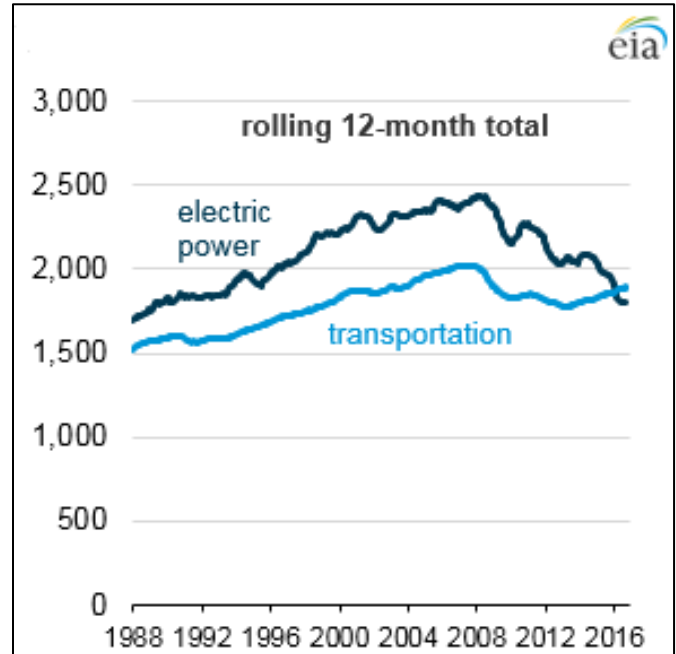


# Electrifying Transportation

## Description:

As greenhouse gas (GHG) emissions from electricity generation are declining, the transportation sector has surpassed the electric sector as the greatest source of GHG emissions in the U.S. (see figure). There is some debate regarding the impact of electric vehicles (EVs) on GHG emissions. In many cases, it depends on the state. EVs move the emissions profile from mobile sources (individual vehicles) to the stationary source emissions of the power plants providing the electricity. As these emissions get cleaner, the associated emissions of vehicles will also get cleaner. Thus, low GHG emissions associated with the electric sector will result in corresponding low vehicle emissions, and the GHG savings in such states will be significant; in other places, the savings will not be as great.

The relationship between the increased adoption of EVs and the availability of EV charging stations is complicated. On the one hand, consumer range anxiety creates a barrier to increased adoption. On the other hand, while greater availability of charging stations would ease this anxiety, the relatively low numbers of vehicles on the road provides little incentive to install and make these stations available to the public. The good news is that both supportive policies for developing charging infrastructure and advancements in technology have eased range anxiety. Bloomberg New Energy Finance [estimates](#) that 57% of all new passenger vehicle sales will be electric by 2040 and that price parity with conventional vehicles will be met for most segments in the mid-2020s. A key part of building a modernized grid is designing infrastructure that will facilitate easy connection of EVs to the grid.



Source: [U.S. Energy Information Administration](#)

## Discussion of the Policy:

EV adoption can be spurred by ensuring that the use of an EV is as or more convenient than the use of a conventional vehicle. There are a number of policies that states can adopt.

1. **Coordinating with Electric Utilities** – Programs that provide access to EV registration data by service territory can enable utilities to plan for shifting demand.
2. **Utility Investment in “Make-Ready” Infrastructure** – “Make-ready” means building and upgrading the infrastructure necessary to the installation of a charging station. The Rocky Mountain Institute (RMI) [recommends](#) that incentives for utilities to invest in make-ready infrastructure or charging infrastructure itself should be performance-based and should encourage investments in locations that are unlikely to be targeted by the private sector, like low-income and multi-unit dwellings.
3. **Utility-Run Programs** – Charging rate incentives and time of use rates can reduce the cost of electricity used for charging. Eligibility for a charging rate incentive may be limited to users with separate or advanced metering systems. Some utilities also offer financial incentives for the purchase of EVs or EV supply equipment (EVSE). In some states, enabling legislation may be required to direct or authorize a public utilities commission to allow regulated utilities to recover the costs of providing these incentives.

4. **Charging Infrastructure Plan** – Locating charging infrastructure is different from locating conventional fueling stations. While some drivers will need to charge more quickly, others will refuel when they are parked for a longer period of time, for example when going shopping, going to a restaurant, or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging (level 2 or direct current fast charging) with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process. States with existing registration fees for EVs could use a portion of these fees to help fund planning and charging infrastructure development efforts, as [Washington](#) has done.
5. **Parking Infrastructure Requirements** – In tandem with the development of a statewide plan, legislation could set requirements for EV parking infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Many states and local governments are updating building standards and codes to provide for the installation of charging equipment. Building codes might also be updated to require either higher voltage pre-wiring or the installation of charging infrastructure.
6. **Rental Properties and HOAs** – Legislation can also make it easier for lessees, renters, and members of a homeowners’ association (HOA) to install charging equipment. Typically, lessors are directed to allow lessees, at their own cost, to install charging systems. In some cases, lessees are required to maintain additional insurance for the system. Legislation related to HOAs typically directs them to avoid restrictions that would inhibit the installation of charging equipment.
7. **Financing and Financial Incentives** – Providing financial incentives and innovative financing options can help increase market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the up-front costs of EVs and EVSE. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers as receipt of the credit is typically removed in time from the purchase.<sup>1</sup> Some states have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EVSE under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.
8. **HOV, HOT, and Parking Incentives** – Allowing EVs to use high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes regardless of number of passengers and without paying the toll may make EV ownership more attractive. Most states require that EVs using these lanes display a decal or particular license plate; others also limit eligibility to certain types of vehicles or to a certain number of vehicles. States can also implement programs to provide parking incentives for owners of EVs. Typically, these programs provide access to carpool parking, preferential spaces, reduced fees, and/or access to charging stations.
9. **California ZEV** – To ensure that automakers research, develop, and market EVs, the [Zero Emission Vehicle \(ZEV\) program](#) in California requires automakers to sell an increasing percentage of electric cars within the state. Managed by California Air Resources Board (CARB), the program’s target is 5 million ZEV sales in the state of California by 2030. Ten states<sup>2</sup> have adopted California’s program, requiring that manufacturers sell a certain number of ZEV vehicles in the state. The program makes it easier for manufacturers by allowing tradeable credits among regional markets (western and eastern) and a variety of classifications of vehicles that count toward the standard in varying degrees.
10. **The Volkswagen (VW) Settlement** – In October 2016, the VW settlement for violating vehicle emissions rules was finalized. In addition to the \$10 billion in direct customer rebates, \$2.7 billion was allocated to states to

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<sup>1</sup> A [study](#) by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

<sup>2</sup> Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont.

reduce emissions. Of these funds, 15% can be earmarked for EV infrastructure investments (the rest are targeted at nitrogen oxides emissions reductions in the medium- and large-duty vehicle fleet markets).

Another [\\$2 billion will be distributed nationally by VW](#), with \$800 million going directly to California. The first investment category includes planning, installation, operation, and maintenance of the following types of EV infrastructure, which must be available to all vehicles, utilizing non-proprietary connectors:

- Level 2 charging at multi-unit dwellings, workplaces, and public sites;
- Direct current fast charging facilities;
- Later generations of charging infrastructure; and
- Hydrogen fueling stations.

**10. Federal Congestion Mitigation and Air Quality (CMAQ) Funds** - [CMAQ funds](#) are available to states and can be used to deploy EV charging infrastructure. There may be a unique opportunity to pair a request for CMAQ funds with the VW Settlement money and a commitment from utilities to invest in charging infrastructure as a public/private partnership that would leverage the federal investment.

## Example State Programs:

States, local governments, and electric utilities offer a variety of incentives to support EVs.

- Electric Drive Washington:  
<http://www.commerce.wa.gov/growing-the-economy/energy/electric-vehicles/>
- EV Connecticut:  
[http://www.ct.gov/deep/cwp/view.asp?a=2684&q=527866&deepNav\\_GID=1619](http://www.ct.gov/deep/cwp/view.asp?a=2684&q=527866&deepNav_GID=1619)
- Hawaii's EV Parking Infrastructure Requirements:  
<http://www.capitol.hawaii.gov/session2012/bills/GM1190.PDF>
- Nevada's Electric Vehicle Supply Equipment (EVSE) Demonstration Program Requirements:  
<https://afdc.energy.gov/laws/11856>

Regional collaborations around the U.S. are emerging to coordinate the development and deployment of EVs and EV charging infrastructure.

- In May 2018, 12 states<sup>3</sup> and the District of Columbia released the [Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure](#). The states in this region, from D.C. to Maine, will collaborate to invest in public EV charging infrastructure, promote EV sales across the region, and develop complementary policies and programs. Part of this strategy includes a [public-private partnership](#) with automakers.
- In October 2017, eight states<sup>4</sup> signed the Regional EV West (REV West) [memorandum of understanding](#) to create an Intermountain West EV Corridor. The goal is to develop best practices and voluntary minimum standards for stations, expand access to new EVs, and create consistent charging experiences.
- The West Coast Green Highway is an initiative between California, Oregon, and Washington to promote cleaner fuels by installing alternative fueling stations along the Interstate 5 corridor.

<sup>3</sup> Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia

<sup>4</sup> Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming

- Established in 2010, the [Transportation and Climate Initiative](#) is a regional collaboration of 12 states<sup>5</sup> and the District of Columbia to promote the use of alternative fuels. Several member states are working together to explore regional policy solutions to reduce transportation sector emissions.

In 2016, the U.S. Department of Transportation established the [Alternative Fuel Corridors](#) network. Designated corridors are priority areas for EV and natural gas infrastructure under the CMAQ program. The Alternative Fuel Corridors program is intended to:

- Provide the initial opportunity for a formal corridor designation now and in the future on a rolling basis, without a cap on the number of corridors;
- Ensure that corridor designations are selected based on criteria that promote the build-out of a national network;
- Develop national signage and branding to help catalyze applicant and public interest;
- Encourage multi-state and regional cooperation and collaboration; and,
- Bring together a consortium of stakeholders including state agencies, utilities, alternative fuel providers, and car manufacturers to promote and advance alternative fuel corridor designations in conjunction with the Department of Energy.

Established in response to the Energy Policy Act of 1992, the U.S. Department of Energy's (DOE) [Clean Cities](#) program supports efforts to reduce the transportation sector's reliance on petroleum. Among other activities, the program provides technical support, information resources, and infrastructure and vehicle acquisition support.

## More Information:

- Alternative Fuels Data Center (AFDC), Hybrid and Plug-In Electric Vehicles:  
<https://www.afdc.energy.gov/vehicles/electric.html>
- The GridWise Alliance, EVs - Driving Adoption, Capturing Benefits:  
<http://gridwise.org/evs-driving-adoption-capturing-benefits/>
- M.J. Bradley and Associates and the Georgetown Climate Center, Utility Investment in Electric Vehicle Charging Infrastructure: Key Regulatory Considerations:  
[https://www.georgetownclimate.org/files/report/GCC-MJBA\\_Utility-Investment-in-EV-Charging-Infrastructure.pdf](https://www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf)
- National Association of State Energy Officials (NASEO) and the National Association of Clean Air Agencies (NACAA): VW Settlement Clearinghouse:  
<https://vwclearinghouse.org/>
- Plug-In America homepage:  
<https://pluginamerica.org/>
- The Rocky Mountain Institute (RMI): From Gas to Grid – Building Charging Infrastructure to Power Electric Vehicle Demand:  
[https://www.rmi.org/insights/reports/from\\_gas\\_to\\_grid/](https://www.rmi.org/insights/reports/from_gas_to_grid/)
- RMI: Electric Vehicles as Distributed Energy Resources:  
<https://rmi.org/insight/electric-vehicles-distributed-energy-resources/>

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<sup>5</sup> Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia.

- Southwest Energy Efficiency Project (SWEET), Policies to Promote Electric Vehicles in the Southwest:  
<http://www.swenergy.org/transportation/electric-vehicles>
- U.S. Department of Energy, Alternative Fuel Vehicle & Fueling Infrastructure Deployment Barriers & the Potential Role of Private Sector Financial Solutions Report:  
[http://www.afdc.energy.gov/uploads/publication/afv\\_fueling\\_infrastructure\\_deployment\\_barriers.pdf](http://www.afdc.energy.gov/uploads/publication/afv_fueling_infrastructure_deployment_barriers.pdf)

For additional information on this topic, please review Chapters 3.2: Advanced Vehicle Incentives and 3.3: Electric Vehicle Charging Infrastructure in the *Clean Energy Policy Guide for State Legislatures* available at:  
<http://cnee.colostate.edu/cleanenergypolicyguide/>

This information, along with additional resources, is also available on the Clean Energy Legislative Academy Resources page at: <http://cnee.colostate.edu/academyresources/>