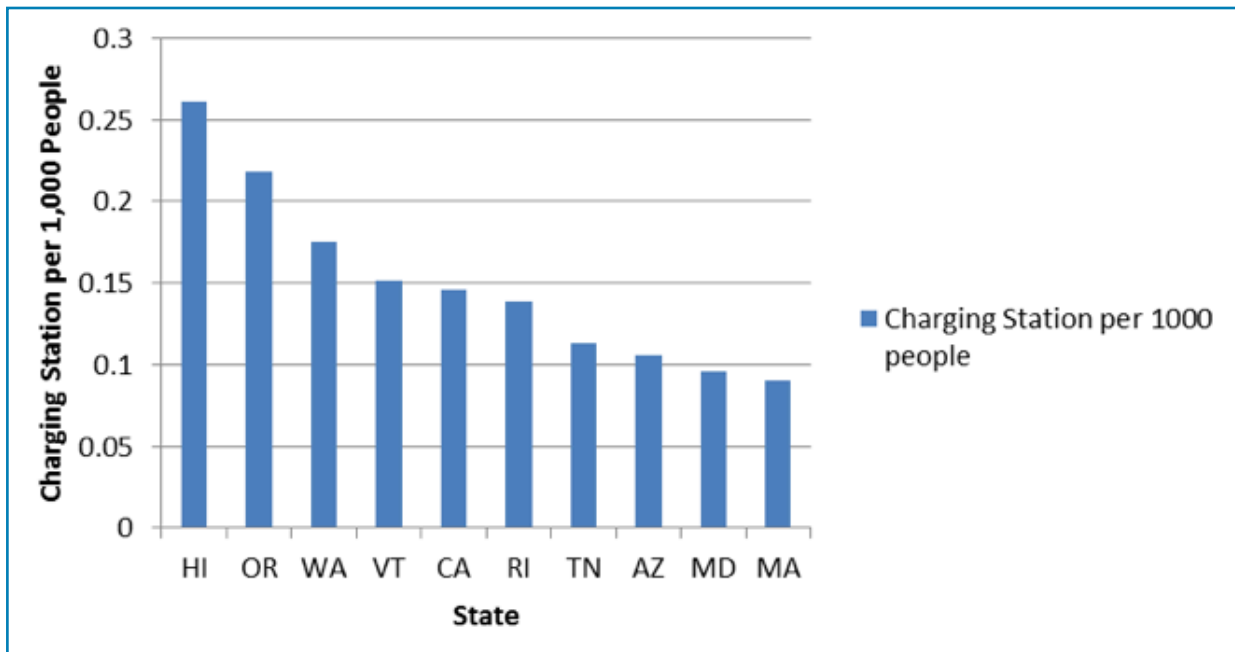
Figure 4-1: Charging Stations, Top 10 States



Source: Alternative Fuel Data Center

In terms of charging stations per capita, Hawaii leads the rest of the states, including California, which still remains in the top 10. Other top 10 states include Oregon, Washington, Vermont, California, Rhode Island, Tennessee, Arizona, Maryland, and Massachusetts.

Figure 4-2: Charging Station per 1,000 People, Top 10 States



Source: Alternative Fuel Data Center

4.2 Collaboration Among States

4.2.1 ZEV Program Implementation Task Force

States have the ability to invest resources to grow charging infrastructure and spur PEV adoption. Recently, a coalition of eight states entered an agreement to form a ZEV Program Implementation Task Force to deploy 3.3 million ZEVs by 2025 and adequate fueling infrastructure to support the deployment. These states include California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont.²⁹ EVSE play a crucial role in scaling the commercialization of PEVs, and the states that entered the agreement will be implementing measures to update state building codes and standards, standardize payment methods for public charging, increase the time-of-use rate and net metering, and streamline home metering options.

Currently, these eight states' incentives and laws that remove barriers for installing charging infrastructure are shown in the chart below.

²⁹ "Zero Emission Vehicle (ZEV) Deployment Support." Alternative Fuels Data Center. Office of Energy Efficiency and Renewable Energy, US Department of Energy. July 7, 2014. <http://www.afdc.energy.gov/laws/11484>

Table 4-1: Incentives for EVSE by Location Type

	CA	CT	MD	MA	NY	OR	RI	VT
Single family			x		x	x		
MUD	x		x		x	x		
Workplace	x		x	x	x	x		
Public accessible	x		x	x	x	x		
Public sector	x		x	x		x		

Table 4-2: Incentives for EVSE by Incentive Type

	CA	CT	MD	MA	NY	OR	RI	VT
Rebate			x					
Tax credit					x	x		
Loan						x		
Grant				x				
Sales tax exemption								
Mandate	x					x		
Other	x							

Maryland, New York, and Oregon offer incentives for single-family residents to install home EVSE. Maryland currently offers rebates equal to \$900 per individual in the residence, up to 50% of the costs of installation.³⁰ In New York, PEV owners who install EVSE are eligible for an income tax credit that is 50% of the cost of the installation, up to \$5,000.³¹ Oregon offers both a tax credit to residents and businesses and low-interest loans to public entities for installing charging infrastructure. The tax credit in Oregon is equal to 25% of the cost of EVSE, up to \$750.³²

California, Maryland, New York, and Oregon have incentives and mandates that encourage the installation of the EVSE in MUDs. The rebates and tax credits available in Maryland, New York, and Oregon also apply to residents living in MUDs. In California, common interest development associations, such as homeowner associations, are barred against preventing members from installing the EVSE in their parking spots. Privately managed apartments are exempted from this regulation in California. Municipalities in California can also voluntarily adopt the CALGreen code, which provides guidance on minimum number of parking spaces to support PEV charging for MUDs that are three-stories or lower.³³ In Oregon, homeowner associations must approve a

30 “Electric Vehicle Supply Equipment Rebate Program.” Maryland Energy Administration. <http://energy.maryland.gov/Transportation/evserebate.html>

31 New York, State Hybrid and Electric Vehicle Incentives. National Conference of State Legislatures, November 15, 2013. <http://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx#ny>

32 Oregon, State Hybrid and Electric Vehicles Incentives. National Conference of State Legislatures, November 15, 2013. <http://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx#or>

33 Southern California Plug-in Electric Vehicle Readiness Plan. Luskin Center for Innovation, UCLA Luskin School of Public Affairs, December 2012.

complete EVSE installation application within 60 days when an owner of a condominium unit or a lot in a planned community apply to install the EVSE in their parking space.³⁴

For workplace and publicly accessible charging, states employ a wide variety of efforts to spur charging infrastructure, including updating building codes and standards, providing tax credits, loans, and grants. California's CALGreen code provides guidance on the minimum number of required electrified parking spaces for commercial, retail, and non-residential locations.³⁵ In Oregon, the Business Energy Incentives program provides opportunities for qualifying alternative vehicle fueling infrastructure projects, including EVSE, to receive a tax credit of up to 35% of their certified cost.³⁶ The Massachusetts Electric Vehicle Incentive Program (MassEVIP) provides funding, up to \$25,000 of the cost to install the EVSE for 50% of the cost (up to \$25,000) of installations for businesses and nonprofits that have more than 15 employees.³⁷ In Maryland and New York, the same rebates and tax credits available for residential installations also apply to businesses.

In Oregon, state agencies are allowed to install the EVSE on their premises and make them publicly accessible; they are also allowed to set a fee that can offset the costs incurred by providing publicly accessible charging stations.³⁸ In addition to providing funding for businesses, MassEVIP also provides up to \$10,000 for Level 2 EVSE installations at public entities, providing that there is at least one PEV in the fleet.³⁹ In California, Governor Jerry Brown issued an executive order, which instructs state agencies to "identify and pursue opportunities" to install charging stations and prepare for future ones in employee parking for new and existing structures.⁴⁰ There is no funding for this mandate at the state level or noticeable mechanisms for enforcement or compliance monitoring.

These eight states have agreed to support and facilitate various steps that can scale PEV adoption and EVSE expansion, including setting targets for public fleet PEV purchases, standardizing payment methods at fueling stations, creating universal signage for fueling stations,

34 "Planned Community and Condominium Electric Vehicle Supply Equipment (EVSE) Installations." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. US Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/11065>

35 Southern California Plug-in Electric Vehicle Readiness Plan. Luskin Center for Innovation, UCLA Luskin School of Public Affairs, December 2012.

36 "Energy Incentives Program Transportation Projects Information." Business Energy Incentives Program, Oregon Department of Energy. <http://www.oregon.gov/energy/BUSINESS/Incentives/Pages/EIP-Trans.aspx>

37 "Massachusetts Electric Vehicle Incentive Program (MassEVIP):Workplace Charging." Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts, 2014. <http://www.mass.gov/eea/agencies/massdep/air/grants/workplace-charging.html>

38 "State Agency Electric Vehicle Supply Equipment (EVSE) Installation." Alternative Fuel Data Center, Office of Energy Efficiency and Renewable Energy. US Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/11064>

39 "Massachusetts Electric Vehicle Incentive Program (MassEVIP):Workplace Charging." Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts, 2014. <http://www.mass.gov/eea/agencies/massdep/air/grants/massevip-municipal.html>

40 "Executive Order B-18-12." Office of Governor Edmund G. Brown, Jr., State of California, April 25, 2012. <http://gov.ca.gov/news.php?id=17508>

and evaluating effectiveness of monetary incentives for PEV adoption.⁴¹ As the timeline moves closer to 2025, more state programs targeting expanding charging networks can be anticipated. Successful efforts in these states can hopefully be adopted by other states that are looking into expanding their PEV adoption policy instruments, and policymakers, researchers, and other stakeholders should pay close attention to the outcomes of new policies in these states.

4.2.2 West Coast Green Highway

In 2007, the U.S. Department of Transportation designated six interstate routes as “Corridors of the Future” with the goal to reduce traffic congestion.⁴² The Interstate 5 that connects California, Oregon, and Washington was one of the corridors, and \$15 million was provided to these states to improve highway conditions, as well as installing charging infrastructure for the Electric Highway initiative.⁴³

For its part of the Electric Highway, Washington received \$1.32 million in funding from the American Recovery and Reinvestment Act (ARRA), administered by the U.S. Department of Energy State Energy Program (SEP), and paid \$1 million to Aerovironment to install nine charging stations along I-5 and U.S. Highway 2.⁴⁴ The state intends to install outlets capable of charging EVs in all highway rest stops run by the state by 2016, “to the extent practicable”⁴⁵ and will also make lease space available that is reserved for battery charging and exchange operations. In Oregon, \$915,000 in ARRA funding went to have Aerovironment install 8 charging stations along I-5 as Oregon’s part of the “electric highway.” In California, a “\$120 million settlement between the California Public Utilities Commission (CPUC) and NRG Energy Inc. will fund the building of a network of charging stations for battery electric vehicles (BEVs) the length and width of the state, as ordered by California Governor Jerry Brown.”⁴⁶

To date, Aerovironment has installed eight charging stations along the I-5, four stations along the Highway 2, and two off I-90 in Washington State. These charging stations are in rest areas, resorts, outlet malls, and restaurants, and some of them have both DC fast charging and Level 2 EVSE. Some of the charging stations are sponsored by local municipalities and businesses.⁴⁷ Oregon has 43 stations total built along the I-5, I-84, and various state highways, with both DC

41 “State Zero-Emission Vehicle Programs Memorandum of Understanding.” October 24, 2013.

42 “U.S. Department of Transportation Names Six Interstate Routes as ‘Corridors of the Future’ to Help Fight Traffic Congestion.” Federal Highway Administration, U.S. Department of Transportation. September 10, 2007. <http://www.fhwa.dot.gov/pressroom/dot0795.cfm>

43 “Corridor: Interstate 5 (I-5)- Washington to California.” Corridors of the Future Fact Sheet. Federal Highway Administration, U.S. Department of Transportation. <http://www.fhwa.dot.gov/pressroom/fsi5.cfm>

44 Spector, D. (2011, December 6). *America’s First ‘Electric Highway’ Will Be Up And Running Within Months*. Retrieved August 15, 2012, from Business Insider: http://articles.businessinsider.com/2011-12-06/news/30480491_1_electric-vehicle-industry-range-anxiety-aerovironment

45 47.38.075, Revised Code of Washington

46 <http://www.greentechmedia.com/articles/read/NRG-Settlement-Funds-Californias-Electric-Expressway-EV-Charger-Network>

47 “Washington’s Electric Highways.” West Coast Green Highway.

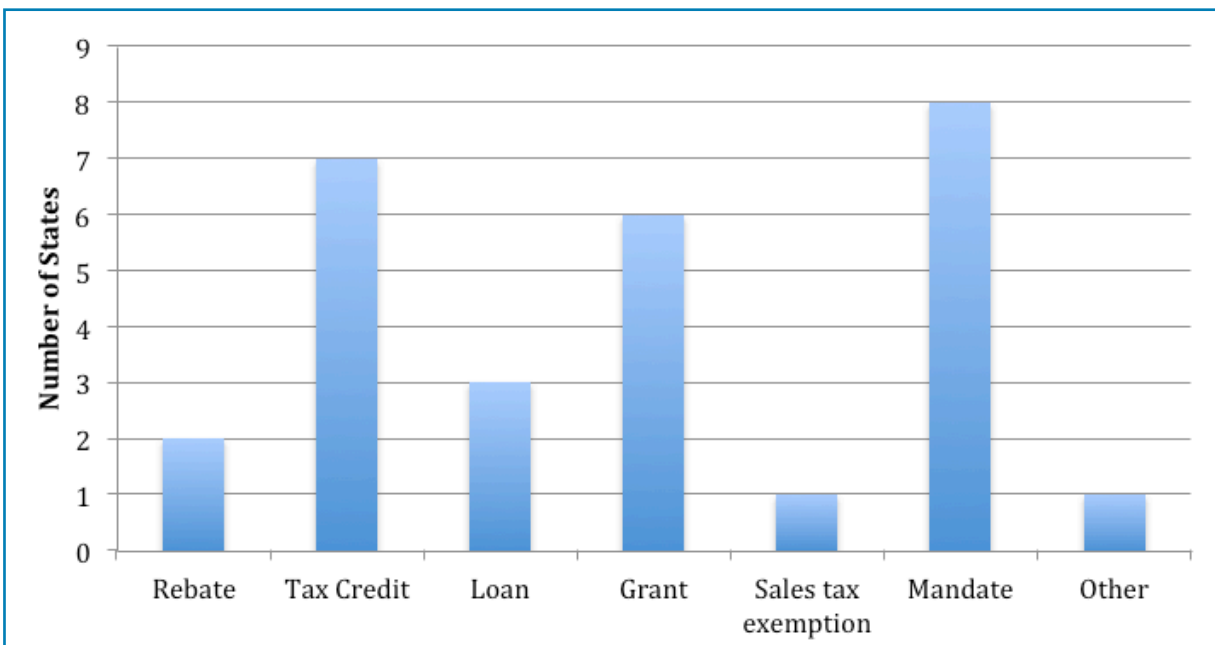
fast chargers and Level 2 EVSE.⁴⁸

California’s network implementation is coordinated by the Governor’s Office. NRG eVgo, an EVSE provider, has agreed to install 200 charging stations across the state. The California Energy Commission has also planned to install DC fast charging stations along the I-5, and its statewide plug-in electric vehicle infrastructure assessment has identified strategies for regional and local governments to pursue further charging network development.

4.3 Individual State Incentives

There are 28 states that currently provide incentives for EVSE installations. Many of the policy instruments are similar to those that are used to reduce the purchase price for PEVs, such as rebates, tax credits, loans, grants, and sales tax exemptions. Some states have adopted specific mandates that would direct local or state governments to invest in publicly accessible charging infrastructures, or reduce barriers for installing the EVSE.

Figure 4-3: Incentives for Charging Infrastructure



48 “Electric Highway Map.” Office of Innovative Partnerships and Alternative Funding, Oregon Department of Transportation. http://www.oregon.gov/ODOT/HWY/OIPP/docs/WCEH_Map_062014.pdf

Table 4-3: States with Incentives to Spur EVSE Network Growth

Incentive	States
Rebates	IL, MD
Tax credit	AZ, GA, LA, NY, OK, OR, WV
Loan	NE, OR, VA
Grant	CO, FL, MA, NC, OH, TX, UT
Sales tax exemption	WA
Mandate	AZ, CA, CO, GA, HI, IL, NC, OK, WI
Other	CA

There are other types of incentives that can spur the growth of charging infrastructure, including directing public charging infrastructure providers to standardize payment methods, creating universal signage that are easily identifiable by PEV drivers, and providing EVSE wires that allow all models of PEVs to charge. These are programs that the ZEV Program Implementation Task Force will likely consider between now and 2025 to expand charging networks in the states that have signed the MOU.

4.3.1 Rebates

Illinois and Maryland provide a variety of rebates for EVSE installations. In Illinois, only Level 2 chargers or hardwired Level 1 chargers are eligible for the rebate, and the installation must comply with the Illinois Commerce Commission’s requirements.⁴⁹ In Maryland, the EVSE must be certified by one of the Nationally Recognized Testing Laboratory Program.⁵⁰

Illinois’ Department of Commerce and Economic Opportunity administers four different rebates for various types of charging stations: single non-network (\$3,000), single networked (\$3,750), dual non-network (\$6,000), and dual networked (\$7,500).⁵¹ These stations need to be either a Level 2 charger or a hardwired Level 1 charger. Networked stations have either cellular or internet connections, and dual charging stations can charge two vehicles at the same time. Networked stations provide a few more added values to charging, including additional payment options, more frequent and proactive maintenance; if the charging station is connected to a smart grid, network connection allows bidirectional electricity flow, where the electric vehicle can become an energy storage unit when there is excess energy in the grid, and can feed energy back into the grid during peak energy demand hours.

The Maryland Department of Energy Administration provides three different kinds of rebates

49 “Electric Vehicles: Electric Vehicles in Illinois.” Key Industries, Illinois Department of Commerce and Economic Opportunity. <http://www.illinois.gov/dceo/whyillinois/KeyIndustries/Energy/Pages/ev.aspx>

50 “Electric Vehicle Supply Equipment Tax Credit Program.” Maryland Energy Administration. <http://energy.maryland.gov/Transportation/evse/>

51 “Government Incentives.” PlugIn Chicago Metro, Environmental Law and Policy Center. <http://pluginchicagometro.org/incentives-for-ev-drivers/>

for the EVSE: individual/residential, workplace charging for businesses and government entities, and publicly accessible charging stations. Individual/residential applicants are limited to one \$900 rebate per person, up to 50% of the cost. Retail services, such as shopping centers, are eligible to apply for the \$7,500 rebate to provide publicly accessible charging stations for PEV drivers. Other commercial properties and public sector entities are eligible for rebates that cover 50% of the cost, up to \$5,000 for each installation.⁵²

4.3.2 Tax Credits

Several states provide income tax credit for installing the EVSE, which government entities and non-profit organizations are not eligible for since they do not bear tax burden. Similar to tax credits for vehicle purchases, some states set a limit on how much tax credit the installation can be eligible for, and some states set a fixed amount of eligible tax credit.

Arizona, Georgia, Louisiana, New York, Oklahoma, Oregon, and West Virginia provide tax credits for installing the EVSE in residential units and on commercial properties. West Virginia will offer tax credit until 2021, and has a specific schedule for when a reduced amount of tax credit will take effect.

Table 4-4: States that Provide Tax Credit for EVSE Installation

Tax Credit	AZ	GA	LA	NY	OK	OR
Tax Credit Amount	\$75 per individual	10% of the cost, up to \$2,500, whichever is less	50% of the cost of the EVSE	50% of the cost of the EVSE, up to \$5,000	75% of the cost of installing EVSE	25% of the cost of EVSE, up to \$750/35% of the cost
Eligibility		Greater than 130 volts			Station has to be publicly accessible	
Recipient	Single- and multi-family residences	Businesses (excluding retail services)	Single- and multi-family residences, businesses	Single- and multi-family residences, businesses	Businesses	Single- and multi-family residences, businesses
Provider	Arizona Department of Revenue	Georgia Environmental Protection Division	Louisiana Department of Revenue	New York Department of Taxation and Finance	Oklahoma Tax Commission	Oregon Department of Energy

52 “Electric Vehicle Supply Equipment (EVSE) Rebate Program.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/11423>

Arizona has made a fixed \$75 tax credit available for residential EVSE installations.⁵³ In Georgia, for the EVSE with capacity greater than 130 volts, commercial workplace properties can apply for tax credit equal to 10% of the EVSE installation cost, which includes equipment and labor costs, up to \$2,500.⁵⁴ New York provides a tax credit that is equal to 50% of the cost of installing the EVSE in residential units and commercial properties, including retail services, up to \$5,000.⁵⁵ In Oregon, the residential tax credit is equal to 25% of the cost of installation, up to \$750. Businesses in Oregon are qualified for tax credit that is 35% of the installation cost.⁵⁶

Louisiana and Oklahoma provide tax credits up to a certain percentage of the cost of installation, 50%⁵⁷ and 75%,⁵⁸ respectively; neither state has set a limit on the maximum tax credit applicants are eligible for. In Louisiana, residential units and businesses can apply for the tax credit. Only businesses can apply for the tax credit in Oklahoma, and the EVSE that is installed has to be publicly accessible.

West Virginia has set a schedule that gradually reduces the amount of maximum tax credit for EVSE installation on commercial properties, and publicly accessible EVSE can receive a higher amount of tax credit. Between 2011 and 2013, EVSE installations on commercial properties can receive tax credit equal to 50% of the cost, up to \$250,000, and publicly accessible stations can receive tax credit for 62.5% of the cost, up to \$312,500. Both amounts have been reduced in 2014, \$200,000 as the maximum tax credit for non-publicly accessible EVSE installations, and \$250,000 for publicly accessible charging stations. In 2016, the maximum tax credit for non-publicly accessible charging stations will be reduced to \$150,000, and \$187,500 for publicly accessible stations. The tax credit individual homeowners can receive remains the same at 50% of the cost of EVSE installation and up to \$10,000.⁵⁹

4.3.3 Loans

Nebraska, Oregon, and Virginia provide low-interest loans for EVSE installations. The Nebraska Dollar and Energy Savings Loan Program, which also provides low-interest loans for purchasing

53 “Residential Electric Vehicle Supply Equipment (EVSE) Tax Credit.” Arizona Laws and Incentives. Alternative Fuel Data Center, Office of Energy Efficiency and Renewable Energy. US Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/all?state=AZ#State%20Incentives>

54 “Low Emission ‘Alternative Fuel’ Vehicle Tax Credits in Georgia.” Georgia Department of Natural Resources. <http://www.georgiaair.org/airpermit/html/mobilearea/engines/Alternativefuels.htm>

55 “Alternative fuels and electric vehicle recharging property tax credit (for tax years beginning on or after January 1, 2013).” The New York State Department of Taxation and Finance. http://www.tax.ny.gov/pit/credits/alt_fuels_elec_vehicles.htm

56 “List of U.S. Electric Vehicle and EVSE Incentives by State.” Plug Incentives, September 3, 2014. <https://www.plugincentives.com/blog/list-us-electric-vehicle-and-evse-incentives-state>

57 “Alternative Fuel Vehicle (AFV) and Fueling Infrastructure Tax Credit.” Alternative Fuel Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/6603>

58 “Alternative Fueling Infrastructure Tax Credit.” Alternative Fuel Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 04, 2014. <http://www.afdc.energy.gov/laws/5951>

59 “West Virginia’s new alternative-fuel vehicles and infrastructure tax credit.” West Virginia Division of Energy. <http://www.wvcng.com/information/WV2011.pdf>

new vehicles, offers loans for EVSE installations for individual residents, businesses, and government entities.⁶⁰ Oregon's State Energy Loan Program (SELP) provides low-interest loans for projects developing renewable resources, and EV charging infrastructure would qualify.⁶¹ Individuals, private businesses, and government entities are all eligible. Through the Alternative Fuels Revolving Fund, Virginia can provide loans to local, county, and state programs that develop alternative fuel capability, including electric vehicle adoption and infrastructure, within the Commonwealth.⁶²

4.3.4 Grants

Six states provide grants to businesses, government entities, non-profits, or multi-unit dwellings to install the EVSE: Colorado, Massachusetts, North Carolina, Ohio, Texas, and Utah. The application process for Texas' Alternative Fueling Facilities Program has been closed, and grantees in Dallas-Fort Worth, Houston-Galveston-Brazoria, and El Paso County will be announced.⁶³ Ohio's Alternative Fuel Transportation Program provides grants to businesses, non-profits, school systems, and local governments to build alternative fueling stations.⁶⁴ North Carolina's Alternative Fuel and Alternative Fuel Vehicle Fund uses the funds generated from the sale of the Energy Policy Act of 1992 credits to enable state agencies to invest in alternative fueling infrastructure.⁶⁵

60 "Dollar and Energy Saving Loans." Nebraska Energy Office. <http://www.neo.ne.gov/loan/>

61 "ODOE: State Energy Loan Program." Oregon Department of Energy. <http://www.oregon.gov/energy/LOANS/Pages/selphm.aspx>

62 "Virginia Laws and Incentives." Alternative Fuels Data Center; Office of Energy Efficiency and Renewable Energy. US Department of Energy. <http://www.afdc.energy.gov/laws/all?state=VA>

63 "Alternative Fueling Facilities Program." Texas Commission on Environmental Quality, October 16, 2013. <https://www.tceq.texas.gov/airquality/terp/affp.html>

64 "State of Ohio Financing and Incentives." Huron County Development Council. <http://www.hcdc.net/state-of-ohio-financing-and-incentives.html>

65 "Alternative Fuel and Alternative Fuel Vehicle (AFV) Fund." Alternative Fuels Data Center; Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy. <http://www.afdc.energy.gov/laws/5986>

Table 4-5: States with Grant Programs

Grant	CO	CO	MA	UT
Grant Amount	80% of the cost, up to \$6,260	80% of the EVSE cost, up to \$6260	50% of cost, up to \$25,000	\$200,000
Eligibility	Level 2 and 3, fleets need to be located within the Denver seven-county metro area	Level 2 and 3, fleets outside of the seven-county Denver metro area	Level 1 and 2 charging stations, workplace with 15 or more employees	Need to submit financial need and work plan documents
Recipient	Government entities, businesses, MUDs	Non-profits, businesses, government entities, MUDs	Businesses and government entities	Government, businesses, and non-profits
Provider	Regional Air Quality Council	Colorado Energy Office	Massachusetts Executive Office of Energy and Environmental Affairs	Utah Department of Environmental Quality

Colorado, Massachusetts, and Utah provide more specifications on their grant programs. In Colorado, the Regional Air Quality Council in the Metropolitan Denver Area and the Colorado Energy Office have an ongoing collaborative grant program that provides grants to government entities, businesses, and multi-unit dwellings for 80% of the cost to install the EVSE, up to \$6,260.⁶⁶ Massachusetts’ Electric Vehicle Incentive Program (MassEVIP) provides grants for businesses and government entities to build workplace charging for 50% of the cost, up to \$25,000.⁶⁷ Utah’s Department of Environmental Quality provides grants for up to \$200,000 to install publicly accessible EVSE and workplace charging stations.⁶⁸

4.3.5 Mandates

A number of states have passed laws that can either make public charging stations more accessible or remove barriers that can prevent PEV owners from installing the EVSE.

66 “Charge Ahead Colorado Grant Application.” Clean Air Fleets, July 3, 2014. http://cleanairfleets.org/documents/electric/electric_vehicle_and_charging_station_grant_application

67 “Massachusetts Electric Vehicle Incentive Program (MassVIP): Workplace Charging.” Executive Office of Energy and Environmental Affairs, 2014. <http://www.mass.gov/eea/agencies/massdep/air/grants/workplace-charging.html>

68 “Clean Fuel Vehicle Grant and Loan Program.” Clean Fuels Program, Utah Department of Environmental Quality, 2014. <http://www.cleanfuels.utah.gov/grants/grantsintro.htm>

Table: 4-6 States with EVSE Mandates

Mandate	AZ	CA	CO	HI
Type	Publicly accessible charging	Removing barrier for EVSE installation	Removing barrier for EVSE installation	Removing barrier for EVSE installation
Details	An Arizona state agency or a political subdivision that operates an alternative fueling station is directed to allow vehicles of other state agencies or political subdivisions to fuel at the station.	Common interest development associations, such as HOAs, are forbidden to make unreasonable restrictions against a member installing EVSE in his/her own parking space. This does not address privately managed apartment complexes.	HOAs cannot prohibit condominium residents from installing EVSE, so long as they abide by requirements and standards related to safety, cost, maintenance, and design. HOAs can apply for EVSE installation grants from the Colorado Electric Vehicle Grant Fund.	Owners or managers of multi-family dwellings cannot make unreasonable restrictions against a resident/homeowner from installing EVSE in a parking stall that he/she owns. Private entities may adopt rules that restrict use, but may not charge a fee for installation. EVSE owner is responsible for damages done to EVSE.

Mandate	IL	NC	OK	WI
Type	Publicly accessible charging	Publicly accessible charging	Publicly accessible charging	Publicly accessible charging
Details	The Illinois Department of Transportation must install at least one EVSE at each interstate highway rest area where electrical service will reasonably permit by January 1, 2016, or as soon as possible thereafter.	The North Carolina Department of Transportation may install and operate publicly accessible EVSE at state-owned highway rest stops so long as it has developed a mechanism to charge EVSE users a fee to recover the costs related to electricity consumed, processing the user fee, and EVSE operation and maintenance.	The Department of Administration should pursue a number of alternative fueling stations in public retail centers adequate to serve public traveling needs.	Owners or managers of multi-family dwellings cannot make unreasonable restrictions against a resident/homeowner from installing EVSE in a parking stall that he/she owns. Private entities may adopt rules that restrict use, but may not charge a fee for installation. EVSE owner is responsible for damages done to EVSE.

Source: Alternative Fuel Data Center, US Department of Energy

California, Colorado, and Hawaii have ordinances that prevent common interest associations, such as homeowner associations (HOAs) from making unreasonable restrictions against residents who wish to install the EVSE in their parking spots in multi-unit dwellings.^{69 70 71} In Colorado, HOAs are eligible to apply for funding to install the EVSE from the Colorado Electric Vehicle Fund.⁷²

Arizona, Illinois, North Carolina, Oklahoma, and Wisconsin have passed provisions that give public agencies a role in expanding electric vehicle charging infrastructure network in these

69 “Electric Vehicle Supply Equipment (EVSE) Policies for Multi-Unit Dwellings.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/9579>

70 “Electric Vehicle Supply Equipment (EVSE) Multi-Unit Dwelling Installations and Access.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/10856>

71 “Electric Vehicle Supply Equipment (EVSE) Requirements.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/8482>

72 “Plug-in Electric Vehicle (PEV) and Electric Vehicle Supply Equipment (EVSE) Grants.” Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/6578>

states. Illinois' statute provides a timeline and directive for EVSE installations in interstate highway rest areas.⁷³ North Carolina allows the state's Department of Transportation to construct the EVSE at highway rest stops as long as NCDOT can recover the costs incurred from installation, operation, and maintenance through a fee charged to EVSE users.⁷⁴ Oklahoma and Wisconsin have statutes that direct the states to build public charging stations or make existing charging stations accessible, but the statutes do not institute timelines or specific instructions like Illinois' or North Carolina's.⁷⁵ ⁷⁶ Arizona's statute requires agencies to share access to charging stations, but does not indicate whether these charging stations are publicly accessible.⁷⁷

4.3.6 Other

In California, NRG and the California Public Utilities Commission (CPUC) reached a \$120 million settlement to settle a claim where Dynergy, NRG's predecessor, failed to fulfill long-term power contracts in 2001, during California's power crisis. Governor Jerry Brown joined CPUC's decision on this settlement and ordered NRG to build a network of charging stations for BEVs.⁷⁸ The settlement amount is supposed to build 200 eVgo Freedom Stations with Level 2 and fast DC chargers, and 10,000 parking spots that have electrical infrastructure to manage the installation of Level 2 chargers.

73 "Highway Electric Vehicle Supply Equipment (EVSE) Installation Requirements." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/11020>

74 "State Highway Electric Vehicle Supply Equipment (EVSE) Regulations." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/10413>

75 "Access to State Alternative Fueling Stations." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/6561>

76 "Alternative Fuel Vehicle Acquisition and Alternative Fuel Use Requirements." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014.

<http://www.afdc.energy.gov/laws/4841>

77 "Joint Use of Government Fueling Infrastructure." Alternative Fuels Data Center, Office of Energy Efficiency and Renewable Energy. U.S. Department of Energy, June 4, 2014. <http://www.afdc.energy.gov/laws/6206>

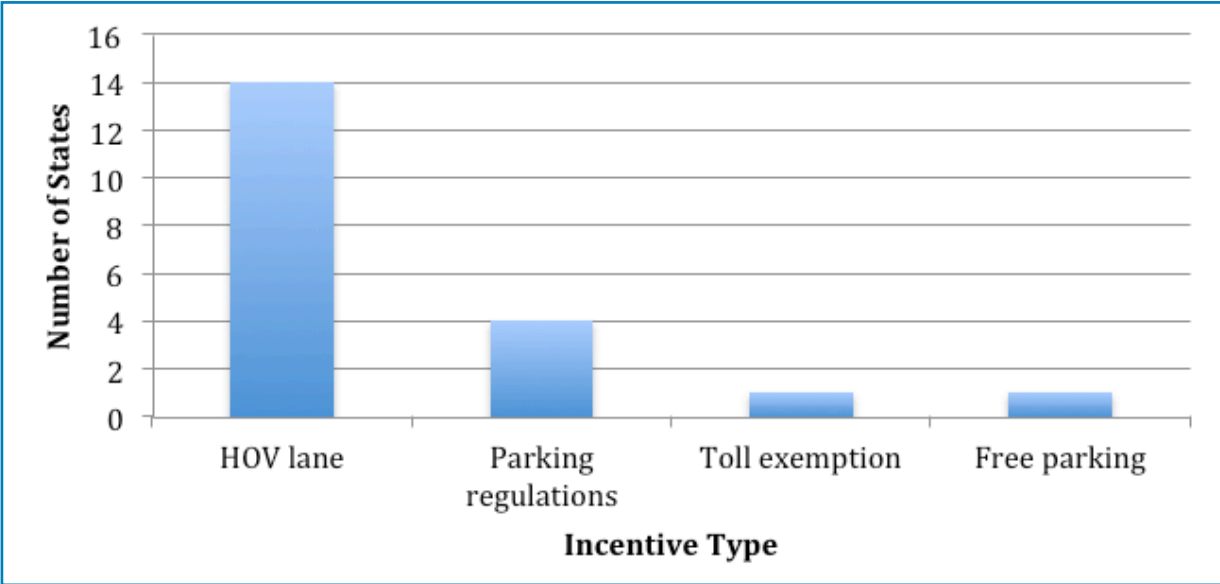
78 Trabish, Herman K. "NRG Settlement Funds California's 'Electric Expressway' EV Charger Network." Greentech Media, March 26, 2012. <http://www.greentechmedia.com/articles/read/NRG-Settlement-Funds-Californias-Electric-Expressway-EV-Charger-Network>

5. Other Policies and Incentives

5.1 Transportation Incentives

In addition to providing financial assistance to spur PEV purchase and charging infrastructure expansion, states can also provide transportation incentives to PEV adopters. The most common incentive is giving unrestricted HOV lane accessibility to PEV drivers, regardless of number of passengers present in the vehicle.

Figure 5-1: Transportation Incentives for PEVs



A total of 14 states provide some form of transportation incentives to give to PEV adopters. Of those, 13 of them grant PEV drivers access to HOV lanes without restrictions on the number of passengers and time of the day.⁷⁹ Four states—Arizona, Florida, Hawaii, and Washington—discourage non-PEV drivers from parking in spots designated for PEVs by giving out fines, fees, or citations.⁸⁰ In Florida, PEVs are exempt from tolls on certain freeways. PEV drivers in Hawaii can park for free at state and county controlled parking lots for up to 2.5 hours.

5.2 Public Fleet Requirement/Demonstration Programs

Of the 50 states, 42 states have passed statutes to require state agencies to prioritize alternative

79 The 13 states with HOV lane access are AZ, CA, FL, GA, HI, MD, NV, NJ, NY, NC, TN, UT, VA.

80 Non-PEVs parked in spots for PEVs are subjected to a \$350 fine in Arizona. Florida issues citations to vehicles parked in EV charging spots that cannot utilize the charging station. A fee of \$50-\$100 applies to non-PEVs parked in PEV spots in Hawaii. In Washington, there is a \$124 fine for a vehicle parked in a PEV spot but not connected to the charger. Source: Alternative Fuel Vehicle Center, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy.

fuel vehicles when procuring fleet replacements. Of these states, Illinois has established milestones for the percentage of PEVs required in their fleets. For the purchase of passenger vehicles by state agencies, 20% of new vehicles purchased must be hybrid electric vehicles (HEVs) and 5% need to be BEVs by July 1, 2015. The goals will be increased in 2025, when 60% of the new vehicles purchased need to be HEVs, and 15% should be BEVs. Public safety and emergency vehicles may be exempted from this requirement, and agencies that operate these vehicles are directed to minimize the use of petroleum vehicles and pursue other alternative fuel vehicles.⁸¹

Over 30 states, including Illinois, have passed statutes that promote the use of electricity as fuel among their state fleets. Most states require a certain percentage of their state agency fleets to operate on alternative fuel vehicles, and include electricity in the menu of alternative fuels that state agencies can pursue. Hawaii provides a list of alternative fuel vehicles prioritized, with PEVs at the top of the list.⁸² In Minnesota, the Department of Administration is directed to state their intent of purchasing HEVs, PHEVs, and BEVs that are commercially available in solicitation documents, though specific purchase goals are not set.⁸³

Arizona, California, Connecticut, and Kentucky either have directly passed laws to provide guidance on procuring school buses that operate on alternative fuels, including electricity, or have statutes to indicate that school districts are part of the state agencies that need to prioritize the purchase of alternative fuel vehicles.

81 “Executive Order 11 (2009): Executive Order to Reduce the Environmental Impact of Illinois State.” State of Illinois, April 22, 2009. http://www.illinois.gov/Government/ExecOrders/Pages/2009_11.aspx

82 “Vehicle Purchasing Guidelines.” Hawaii State Energy Office, Department of Business, Economic Development and Tourism. <http://energy.hawaii.gov/lead-by-example/programsachieving-efficiencylead-by-examplevehicle-purchasing-guidelines>

83 Minnesota Statutes 16C.138

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