



# Consumer Guide to Electric Vehicles

Electric vehicles (EVs) are on the move, literally. There are more EV choices now than at any time in automotive history, and consumer sales of EVs have skyrocketed as EVs have achieved greater battery power, faster charging times, and lower fueling and maintenance costs. As EVs continue to become more affordable and economical, they will become even more commonplace.



## A Tale of Two EVs

EVs, by definition, include battery electric vehicles (BEVs), which are all-electric, and plug-in hybrid electric vehicles (PHEVs). EVs offer several benefits compared with vehicles with internal combustion engines (ICEs), including better fuel economy.

Perhaps the biggest difference between the two EVs is their driving range and operating efficiency. BEVs are limited in how far they can travel based on their battery charge. For example, in 2020 the average range of a light-duty BEV was 260 miles before needing to be recharged, with some models exceeding 400 miles on a full charge. Alternatively, PHEVs can travel much greater distances on a single battery charge because they also use an ICE to get power. But without charging the battery, PHEVs won't achieve maximum fuel economy or provide the full environmental and cost-saving benefits of EVs.

Both EV types help reduce greenhouse gases; BEVs virtually eliminate tailpipe emissions, whereas PHEVs produce no tailpipe emissions when in electric-only mode. For a comparison of vehicle emissions by state, see the Alternative Fuels Data Center's (AFDC) comparison tool at [afdc.energy.gov/ev-emissions.html](https://afdc.energy.gov/ev-emissions.html).

## The Bottom Line: What an EV Means for You

A major consideration for EVs is the sizable improvement in fuel economy. EVs are more than three times more efficient than cars powered by today's conventional engines! This means the payback from fuel savings will offset the higher cost in less time. To find fuel economy ratings and fuel/vehicle cost comparisons among current models, visit [fuelconomy.gov](https://fuelconomy.gov) or, for a comparison of fuel prices over time, visit [afdc.energy.gov/fuels/prices.html](https://afdc.energy.gov/fuels/prices.html).

**DID YOU KNOW?**



Nearly all major auto manufacturers have EV models available, and some automotive companies have committed to having electric-only models by 2030. For up-to-date information on available models, go to AFDC's "Vehicle Search" tool at [afdc.energy.gov/tools](https://afdc.energy.gov/tools) or the "Find a Car" tool on [fuelconomy.gov/feg/findacar.shtml](https://fuelconomy.gov/feg/findacar.shtml).

You can also look for available federal and state tax credits, as well as private and utility rebates, to help offset the cost of purchasing EVs, by searching AFDC's Federal and State Laws and Incentives database at [afdc.energy.gov/afdc/laws](https://afdc.energy.gov/afdc/laws).

## Get Your Charge On

To charge an EV at home, simply plug the EV's 110-volt cord into an electrical outlet. Note that charging this way may take several hours to achieve full power.

For faster charging, you can purchase a portable 240-volt unit or have an electrician install a hard-wired 240-volt outlet in your garage. A 240-volt outlet can fully charge an EV battery in as little as 20 minutes, though charging times vary based on the type of battery, its capacity, how depleted it is, and the capacity of the vehicle's internal charger. Make sure you know your EV's charging capabilities before you purchase charging equipment or upgrades.

Nationwide there are 40,000 public rapid-charging stations with more than 100,000 ports. The Federal Highway Administration is increasing this network of fast-charging stations along designated EV highway corridors. To locate a charging station, visit the AFDC's station locator at [afdc.energy.gov/stations/#/analyze?country=US&fuel=ELEC](https://afdc.energy.gov/stations/#/analyze?country=US&fuel=ELEC) or AFDC's map at [afdc.energy.gov/stations#/find/nearest?country=US](https://afdc.energy.gov/stations#/find/nearest?country=US), which is also available as an iPhone and Android app for instant mobile access. Many EVs also have built-in station locators in their on-board navigation system.

## Drive with Confidence

EVs adhere to the same rigorous Federal Motor Vehicle Safety Standards as conventional vehicles sold in the United States.

EVs lack conventional engines and have far fewer moving parts and fluids to change, so they typically require less maintenance than conventional vehicles or even PHEVs. EV electrical systems (battery, motor, and associated electronics) require minimal scheduled maintenance. Battery warranties typically cover eight years or 100,000 miles, and the average expected battery lifetime is 12-15 years under normal operating conditions in moderate climates. BEV brake

## Benefits of Electric-Drive Vehicles compared to conventional vehicles



PHEVs



BEVs

<b>Fuel Economy</b> 	Most achieve combined fuel economy ratings <b>higher than 90 mpge</b> .	Most achieve fuel economy ratings <b>higher than 100 mpge</b> .
<b>Emission Reductions</b> 	Produce <b>no tailpipe emissions</b> when in electric-only mode.  Generally, they produce <b>less than half the emissions</b> .	Produce <b>no tailpipe emissions</b> .  Generally, they produce <b>one-third the emissions</b> .
<b>Fuel Cost Savings</b> 	In electric-only mode, PHEV electricity costs are about <b>3¢-10¢ per mile</b> .  On gasoline only, fuel costs are about <b>4¢-36¢ per mile</b> .	All-electric vehicles run on electricity only. Electricity costs are <b>2¢-6¢ per mile</b> .
<b>Fueling Flexibility</b> 	Can fuel at <b>gas stations</b> .  Can charge at: <ul style="list-style-type: none"> <li>• home</li> <li>• public charging stations</li> <li>• some workplaces</li> </ul>	Can charge at: <ul style="list-style-type: none"> <li>• home</li> <li>• public charging stations</li> <li>• some workplaces</li> </ul>
Electricity is produced from varied, domestic sources:		

Source: AFDC ([afdc.energy.gov](https://afdc.energy.gov)), [FuelEconomy.gov](https://FuelEconomy.gov)

systems typically last longer than conventional vehicles, because regenerative braking reduces brake wear.

For more information, refer to the AFDC's Maintenance and Safety of Hybrid and Plug-In Electric Vehicles webpage at [afdc.energy.gov/vehicles/electric\\_maintenance.html](https://afdc.energy.gov/vehicles/electric_maintenance.html).

### KNOW BEFORE YOU GO!

Thinking about buying an EV? Make sure you understand your options and the benefits EVs provide, compared to ICE vehicles. To learn more, visit AFDC's Electric Vehicle Benefits and Considerations webpage at [afdc.energy.gov/fuels/electricity\\_benefits.html](https://afdc.energy.gov/fuels/electricity_benefits.html).