Electric Cars 101: The Answers to All Your EV Questions

What you need to know to decide whether going electric is right for you

By Consumer Reports
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Electric vehicles (EVs) are becoming increasingly common, with many manufacturers currently offering models that plug in. Dozens more are expected to hit the market over the next few years.

Although sales of pure electric vehicles and plug-in hybrids account for less than 2 percent of U.S. light vehicle sales currently, there has been increasing interest from car shoppers. In 2010, just 1,919 EVs were sold in the U.S. In 2018, sales hit 233,411. But forecasts for how much of the U.S. auto market EVs could occupy range from 8 to 25 percent by 2025. Stephanie Brinley, an analyst at market research firm IHS Markit, says her prediction sits at the low end.

“If you look at EVs for 2021 and 2022, we’re really at the beginning of this market,” she says. “By 2025, EVs should be about 9 percent of the U.S. market. That’s a huge amount of growth from where we are right now.”

MORE ON EVS AND HYBRIDS

How to Choose the Best Home Wall Charger for Your Electric Vehicle
EVs Offer Big Savings Over Traditional Gas-Powered Cars
All-Electric Rivian Pickup and SUV Take Charge
Electric Tesla Cybertruck Unveiled With Edgy, Futuristic Design
Hot New Electric Cars That Are Coming Soon

A 2019 survey conducted by Consumer Reports and the Union of Concerned Scientists shows that 63 percent of prospective car buyers in America are interested in electric vehicles. Overall, 31 percent would consider one for their next purchase, 27 percent would consider one at some point down the road, and 5 percent say they are definitely planning on buying or leasing one for their next vehicle. This last number would mark a big escalation in electric car purchases in the U.S.

A growing number of consumers may be interested, but most have had limited experience with electric vehicles, despite the fact that some EVs have been on the market for years, including models from Chevrolet, Ford, Nissan, and Tesla. And many consumers naturally will have questions about how an electric car might fit into their lives.

This guide is a basic primer that can help determine whether going electric is right for you.

Download our Electric Vehicle Checklist (PDF) to help decide whether going electric is right for you.

Shopping for an Electrified Car or SUV?

See our hybrids/EVs buying guide and ratings.

Tesla Model Y

Which Models and Types Are Available?

Electric vehicles come in all shapes and sizes, from small hatchbacks to luxury SUVs. Some are electric versions of familiar models; others are all-new vehicles engineered to strictly use electric power.

There are two basic kinds of plug-ins: battery electric vehicles (BEVs) that run exclusively on electricity, and plug-in hybrid electric vehicles (PHEVs) that can run on electricity for a limited distance before switching to gas/electric hybrid mode.

Below is a list of models that are on sale now or are scheduled to be by the end of 2020.

Hatchback

- BMW i3 (BEV)
- Chevrolet Bolt (BEV)
- Hyundai Ioniq (BEV, PHEV)
- Mini Cooper SE (BEV)
- Nissan Leaf (BEV)
- Toyota Prius Prime (PHEV)

Sedan

- Honda Clarity (BEV, PHEV)
- Tesla Model 3 (BEV)
- Toyota Mirai (FCEV)

Luxury

- BMW 3 Series, 5 Series, and 7 Series (PHEV)
- BMW i8 (PHEV)
- Mercedes-Benz C350e and S550e (PHEV)
- Lucid Air (BEV)
- Polestar 2 (BEV)
- Porsche Panamera 4 E-Hybrid (PHEV)
- Porsche Taycan (BEV)
- Tesla Model S (BEV)

SUV/Minivan

- Audi E-Tron, Q4 E-Tron, and E-Tron GT (BEV)
- BMW X3 and X5 (PHEV)
- Chrysler Pacifica Hybrid (PHEV)
- Ford Mustang Mach-E (BEV)
- Hyundai Kona Electric (BEV)
- Hyundai Nexo (FCEV)

- Kia Niro Electric (BEV, PHEV)
- Jaguar I-Pace (BEV)
- Land Rover Range Rover and Range Rover Sport (PHEV)
- Mercedes-Benz EQC (BEV) and GLC 350e (PHEV)
- Mini Countryman ALL 4 SE (PHEV)
- Mitsubishi Outlander (PHEV)
- Porsche Cayenne S E-Hybrid (PHEV)
- Rivian R1S (BEV)
- Tesla Model X and Model Y (BEV)
- Toyota RAV4 Prime (PHEV)
- Volvo XC60 T8 and XC90 T8 (PHEV)
- Volkswagen ID.4 (BEV)

Pickup Truck

- Rivian R1T (BEV)

Hybrid/EV Buying Guide

The Era of the electrified car has arrived

Plug-In Hybrid vs. Pure Electric

Plug-in hybrid electric vehicles can operate on electric power alone for anywhere from 15 miles to 50 miles. Once their battery power is depleted, plug-ins transition from running on mostly electricity to operate as regular hybrids and drive about as far as a regular car, and they can quickly refuel at any gas station.

Plug-in hybrids are an appealing option for drivers who travel mostly short distances, and they can benefit from operating on electricity most of the time. But those owners can still get the ultimate range of a gasoline engine when needed.

Battery electric vehicles are very efficient, and most newer models have enough range to satisfy the needs of a typical driver for multiple days without fully recharging. For some drivers, this means daily energy usage can be replenished from a simple 120-volt outlet, without the need to purchase and install a more expensive 240-volt home charger. But for convenience and peace of mind, EV owners will want a 240-volt charger. Here's a guide to home chargers.

Battery electric vehicles have fewer components than a plug-in hybrid or an internal combustion engine vehicle, so they often have lower maintenance costs because they don't require fluid changes or tune-ups. An analysis of EVs completed by CR experts earlier this year found that EVs generally cost less to own over the long run than their equivalent gasoline-powered counterparts.

Why Should I Buy an Electric Car?

Electric cars offer significantly lower fuel costs compared with traditional gas-powered cars. On average, a gallon of gasoline costs about twice as much as the comparable cost to run an electric car. That's especially true if drivers take advantage of off-peak electricity rates while charging at home. And electric rates tend to be more stable than oil prices. (Compare how much you'd save in your state using the Department of Energy's eGallon tool.)

Lower Operating Costs

- EVs have overall lower fueling costs.
- Most EVs have lower maintenance costs because they have fewer and simpler components and don't require fluid changes or tuneups.
- When combined with a home solar system, "fuel" costs could be completely eliminated, although it can take some time to recoup the cost of installing solar panels.

Less Pollution

- EVs produce no particulate or smog-causing tailpipe emissions, which are a significant contributing factor in causing asthma and other air pollution-related illnesses.
- EVs have lower carbon emissions than gasoline powered vehicles over their service life.

Unique Features

- EVs are quiet because of their lack of engine noise.
- Most EVs provide instant power and can be fun to drive.

- Charging at home is convenient.

Quiz: Is an Electric Car Right for You?

Why Shouldn’t I Buy an Electric Car?

EVs cost more to purchase, on average, than equivalent gasoline-powered cars, and despite significant advances in range, they might not be ideal for some one-car households. Plug-in hybrids solve the range problem, but they still require a place to plug in to take full advantage of their propulsion system. This can be a challenge for people who live in multiunit dwellings or who don’t have access to off-street parking.

Electric vehicle owners need to have ready access to an outlet (or a 240-volt EV charger) and a parking spot for overnight charging, unless they are relying entirely on workplace charging.

For EV drivers, planning when and where the car will be charged is a constant part of ownership.

Unlike refueling a gas car, which takes only a few minutes, recharging an EV can take 25 to 60 minutes (depending on the battery size and charging speed) using fast chargers in public places. Under normal circumstances, it takes about 10 hours to recharge an EV using Level 2 (240-volt) chargers when the battery is near empty (see below for more details on levels). Note also that in cold weather or extreme heat, a vehicle’s range drops off dramatically because of the physical limitations of battery chemistry.

Of course, an EV doesn’t have to be somebody’s only car. A conventional gas-powered car can fill in where a pure EV falls short—and vice versa—in a multicar household.

The Main Questions to Ask Yourself

- How many miles do I drive each day?

- Do I have regular access to charging at home or at work?
- How much would the electricity cost?
- Do I need a faster charging option, or can I charge overnight with a regular outlet?
- How often do I travel beyond the electric range?
- Are there public charging stations in my local area or travel corridors? (Check out PlugShare and the DOE's Alternative Fuels Data Center and related apps.)

What's the Cost to Buy?

Base prices start around $30,000 for the Hyundai Ioniq and Nissan Leaf. From there, prices run the gamut and span into six figures for a Tesla Model S and Model X. In some cases, those prices are thousands more than similarly sized gas-powered cars.

But many electric cars are eligible for up to a $7,500 federal tax credit to help offset the extra cost. Additional city and state tax credits, rebates, or vouchers are available in California, Colorado, New York, Texas, and elsewhere; these can make the costs of electric cars more compelling and competitive with the price of non-EVs. Plus, consumers with a home solar system can really lower or even eliminate their energy costs.

Under current rules, once an automaker sells 200,000 electric cars, the value of the tax credit decreases and eventually fades away. So far, this has affected only two automakers, General Motors and Tesla. However, Congress is considering a plan that would expand the federal tax credit, including increasing the number of electric cars from each automaker that is eligible for the credit, so this limitation may change. Be sure to consult your accountant to determine eligibility for receiving a tax credit. Check the current status for credits being offered by the IRS.

It pays to do your homework and look beyond the sticker price to find out how much you'd be paying after state, federal, and local incentives, as well as local lease offers. You may be surprised to find that some EVs are more affordable than you think.

What Are They Like to Drive?

We've found that most electric cars deliver instant power from a stop, and they are both smooth and quiet when underway. The driving experience is quite different from a traditional gasoline-fueled car because EVs feel like they glide effortlessly.

Most electric vehicles we've tested ride comfortably. Despite their heavy batteries, they typically handle well because that battery is positioned low in the vehicle, plus they lack a heavy engine above the front axle.

Check out our full EV ratings.

How Far Can They Go?

Most all-electric cars can now go more than 200 miles on a full charge—much less than the typical 400- to 500-mile range for gasoline cars. We found that the Environmental Protection Agency-rated range is quite accurate for EVs, though hilly terrain and running the air conditioning in hotter weather can also exact a toll. And driving in cold weather will shorten the range noticeably because of the power required to heat the cabin.

Driving an EV requires planning. But plug-in hybrids have a combined gasoline and electric range of 400 to 550 miles, and if you plan it right, you may never have to go to a gas station, except for during long trips.

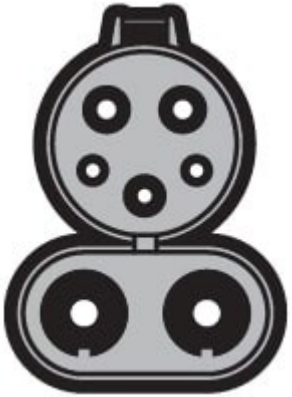
Below are 10 examples of EVs with their EPA-rated range. For plug-in hybrids, a total range that combines electric and gasoline power is shown in parentheses.

VEHICLE MAKE/MODEL	EPA-RATED DRIVING RANGE ON SINGLE CHARGE (MILES)
Audi E-Tron	222

Chevrolet Bolt	259
Chrysler Pacifica Hybrid	32 electric (520 total)
Hyundai Ioniq PHEV	29 electric (630 total)
Hyundai Kona EV	258
Kia Niro EV	239
Nissan Leaf Plus	226
Toyota Prius Prime	25 electric (640 total)
Tesla Model 3 Long Range	330

Tesla Model Y Long Range Dual Motor (AWD)	316

Level 1 & 2 J1772 Charge Port



DC Fast-Charging SAE/CCS Combo

DC Fast-Charging CHAdeMO

DC Fast-Charging Tesla

Illustration by Chris Philpot

How Long Does It Take to Charge One?

Charge times vary greatly, depending on the size of the battery, how fast the car is able to take the charge, and the amperage of the circuit. For most EV owners, charging overnight at home is the cheapest and most convenient option. Unless you are pushing the range limit on a daily basis, you won’t have to fill it up from empty all the way to full very often.

On a typical 240-volt, 32-amp (Level 2) charger, it takes between 9 and 13 hours to fully charge an EV that can go more than 200 miles. Plug-in hybrids, with their smaller batteries, take significantly less time to recharge. For instance, it takes about 2 hours to replenish the Toyota Prius Prime.

Expect about triple those times when charging from a standard 120-volt (Level 1) household outlet. Put another way, on a standard household outlet, expect to get about 4 miles of driving for every hour of charging.

A wider variety of 240-volt chargers are coming on the market that charge at different speeds, with charge times that vary depending on the car and charger. Some systems, such as Tesla's High Power Wall Connector home charger, replenish the battery much quicker with Long Range Tesla versions.

Publicly accessible DC fast chargers are spreading throughout the country. These can replenish up to 50 percent of the battery's range in 30 to 45 minutes. Tesla's Superchargers are even quicker, with the speed varying by model. The most common V2 superchargers can restore 50 percent of the battery capacity in 30 minutes for the Long Range versions of the Model 3, S, and X.

Where Do I Recharge?

Electric cars achieve the biggest benefits and cost savings when they're charged overnight at home, when electric rates may be lowest. As another benefit, most electric-car drivers say they find it much more convenient to just plug in at home than to have to stop at a gas station.

It's possible to charge a plug-in hybrid overnight, even on a standard 110-volt household outlet (Level 1).

“Most PHEV owners will not need a Level 2 charger,” says Gil Tal, director of the Plug-In Hybrid & Electric Vehicle Research Center at the University of California, Davis. “The Level 1 charger that is provided with the car can charge the battery back to 100 percent overnight.” Tal adds that Level 1 may be sufficient for many electric car owners, as well, if they do not drive more than 40 to 50 miles per day.

It’s worth investing in a wall-mounted charger if you need juice quicker than 120 volts can provide and you don’t have convenient access to a public or workplace charger. Wall units are available online through Amazon, Costco, Home Depot, Lowe’s, and Sam’s Club, among others. The cost is typically $500 to $700.

See best home chargers.

You’ll need a professional electrician to install a Level 2 charger. It entails putting a special 240-volt receptacle in your garage, like the ones used for a clothes dryer. The national average installation cost is $750, according to HomeAdvisor. Of course, costs will vary depending on your specific setup.

Check your utility and state incentives for discounts and tax rebates on charging equipment, some of which can cut the total cost in half.

Charging on the go is becoming increasingly viable. There are currently about 22,000 public EV charging ports in the U.S., and that number is expected to more than triple by 2023.

There are apps available to help, including from the automakers. These are essential tools for EV owners. There are websites, such as PlugShare, that are helpful for locating public chargers, as well.

Ready to Go Electric?