

# Is an EV For You? An Introduction to Electric Vehicles

## Plug into the Future: EVs are Revolutionizing Transportation

Buckle up, because the world of transportation is shifting gears! With over 2.5 million Electric Vehicles (EV) on US roads, dozens of new models expected to debut soon and billions of dollars being spent on public charging networks, the EV revolution has begun!

EVs are rapidly gaining traction, promising a cleaner, quieter, and more sustainable future. EVs run on electricity and can be charged at home or at public charging stations. They are typically cheaper to operate and maintain than gasoline-powered vehicles, they produce fewer emissions, are whisper quiet and can be fun to drive!

Let's delve into the promising world of EVs, exploring their benefits, drawbacks, and the potential they hold for our planet.

## Why Go Electric? Power Up Your Savings and the Planet with EVs

### Eco-Friendly:

EVs produce zero tailpipe emissions, significantly reducing air pollution and contributing to a healthier planet. They are many times more efficient than gas engine vehicles. Gas vehicles only use 16-25% of the energy they consume (most is wasted as heat) vs 87-91% used by EVs.

### Cost-Effective:

While EVs have a higher upfront cost, long-term savings on fuel and maintenance make them a competitive choice. Charging at home is cheaper than gas, and EVs require less frequent and less expensive repairs. Far fewer moving parts from simpler drivetrains that endure less thermal stress means EVs are subject to less wear and tear, fewer potential problems, less complicated repairs and expected greater longevity. EVs don't need oil changes, engine filter replacements, tune-ups or transmission services normally required for gas vehicles. EVs also don't have alternators, mufflers, catalytic converters, fuel pumps, pistons, serpentine or timing belts,

or spark plugs. Common EV maintenance items include tire rotations, brake pads (much less often), and windshield wiper blades.

EVs are much cheaper to fuel than gas vehicles. With the average residential rate of electricity in New Jersey at 17 cents/kWh, the average EV cost 4-6 cents/mile. At 24.5 MPG a gas car costs around 13 cents/mile (<https://gasprices.aaa.com/?state=NJ> 1/30/24). At 1,200 miles per month, a gas car will cost you nearly \$154 to fill up compared to the \$48-72 added to your electric bill to charge your EV - the savings are \$82 to \$106 per month or \$984 to \$1272 per year. (<https://dep.nj.gov/drivegreen/charging> with updated gas price).

### Performance:

EVs offer instant torque and smooth acceleration, providing a satisfying driving experience. They are also remarkably quiet, making for a more peaceful ride. They are often safer due to a lower center of gravity making them less likely to roll over.

## Challenges and Considerations - Potential Drawbacks of EVs

### Range Anxiety:

Currently, EVs have a shorter driving range than gas-powered vehicles, leading to "range anxiety" (the fear of running out of charge). Limited charging infrastructure in some areas can exacerbate this concern, but that is rapidly changing and investment in a nationwide charging infrastructure is underway via the Inflation Reduction Act (IRA).

The Joint Office of Energy and Transportation (Joint Office) is investing \$7.5 billion to build out a convenient and reliable national EV charging network where people live, work and shop.

The Tesla infrastructure has over 17,000 chargers in over 2,000 locations across the US. Nearly every large car manufacturer has signed on to implement

the Tesla NACS (North American Charging Standard) in their vehicles over the next few years.

EV range is more than enough for typical daily use in the U.S. EVs have sufficient range to cover a household's usual daily travel, which is approximately 50 miles on average per day. The majority of households (roughly 85%) travel under 100 miles a day. Most EV models go above 200 miles on a fully-charged battery, with nearly all new models traveling more than 100 miles on a single charge.



### Charging Time:

While fast charging technology is advancing, recharging an EV usually takes longer than filling up a gas tank. Charging while at work, shopping, dining and other activities will become more commonplace as the nationwide charging infrastructure expands.

## Upfront Cost:

The initial purchase price of EVs is generally higher than gas powered cars, although government tax credits and other incentives plus lower operating costs can bridge the gap over time.

Sales and use tax is exempt in New Jersey for the sale, rental or lease of new or used zero emission vehicles (ZEVs). This would be a savings of \$3,230 on the average cost of a new vehicle of \$48,759 vehicle (1/18/24 <https://www.kbb.com/car-advice/when-will-car-prices-drop/>)

The exemption is NOT applicable to partial zero emission vehicles, which includes hybrids and plug-in hybrids. Eligible vehicles list: <https://dep.nj.gov/drivegreen/sales-and-use-tax-exemption>

You should always consider total cost of ownership when considering a vehicle purchase, including purchase price, depreciation, insurance, financing, maintenance and repair, fuel/energy, sales tax, license, registration and incentives.

## Battery Life and Replacement:

EV batteries are designed to last for the expected life of the car and the likelihood of an EV needing a battery replacement is extremely small. Federal regulations require automakers to offer a powertrain warranty that covers the battery and most usually span 8 years or

100,000 miles. Advancements in battery technology and manufacturing volume have significantly decreased battery costs and they are expected to continue to decline.

## Home Charging:

Installing a home charging station provides daily charging convenience but can be costly and may require electrical upgrades. Electric vehicles can be plugged into the same type of outlet as your toaster! Many people can meet their driving needs by plugging in only at home. Most EVs can be charged with a standard 120 Volt (Level 1) outlet. To charge the vehicle more quickly, you can install a dedicated 240 Volt (Level 2) outlet or charging system. And for those who live in apartments or condominiums, EV charging stations are becoming a more common building amenity. Overnight charging at home means a “full tank” every morning.

## Taking the Wheel towards a Brighter Future

The transition to EVs is not without its challenges, but the potential benefits for our planet, our wallets, and our driving experience are undeniable. As technology continues to develop and charging infrastructure expands, EVs are poised to become the mainstream choice for a cleaner, greener future. So, plug into the possibilities and consider joining the electric revolution.

# EV FAQs – Frequently Asked Questions

## 1. How do electrified vehicles differ?

There are several types of EVs, each with individual characteristics. Factors that may influence a choice are driving patterns, access to charging, environmental concerns, and fuel efficiency. EVs are fully electric, plug-in hybrid electric vehicles offer a balance and hybrids provide a smoother transition from traditional vehicles to more sustainable options. EVs have all the advantages listed above attained by the lack of an ICE. Hybrids have electric motors and ICEs and the advantages and disadvantages of both (more maintenance and range).

### The main types include\*

#### \*Battery Electric Vehicles (BEV)

Run entirely on electric power stored in high-capacity batteries. They have no internal combustion engine (ICE) and produce zero emissions.

#### \*Plug-in Hybrid Electric Vehicles (PHEV)

Plug-in hybrid electric vehicles have both an electric motor and a gasoline engine. They have both a gas cap and a charging port and can be charged using an external power source. They

can operate in electric-only mode for shorter distances and switch to a gas car for longer trips. They may be an option to transition to electric if you have a long commute and no charging options at work.

#### \*Hybrid Electric Vehicles (HEV)

Hybrid electric vehicles use a combination of an internal combustion engine and an electric motor. They cannot be plugged in and rely on regenerative braking and power generated by the gas engine to charge the battery. They rely on both electric and gas power with limited electric-only driving at low speeds.

## 2. What's the best charger for an EV?

The best charger depends on your needs.

Level 1 chargers - standard home 120v outlets.

Level 2 chargers - faster charging with a dedicated charging station at home or a public charger.  
DC fast chargers - the fastest type of charging found only in public chargers, can be very useful for longer travel.

## 3. Do EVs cost more to run?

EVs generally cost less to run compared to traditional gasoline vehicles due to lower fuel and maintenance costs.



#### 4. Are EVs better or worse for the environment?

EVs produce fewer emissions than conventional vehicles, making them a more environmentally friendly option.

#### 5. What are the tax credits for EVs?

In the US, federal tax credits are available for new EV purchases that can reduce the cost of a qualifying EV by up to \$7,500 <https://fueleconomy.gov/feg/tax2023.shtml> . Incentives may also be available at the state/local level, plus there is no sales tax on EVs in New Jersey - see more info above under Challenges and Considerations/Upfront Cost.

#### 6. How long does it take to charge an EV?

Charging time can vary from 30 minutes to 12 hours or more depending on the type of charger used and the EV's battery capacity.

#### 7. What's an EV like to drive?

EVs are known for their quick acceleration and smooth, quiet ride.

#### 8. Does temperature affect an EV's range?

Yes, extreme temperatures can affect the battery performance and range of an EV. Estimates for cold weather reduction of EV range are typically 20-25%. In Norway, winter temperatures average 19 degrees and can reach -40, however, EVs represent nearly 1 in 4 vehicles on the road and over 80% of new purchases in 2023.

#### 9. What if you run out of charge?

Running out of charge can be inconvenient, but planning your route with charging stations in mind and keeping an eye on the battery level can help avoid this situation. EV charging apps are available in cars and smartphones. Provided by EV automakers, charging networks and third parties, these apps offer several convenient features for trip planning and locating and paying for charging stations.

#### 10. Is now a good time to buy an EV?

With advancements in technology, expanding charging infrastructure, and increasing government incentives, now is a great time to consider going electric.

#### 11. Are EVs more expensive to repair?

Despite some horror stories, there are no data so far that EVs overall are a lot more expensive to fix than gas vehicles that are comparable in age and price. There is evidence, however, that the average cost for EV crash repairs is a bit higher, and data also show that individual EV models and brands vary a lot, just as with gas vehicles. <sup>\*</sup>(cars.com)

The Highway Loss Data Institute (HDLI), a research group for the vehicle insurance industry, did not find EVs to be excessively more expensive to repair than gas vehicles. What the research found was that repair claims were higher for the EV versions, but only by about 2% more than their gasoline counterparts. The study also showed much lower "claims frequency" — the number of reported collisions. EV crash claims were 19% lower than the gas-powered versions.

#### 12. Are EVs more expensive to insure?

EVs may be more expensive to insure if the EV has a higher sticker price versus a comparable gasoline vehicle, as well as the technology features on most EVs and a need for more shops to be qualified to repair them. <https://www.cars.com/articles/do-evs-cost-more-to-repair-475432/>

However, EV tech has come down in cost — EV battery pack costs decreased nearly 90% from 2008 to 2022, according to the Department of Energy (DOE) and it predicts average EV rates will be comparable to gas vehicles as EVs become more popular. <https://www.energy.gov/eere/vehicles/articles/fotw-1272-january-9-2023-electric-vehicle-battery-pack-costs-2022-are-nearly>

You should always consider total cost of ownership when considering a vehicle purchase, and check with your current insurance provider when investigating EVs to minimize surprises. But keep in mind a new vehicle's insurance will be more than an older car model.

#### 13. Are EV sales slowing in favor of Hybrid EVs?

U.S sales of full hybrids increased 53% year-over-year in 2023, slightly higher than the 51% increase in combined deliveries of EVs and plug-in electric vehicles. However, with 19 additional mainstream-brand BEVs slated to hit the market this year, sales of electric-only vehicles are expected to overtake hybrids in 2024. <https://wardsintelligence.informa.com/WI967602/US-Sales-of-Full-Hybrids-Widen-Lead-on-BEVs-in-2023-PHEVs-up-103-in-December>

#### 14. Is disposal of old EV batteries an environmental concern?

The majority of EV battery components can be recycled. Lithium is a major component in Li-ion batteries and there is already a great demand for recycled lithium for cell phones, laptops and other electronic products. Additionally, the market for battery reuse is increasing for energy storage for home and electric grid applications.

Under the Bipartisan Infrastructure Law for electric drive vehicle battery recycling and second life applications the DOE has awarded \$111 million to advance technologies and processes for EV battery recycling and reuse and reduce the costs associated with transporting, dismantling, and preprocessing end-of-life electric drive vehicle batteries for recycling; and recycling of plastic and polymer electric drive battery accessory components.



### 15. Are EVs worse for the climate than gasoline cars because of battery manufacturing?

The greenhouse gas (GHG) emissions associated with an EV over its lifetime are typically lower than those from an average gasoline-powered vehicle, even when accounting for manufacturing. Some studies have shown that making an EV can create more carbon pollution than making a gasoline car. This is because of the additional energy required to manufacture an EV's battery. Still, over the lifetime of the vehicle, total GHG emissions associated with manufacturing, charging, and driving an EV are lower than the total GHGs associated with a gasoline car. That's because EVs have zero tailpipe emissions and are therefore responsible for significantly fewer GHGs during operation.

### 16. Will the increase in EVs collapse the U.S. power grid?

Increasing numbers of EVs will lead to increased electricity demand, but EVs have charging strategies that can prevent overloading the grid. EVs can be charged at off-peak times, such as overnight, when rates are often cheaper. Even with a mix of charging times (so not all nighttime charging), research indicates that sufficient capacity will exist to cover EVs entering the market in the coming years.

California leads the country with more than 1 million electric vehicles and EV charging currently makes up less than 1% of the state's grid total load, even during peak hours.

Long term, higher electricity demand from EV growth may drive the need for upgrades to transmission and distribution infrastructure. Planning for this possibility is underway. The Department of Energy's (DOE) Build a Better Grid Initiative, launched as part of the Bipartisan Infrastructure Law, will provide over \$13 billion towards improving the reliability and efficiency of the grid over the next decade.

### 17. Can You Use Solar Energy to Power Your Electric Vehicle (EV)?

If you're looking to reduce your carbon footprint, save money, and embrace clean energy, owning an EV and harnessing the power of solar energy for your home is a brilliant combination. Not only will you be driving on sunshine, but you'll also make a positive impact on the environment and your wallet. Installing solar panels on the roof of a private home can reduce the cost of charging to near zero (for those who mostly home-charge their EVs). (<https://njsolarpower.com/can-you-use-solar-energy-to-power-your-electric-vehicle-ev/>)

---

SEE FOLLOWING PAGE FOR LINKS TO MORE INFORMATION



## More Information:

### Disclaimer for External Links

These links are being provided as a convenience and for informational purposes only; they do not constitute an endorsement or an approval by Marlboro Township of any of the products, services or opinions of the corporation or organization or individual. Marlboro Township bears no responsibility for the accuracy, legality or content of the external site or for that of subsequent links. Contact the external site for answers to questions regarding its content.

Drive green New Jersey <https://dep.nj.gov/drivegreen/>

Joint Office of Energy and Transportation <https://driveelectric.gov/>

EPA <https://www.epa.gov/greenvehicles>

IRS.gov Internal Revenue Service Credits for new clean vehicles purchased in 2023 or after  
<https://www.irs.gov/credits-deductions/credits-for-new-clean-vehicles-purchased-in-2023-or-after>

National Highway Traffic Safety Administration (NHTSA) <https://www.nhtsa.gov/vehicle-safety/electric-and-hybrid-vehicles>

AAA.com EV Consumer Survey and Green Car Guide  
<https://www.aaa.com/autorepair/articles/ev-consumer-survey-and-green-car-guide>

Edmunds.com Edmunds EV Hub <https://www.aaa.com/autorepair/articles/ev-consumer-survey-and-green-car-guide>

Usnews.com Pros and Cons of Electric Cars <https://cars.usnews.com/cars-trucks/advice/pros-and-cons-electric-cars?slide=29>

Insideevs.com EV Education Features <https://insideevs.com/features/category/ev-education/>

FindMyElectric Used Tesla & Electric Cars for Sale <https://www.findmyelectric.com/>

Hybrid and Electric Car News, Reviews and Buying Guides <https://www.greencarreports.com/>

Drive Electric Earth Day <https://driveelectricearthday.org/>

Driveelectricus.com why-drive-electric? <https://driveelectricus.com/why-drive-electric/>

Pluginamerica.org Plug into the electric vehicle revolution! <https://pluginamerica.org/>

Consumerreports.org electric cars 101 the answers to all your ev questions  
<https://www.consumerreports.org/cars/hybrids-evs/electric-cars-101-the-answers-to-all-your-ev-questions-a7130554728/>

Motortrend.com You're Being Lied to About Electric Cars  
<https://www.motortrend.com/features/truth-about-electric-cars-ad-why-you-are-being-lied-to/>

Forbes.com The Road To Mass EV Adoption: Three Barriers To A Sustainable Future  
<https://www.forbes.com/sites/forbestechcouncil/2023/08/30/the-road-to-mass-ev-adoption-three-barriers-to-a-sustainable-future/?sh=304194ea2293>

Axios.com The barriers to an EV revolution <https://www.axios.com/2022/08/01/electric-vehicle-adoption-barrier>

Evchargingsummit.com Barriers To Widespread EV Adoption <https://evchargingsummit.com/blog/barriers-to-widespread-ev-adoption/>