

ELECTRIC VEHICLES 101



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Introduction

EVs are gaining popularity. The promise of reduced environmental impact and fuel cost savings has led many people to consider purchasing an EV.

If you are new to EVs, you will likely have questions, and this guide aims to answer those questions plus cover essential topics related to buying an EV.

What is an EV?

Two types of vehicles are considered electric — battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV). BEVs are powered entirely by electricity and are likely what people think of when they hear the term EV. It has a battery pack that supplies power to the motor(s) and propels the vehicle.

PHEVs are similar in that they have a battery pack that supplies power to the motor, but they have the addition of a small gas engine to extend range. They are hybrids because they use gas engines and electric motors. The big difference is that they can run on battery alone for a limited range (typically 20 to 50 miles). This guide will focus primarily on BEVs, which is what “EV” will refer to from here.



Driving Range and Charging

Nearing the top of the list of consumer concerns regarding EVs are a limited driving range and finding a charger when needed. Many EVs have less driving range than comparable gas-powered vehicles, especially for models produced closer to 2010 — the start of the modern EV era. A used EV is also likely to have less range than it did when it was new due to the age of the battery.

Before purchasing an EV, buyers need to consider the vehicle's purpose. Will they often drive in cold weather? Do they need to drive it on long trips? Where is the closest charging option? Understanding how they need to use their vehicle will help consumers determine if electric is the right choice for them. The good news — most EVs have more than enough range for people's daily driving habits.

Driving Range

According to the US Department of Energy, for the 2022 model year, the average driving range for an EV was 257 miles¹. Note that the driving range of EVs varies greatly by model. For example, a 2023 MINI Cooper SE has an EPA range of 114 miles, while a 2023 Tesla Model 3 Long Range has an EPA range of 358 miles. According to the AAA Foundation for Traffic Safety's 2021-2022 [American Driving Survey](#), people drive an average of 30.1 miles daily. This suggests that for most drivers, an EV has more than enough range for a typical day of driving.

If someone starts the day with a fully charged EV, even with a long daily commute, they should make it through their day without needing to charge. But there are a couple of situations where an EV's range limitation should be considered.

Long Distance Trips

EV owners must rely on public charging when driving beyond their vehicle's range, whether on a road trip or just an extended day trip. Public charging may be easy to find in densely populated areas or along high-traffic highways. But the nearest public charging station in rural areas could be far away or nonexistent.

Another consideration is the time it takes fully recharge an EV. In contrast, drivers of gas-powered vehicles can find a nearby gas station almost anywhere and refuel in just a few minutes. But with proper planning, taking

a long-distance trip in an EV is possible. Using tools like the [US Department of Energy's Alternative Fuels Data Center](#), drivers can find public chargers along their route.

AAA also offers tools to help with planning road trips. The [AAA TripTik Travel Planner](#) is a free point-to-point directions tool that travelers can use to map their routes, save favorite or frequent trips, discover destination information, including points of interest and the location of EV charging stations.

Weather

Climate can have a significant effect on the driving range of an EV. [AAA research](#) found that an outside temperature of 20°F and heat used inside the vehicle reduced driving range by an average of 41%. AAA's research also found that with an outside temperature of 95°F and air-conditioning used inside the vehicle, driving range decreases by 17%. Weather is an important consideration when planning long-distance travel in an EV, especially in cold climates.

Alleviating Range Anxiety

When it comes to knowing how much EV range is enough, drivers must understand their personal needs, preferences, and daily habits. The key is choosing a vehicle that fits the situation. For those with a short commute, an EV may make sense for everyday use with the option of renting a gas vehicle for occasional long-distance travel. For a two-vehicle household, owning one EV and one gas vehicle might provide the best of both worlds — saving on fuel costs for daily driving but having the option of a gas-powered vehicle for longer trips.

EV Charging

One of the most significant questions when it comes to EVs is charging. EVs rely on batteries to power their electric motors and propel the wheels into motion. The battery's charge is essential for the vehicle's operation, and maintaining a full charge is crucial. To charge an EV, it must be connected to a charging station, which provides the necessary power source. Once connected, the EV's charging port and onboard charger work together to convert the external power into battery charge.

EVs have the capability to charge at varying power output levels, which will affect both where you can charge the vehicle (at home or in public areas) and how long it will take to fully charge.

While most EV charging is done at home, a AAA survey found that 56% of people cite a lack of convenient places to charge as one of their top reasons not to buy electric. Another point of confusion is over the number and types of EV charging connectors. This section will discuss the different options for EV charging and their pros and cons. Additional information about EV charging (including charging levels and types of connectors) can be found at the [US Department of Energy's Alternative Fuels Data Center](#).

Home charging

Charging at home saves EV owners time since it can be done overnight or when the car is not in use. It also saves on charging costs since

electricity used at home is much cheaper than public charging.

¹ US Department of Energy, "FOTW #1290, May 15, 2023: In Model Year 2022, the Longest-Range EV Reached 520 Miles on a Single Charge," 15 May 2023. [Online]. Available: <https://www.energy.gov/eere/vehicles/articles/fotw-1290-may-15-2023-model-year-2022-longest-range-ev-reached-520-miles>. [Accessed Sep 2023].

There are two types of home charging — Level 1 and Level 2. Level 1 chargers, which come with most EVs, plug into a standard 120-volt household outlet (meaning no special installation is required). This option is the most convenient and affordable but much slower than the other options. The typical rate of charge is 2 to 5 miles of range per hour, meaning those who drive longer distances may not be able to recharge their vehicle overnight fully.

Level 2 chargers operate on a 240-volt source (similar to the plug used for a clothes dryer). Some units plug directly into 240-volt outlets, which may require installation if not already available in the home, and others need to be hardwired to the service panel. The upfront installation cost may be worth it since Level 2 charging is up to ten times faster than Level 1. Depending on the unit, Level 2 chargers provide roughly 10 to 20 miles of range per hour. Most drivers will have plenty of time to get their EV back to full charge overnight.

Public Charging

While not nearly as common as gas stations, the availability of public EV chargers has significantly grown in recent years and continues to do so. Public chargers allow drivers to charge their EVs away from home and often at a faster rate, whether on a long-distance road trip or just topping off to make it home from work. However, public charging is more expensive than charging at home.

Other considerations drivers must make when it comes to public charging is the possibility of encountering a broken charger and not

having enough range to make it to the next charging station. This reality can contribute to range anxiety for even experienced EV drivers. Additionally, it is possible that all chargers at a station will be occupied, especially during busy travel days.

Level 2 chargers are the most common type available at public stations. However, these chargers are more suited to “destination charging” during which drivers will spend significant time doing something such as shopping or enjoying a leisurely meal. This is because a Level 2 charger is significantly slower than DC fast chargers, adding anywhere from 30 to 60 miles of driving range per hour. If a driver is seeking to quickly cover long distances, Level 2 chargers are not ideal. But if a driver needs to add a small amount of range to finish their trip, then public Level 2 chargers are a good solution.

The other type of public charger is the DC fast charger. As the name implies, DC is the quickest method for charging an EV, adding 180 to 240 miles of range per hour². They can fully charge most EVs within an hour; however, the vehicle’s capability can limit the charge rate. DC charging is typically more expensive than Level 2 and can degrade the battery if used too often.

Prospective EV buyers should consider whether they will be relying on public charging regularly and know the availability in their area. The [US Department of Energy’s Alternative Fuels Data Center](#) provides a map of public charging stations, a helpful resource for determining public charging in a particular area.

Charging Costs

The cost to charge an EV can vary based on the vehicle and the local electricity rates. But one thing is true — it costs less to charge an EV than to fuel a gas-powered vehicle. Let’s compare the cost to charging/refueling similar electric and gas vehicles.

The 2022 Chevrolet Bolt EV has a range of 259 miles and an EPA efficiency rating of 28 kWh/mi. The comparable 2022 Chevrolet Trax LT (gas-powered) has an EPA efficiency of 27 MPG or 0.037 gallons per mile³. According to the US Bureau of Labor Statistics, the national average household electricity rate was \$0.170 per kWh as of August 2023, while the national average price for regular-grade gasoline was \$3.871 per gallon⁴.

In this scenario, when charging at home, the Bolt EV will cost about 4.6 cents per mile to charge, while the Trax will cost more than triple to fuel at about 14.3 cents per mile. This fuel savings is one of the major selling points of EVs.

This calculation assumes that the EV is being charged at home. Public charging rates are typically higher and can vary greatly depending on the location, type of charger, and even time of day. States have different laws about how charging rates are set, with some charging by the kWh and others by the minute. Because of this, it is difficult to determine the typical rate for public charging.



³ US Department of Energy & US Environmental Protection Agency, “www.fueleconomy.gov,” [Online]. Available: <https://www.fueleconomy.gov/feg/powerSearch.jsp>. [Accessed Sep 2023].

⁴ US Bureau of Labor Statistics, Average energy prices for the United States, regions, census divisions, and selected metropolitan areas Sep 2023. [Online]. Available: https://www.bls.gov/regions/midwest/data/averageenergyprices_selectedareas_table.htm. [Accessed Sep 2023].

² US Department of Transportation, “Electric Vehicle Charging Speeds,” February 2, 2022. [Online]. Available: [https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds#:~:text=Level%201,vehicle%20\(PHEV\)%20from%20empty..](https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds#:~:text=Level%201,vehicle%20(PHEV)%20from%20empty..) [Accessed October 2022].

Ownership Costs of EVs

EV owners can expect to save on fuel costs since the electricity needed to charge their battery is considerably cheaper than gasoline or diesel fuel. But other costs associated with vehicle ownership need to be considered. Vehicle ownership costs can be broken down into six categories: depreciation, fuel, insurance, maintenance and repairs, taxes and fees, and finance charges. Each will vary based on the vehicle, whether it is new or used, the owner's state of residence, driving tendencies, and other factors.

AAA's 2023 Your Driving Costs study compared new vehicle ownership costs of nine different vehicle categories and found that EVs are middle of the pack (fifth) in total ownership costs. The most significant savings were in fuel, repair, maintenance, fees, and taxes (due to available rebates for some EVs). On the other hand, EVs were found to have the highest depreciation costs. But for those looking to purchase a used vehicle, some of these costs will change.

Electric vs. Gas Vehicle Ownership Costs

Using AAA's online Your Driving Costs calculator, the cost to own EVs (both new and used) were compared to similar gas-powered vehicles. These U.S. average cost estimates are based on 15,000 miles driven annually and an EPA-standard 55%/45% city/highway driving ratio. The cost estimates assume that the vehicles were purchased in 2023, driven for five years, and traded in.

In both comparisons, the EVs offer significant savings in fuel costs — \$5,000 over five years. They also save on maintenance costs compared to their gas-powered counterparts. When all cost categories are added up, EVs are estimated to cost less to own than their gas-powered comparison.

Car buyers should thoroughly research their options and use tools like AAA's online Your Driving Costs calculator to compare ownership costs for different vehicles and situations.

Buying Used vs. New

In the past, on average, EVs depreciated much faster than their gas-powered counterparts, meaning used EVs could be purchased at low prices compared to used gas vehicles. But recently, high gas prices and general inflation of used automobile prices have increased the purchase prices of used EVs. Despite this, buyers can expect to spend thousands less on a used EV than on a new one. A lower purchase price means a smaller down payment, fewer financing costs, and fewer taxes. However, that savings could be negated in the long run by similarly low future resale value.

NEW Compact Comparison: 5-year cost to ownership

	Electric	Gasoline
	2023 Nissan Leaf S	2023 Nissan Sentra SR
MSRP	\$27,800	\$23,090
Fuel	\$3,615	\$9,499
Maint & Repair	\$4,311	\$7,381
Depreciation	\$20,253	\$15,616
Insurance	\$8,618	\$9,426
Fees & Taxes	\$3,287	\$2,575
Finance Charges	\$4,720	\$3,985
Total	\$44,804	\$48,482

USED Compact Comparison: 5-year cost to ownership

	Electric	Gasoline
	2018 Nissan LEAF S	2018 Nissan Sentra SR
MSRP	\$29,990	\$20,500
Fuel	\$3,615	\$9,336
Maint & Repair	\$10,035	\$13,968
Depreciation	\$9,914	\$9,071
Insurance	\$7,042	\$7,471
Fees & Taxes	\$1,645	\$1,279
Finance Charges	\$1,724	\$1,824
Total	\$33,975	\$42,494

*These numbers were analyzed by AAA Automotive Engineers on 9/22/23. Please visit the YDC calculator for the most accurate category cost breakdowns.



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Depreciation

Depreciation (the difference between the price paid for a vehicle and the price it is eventually sold for) is typically the single largest vehicle ownership cost. In the past, EVs were known to depreciate faster than gas vehicles, but the increasing popularity of EVs means that this is not necessarily true anymore. In reality, depreciation is vehicle-specific. Due to brand name, perceived quality, or other factors, some vehicles will lose value more quickly than others.

EV shoppers can find estimates for depreciation over five years of ownership for vehicles going back five model years at AAA's Your Driving Costs online tool.

Fuel Costs

As discussed in the Driving Range and Charging section, EVs can save money on fuel costs. In the above estimates, charging costs for both EVs are \$5,000 less than their gas-powered counterparts, but note that these estimates assume mostly home charging. Public charging can cost significantly more than home charging, reducing savings compared to gas.

The upfront cost of installing a home unit saves money in the long run and is likely the best option for most owners. Those unable to install a dedicated EV charger in their home can find Level 1 charging options that plug into standard 120-volt wall outlets, though they typically charge much slower.

Maintenance Costs

Maintenance costs for EVs are generally less than for gas vehicles. This is because electric powertrains have fewer moving components than combustion engines and don't require as much ongoing maintenance (like oil changes). In our examples above, each EV is estimated to cost less in maintenance, repair, and tires than the gas comparisons. In the case of the used EV it is 28% and for the new 42%.

There are, however, potential expenses not necessarily accounted for in the above estimates once a vehicle is outside of warranty. In the case of gas vehicles, major repairs like transmission replacements can cost thousands. Similarly, an EV battery that has reached the end of its life can cost thousands to replace.

Tax Incentives

In August of 2022, the Inflation Reduction Act was signed into law and changed how federal tax credits for alternative fuel vehicles (including EVs) work. As of January 2023, purchasers of new EVs could get a maximum tax rebate of \$7,500⁵. But things like where the vehicle and battery were assembled, where battery materials were sourced from, the purchase price, and the purchaser's income can reduce the rebate or disqualify a purchase altogether.

Buyers of used EVs can receive up to \$4,000 or 30% of the price of the vehicle when purchasing an EV that is a minimum of two years old. And there are no requirements related to assembly and materials, so more models should qualify. The purchase price must not exceed \$25,000, and the purchaser's income must be below \$150,000 filing jointly, \$112,500 for the head of a household, and \$75,000 for single filers and others. The used vehicle tax credit is only available for the first sale after the new purchase⁶.

EV shoppers can find a list of qualifying EVs at the [IRS's Index of Qualified Manufacturers and Previously Owned Clean Vehicles](#). Buyers should also research state-level incentives, as some states provide additional credits for EV purchases. Buyers can find more information on federal and state-level EV incentives at the [US Department of Energy's Alternative Fuel Data Center](#).



⁵ 117th Congress, H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. 2022. [Online]. Available: <https://www.congress.gov/bills/117/congress/house-bill/5376/text/pl?overview=closed>. [Accessed Oct 2022].

⁶ US Department of Energy, Pre-Owned Electric Vehicle (EV) and Fuel Cell Electric Vehicle (FCEV) Tax Credit [Online]. Available: <https://afdc.energy.gov/laws/13038>. [Accessed October 2022].

Repair and Maintenance

EVs tend to require less maintenance than gas-powered ones. An electric powertrain has fewer components than an internal combustion engine (meaning fewer parts to wear out or break). EVs also don't require regular oil changes, meaning fewer visits to the mechanic. Depending on how it's driven, EV owners may even have to replace their brake pads less often due to the use of regenerative braking.

However, there are some caveats. Most notable is the traction battery that powers the vehicle's motors. While it does not typically need ongoing maintenance, it does wear out over time, and when the time comes, the cost to replace it can be very high. This section will discuss this and other maintenance-related topics that prospective EV owners should know.

Battery Repair and Replacement

Instead of a gas tank, EVs store their energy in a traction battery pack. Unlike the twelve-volt battery used by most cars to start engines and power accessories, a traction battery is much larger, operates at a much higher voltage, and powers an EV's motor(s).



The traction battery (like other batteries) gradually loses its capacity as it is charged and discharged. This is why an EV that is a few years old typically has less range than when new. And things like how the battery is charged and the climate it resides in can decrease its longevity. But how long the traction battery will last is a difficult question since a relatively small number of EVs have been around long enough to reach this point.

EV Maintenance and Repairs

Whether still under warranty or not, the best bet is to have drivetrain and traction battery issues serviced at an authorized dealership that services that brand. EVs are still quite new and sell in relatively low numbers, so mechanics (whether independent or dealership) may not have much experience with them. But taking an EV to a dealership ensures they have access to the vehicle's appropriate service information and equipment. This will change over time as EVs become more prevalent and more independent shops build the skills and tools required to service EVs.



An independent service provider should be equipped to handle maintenance on equipment not specific to EVs (such as brakes, suspension, and tires). Owners may even find independent shops that specialize in EVs. No matter where they choose to take their EV, owners should research shops before bringing in their vehicles to ensure they are experienced, certified, and equipped to handle their specific needs. EV owners can find a quality repair shop using the [AAA Approved Auto Repair Facility Locator](#).

Warranties

Manufacturers are federally mandated to offer an 8-year/100,000-mile warranty on traction batteries, with some offering 10-year/150,000-mile or even lifetime warranties. Traction battery replacements can cost thousands (or tens of thousands) of dollars, so buyers need to know the duration and terms of the warranty.



Some automakers (such as Hyundai/Kia and Tesla) provide warranties beyond the federal mandate on specific models. This provides owners peace of mind that they will not have to pay for a battery replacement for many years.

Buyers should check to see whether a used vehicle is still under warranty (especially on the traction battery), but beware that not all warranties are passed along to subsequent owners. Buyers can contact a dealership and provide the vehicle's VIN to check the remaining warranty. An active warranty can mean peace of mind for however many miles (or years) are left on it and could be the deciding factor when comparing used EVs.

Tires

EVs are typically equipped with specialized tires from the factory. Because efficiency and driving range is at a premium, manufacturers tend to install low rolling resistance tires on their electric models. Besides that, EVs are significantly heavier than their gas counterparts due to the weight of the electric motor and large battery pack, and they need tires that are rated to support that extra weight.



This means that replacing the tires of an EV will likely cost more than for gas vehicles. However, if the tires are replaced with cheaper, non-specialized tires, owners could get worse efficiency (less range) and have to replace those tires sooner due to faster wear.

First-Time Driving an EV

AAA conducted a focus group to better understand first-time drivers' experience in an EV. Through their point of view (POV), study participants identified what drivers have to consider while driving an EV.

Charging

What was your experience charging the EV at home?	
Positive	<i>"Piece of cake. It took a moment to push the release button to disengage the charging chord."</i>
Neutral	<i>"No way to charge at home, but I did locate an office building nearby that offered public charging."</i>
Negative	<i>"The only challenge at home was the limited amount of charge garnered after having it plugged in overnight."</i>
What was your experience charging the EV in public?	
Positive	<i>"Charged twice at a Tesla Super Charging station. Very easy to use as long as you can combine the charge with a stop for food or light shopping. If I were to own a Tesla, I would have to install a charger at home."</i>
Neutral	<i>"Public charging is fine, but you need to have the time! I didn't realize there was an adaptor in the trunk for charging. Looked around and figured it out. Also was not aware of where the charging port was or how to gain access to it. Figured that out too."</i>
Negative	<i>"Traumatized to try for the first time. Found only 2 units with 4 types of chargers, no instructions anywhere for a newbie and the screens were very difficult to see, approx. 1hr 15 min. later to charge up 8% more from 50% to 58%."</i>

AAA TIPS

- ▶ Locate the charging cable for charging and know how to charge the vehicle (how to open the charging connection door, where to release the charging cable when finished charging).
- ▶ To help alleviate range anxiety, plan to use only 60-70% of the driving range before charging.
- ▶ Sustained highway driving or extreme temperatures will erode the driving range quickly.
- ▶ Make a habit of recharging the vehicle before it gets below the 20% state of charge.
- ▶ Develop a recharge routine and plan for the necessary access to charging networks before attempting any trip (this sometimes includes joining a charging network and registering a credit card).
- ▶ If you plan to use public DC Fast charging, know what type of charger works with the car you are driving.

Accelerating

How was the acceleration of the EV?	
Positive	<i>"I felt way more torque compared to a gas-powered vehicle, a positive feature of powerful pickup and agility. I was comfortable behind the wheel; the acceleration was impressive!"</i>
Neutral	<i>"Smooth and fast acceleration. However, it did seem like I had to push the accelerator harder to get it to 'go.'"</i>
Negative	<i>"No engine sound, which caused confusion to know if the vehicle was ready to be driven. No movement at all when the brake is released, which was a different driving style than what I was used to."</i>

AAA TIPS

EVs are generally faster than their gas-powered counterparts and their acceleration can launch the vehicle quickly and at a fast distance and speed — increasing the possibility of a crash.

- ▶ Use a smooth accelerator pressure to help drive at a moderate speed and to maintain a safe distance behind other vehicles.
- ▶ Keep an eye on the speedometer until you adjust to what it feels like to drive an EV. Most EVs are developed and marketed as performance cars, SUVs, and trucks. The ability for rapid acceleration from a stand-still or at highway speed is exhilarating — but can be dangerous if either unexpected by a novice EV driver, or if used irresponsibly.

Riding

EVs don't emit any engine or exhaust noise, which makes them much quieter than their gas counterparts. Handling of the vehicle can be appreciated more because of the low center of gravity, making the EV easier to turn at reasonable speeds. Inside the EV, the vehicle user interface dashboard incorporates modern technology and influences how users interact with EVs.

How was your experience with the drive/ride of the EV?	
Positive	<i>"Driving the vehicle was smooth and comfortable. I quickly learned how to sync my phone for music via Bluetooth and was able to adjust the AC settings."</i>
Neutral	<i>"Learning the software to the various information was overwhelming initially, leading me to the Hertz EV Blog, which was much more helpful. Definitely had to watch a video."</i>
Negative	<i>"Learning to use the features on the touchpad was confusing. Climate control and radio, for example. Scrolling through the different screens took a bit of time. Not as straightforward as I am used to."</i>

AAA TIPS

Give yourself the gift of time!

- ▶ Get familiar with all driver controls. Making mental logs of how to use the lights, wipers, stereo, heat, and air conditioning by understanding the use of and where the touchscreen interface is located is a must before starting to drive.



Braking

In an EV, the braking system automatically uses the electric drivetrain and (depending on settings) can cause the car to slow down without the brake pedal engaged. This is called Regenerative Braking. The EV captures the energy released during the braking process and uses it to recharge its battery. This makes EVs more efficient and helps to extend their overall range. A "jarring" feeling often kicks in the moment the driver takes their foot off the acceleration pedal.

How was your experience with the drive/ride of the EV?	
Positive	<i>"Regenerative braking started as a distraction but over time became an enjoyable driving feature."</i>
Neutral	<i>"It was a bit awkward getting used to controls especially braking at first but operated the same as any vehicle."</i>
Negative	<i>"The braking was off-putting. When coming to a stop, I'm used to taking my foot off the accelerator to coast to light, but the EV instead actively brakes."</i>

AAA TIPS

- ▶ Most EVs allow the adjustment to the sensitivity of regenerative braking. Setting this to a minimum for the first driver will help avoid the harsh sensation.
- ▶ Turning the setting up to increase levels of regenerative braking will save more energy that ultimately increases the EVs driving range.

Shopping for an EV

Availability

EVs currently account for less than 1% of vehicles in operation. Historically, there has been little variety in EVs, with sedans and small SUVs making up the majority. This is changing, though, with recent additions of electric pickups, SUVs, and sports vehicles. Therefore, buyers looking for a new EV will have more choice than in the past.

In some cases, the price of a new EV can be much higher than a comparable gas-powered vehicle. Those who want an EV but need a more affordable option may find buying used a better way to go. However, the variety of choice for used EVs is limited, especially in areas with a lower EV prevalence. Four of the most popular used EV models in the US include the Tesla Model S, Chevrolet Bolt EV, Tesla Model X, and Nissan LEAF — all of which are sedans or compact SUVs. Buyers looking for larger used vehicles may have difficulty finding electric options, but the variety of EV models and vehicle types has been growing yearly. Looking for newer used vehicles could offer more options.

Where to Shop

Car buyers can find both new and EVs at dealerships, independent car lots, and online listings. Since used EV inventory is more limited, car buyers may have to spend more time searching and traveling to find a vehicle that meets their needs.

Choosing an EV

Price

First, a buyer must decide how much they want to spend. For example, the 2023 Tesla Model S is a high-performance large sedan with a stated range of 405 miles and a MSRP of \$89,990. However, a used model (2017) might cost \$50,000 or more⁷. The more moderately

priced Nissan LEAF S is an economical compact hatchback with a stated range of 150 miles and a MSRP of about \$27,800. A used model (2017) might currently cost less than \$15,000⁸.

Size & Performance

Before shopping, buyers should decide how large of a vehicle they need. There are large sedan models that can fit a small family comfortably, and there are compact models with limited storage and passenger space.

Range

One of the most critical factors when selecting an EV is range. Some car buyers may not need their EV to go further than a few miles a day, especially if they own a second vehicle that is gas-powered. Others may own just one vehicle and rely on it for a long daily commute. Buyers should understand their driving needs and select a vehicle accordingly.

Brand

The brand is a major factor affecting the cost of an EV (or any vehicle). Some brands may offer higher quality or a sense of luxury. Some people may prefer the styling of a particular car over another. And some people may have a favorite. Buyers should understand that some brands and models tend to cost more or hold their value better than others. For example, Tesla vehicles cost more than many other EVs when new and hold their value well.

Buying Used: Evaluating Vehicle Condition

Before purchasing a used EV, it is important to evaluate the vehicle's condition. If available, buyers should consider purchasing an independent pre-purchase inspection by a company specializing in EVs or the vehicle brand they are considering buying. Buyers should also request a service record from the seller, which can be obtained from the dealership (assuming that is where the vehicle was taken for service). Otherwise, records can be obtained through a service like CARFAX[®].

Buyers should look for records indicating future problems (like wrecks) or for battery repairs or replacements. While battery repairs may suggest an aging battery that could require more service in the future, a new battery replacement could mean that the buyer is getting a battery with a longer life.

Buyers should specifically request information on the state of health of the battery since this is a potential future expense that can cost thousands. Dealerships may be able to perform a battery evaluation, but if this isn't available, find out the current maximum capacity of the vehicle's battery and compare it to the as-new capacity as stated by the manufacturer. On the dash, many EVs will provide the battery's current max capacity (in kW-h). If not, a buyer should at least ask to check the driving range (in miles) stated with the vehicle fully charged.

Comparing the capacity or range on the dash to the manufacturer-stated value when new can show how much the battery has already degraded. The more range that has already been lost, the closer a battery is likely to be repaired or replaced.

⁷ Kelley Blue Book Co., Inc., Used 2017 Tesla Model S [Online]. Available: <https://www.kbb.com/tesla/model-s/2017/>. [Accessed Oct 2022].

⁸ Kelley Blue Book Co., Inc., Used 2017 Nissan LEAF [Online]. Available: <https://www.kbb.com/nissan/leaf/2017/>. [Accessed Oct 2022].

Recalls

Buyers should check for recalls before purchasing a vehicle (electric or otherwise). This can be done by entering the vehicle's VIN at [NHTSA's Safety Issues and Recalls](#) search page. An active recall may not be a reason to avoid a vehicle, but not knowing about a recall could mean driving around with faulty or dangerous equipment or a surprise trip to the dealership soon after purchasing.



Additional Resources

- ▶ **[AAA's Your Driving Costs Calculator:](#)**
Compare customized ownership cost estimates for new and used vehicles dating back to the model year 2017.
- ▶ **[Department of Energy's Alternative Fuels Data Center:](#)**
Information on EV charging, map of public chargers, explanation of EV tax incentives, and more.
- ▶ **[IRS Index of Qualified Manufacturers and Previously Owned Clean Vehicles:](#)**
Check for tax rebates for specific EV models.
- ▶ **[AAA Approved Auto Repair Facility Locator:](#)**
Find a quality service facility for your vehicle's maintenance and repairs.
- ▶ **[NHTSA Safety Issues & Recalls:](#)**
Check on safety issues for a vehicle you are interested in purchasing.