

Electric-Car-Insider.com

# Electric Car

I N S I D E R

## ELECTRIC VEHICLE BASICS



### Electric Vehicle Reference

ESSENTIAL CONCEPTS

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Range, Refueling, Incentives

EV  
Basics

BY CHRISTOPHER ALAN

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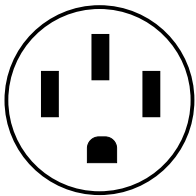


114 - 520 miles

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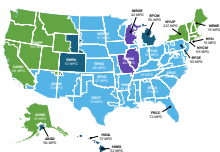
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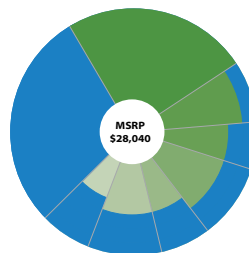
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# Electric Car Cost Savings

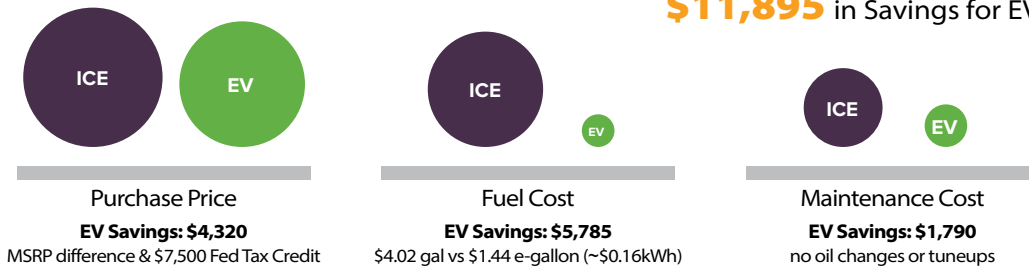
## Total Cost of Ownership - EV vs ICE

A cost of ownership comparison between two cars with similar performance, an electric car (EV) and a gasoline car (ICE), over 5 years shows:

### BMW 330i vs Tesla Model 3



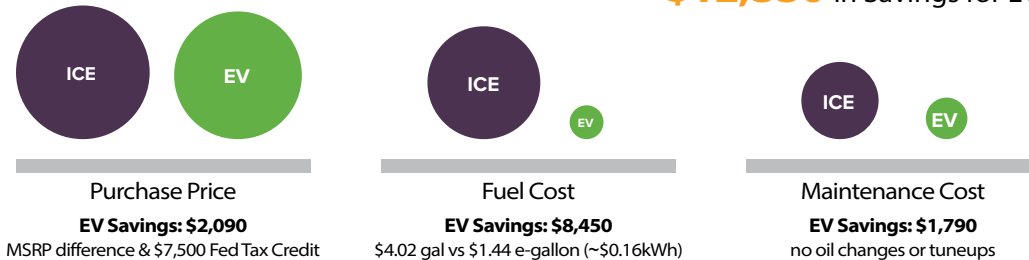
**\$11,895** in Savings for EV



### Ford Mustang GT vs Ford Mustang Mach-E



**\$12,330** in Savings for EV



Fuel and electricity prices based on USA averages in January 2023 using 12,000 annual miles driven.



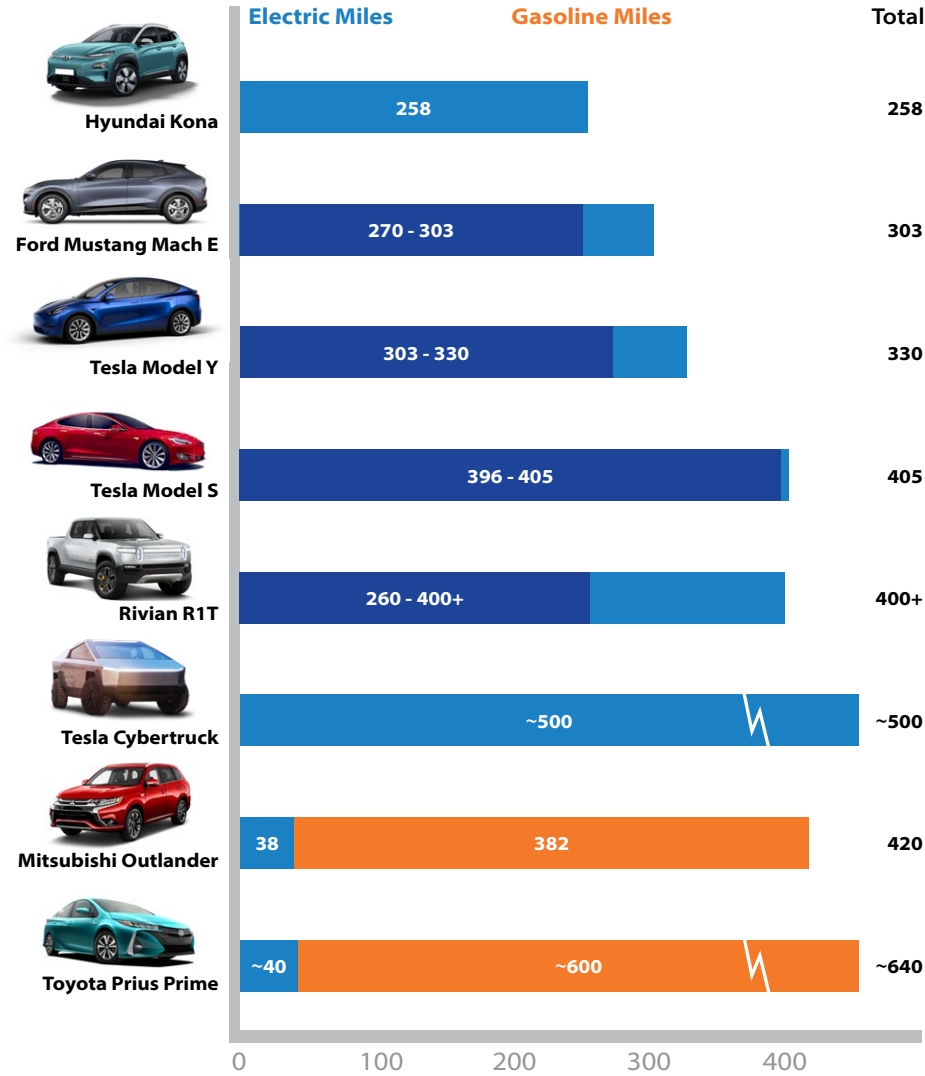
Electric cars provide substantial monthly operating cost savings. Discounts, tax credits and rebates may also make acquisition costs lower.

# How Far Can an EV Drive?

## Plug-in Hybrid and Electric Vehicle Range

Battery Electric Vehicles use electricity for all miles of travel. The electricity can be from standard 120V or 240V AC house circuits, 3-phase 208V commercial circuits or 200-800VDC Fast Charge public chargers. Most charging is AC, overnight, at home.

### Range in Miles



Plug-in Hybrid Vehicles use “mains” electricity for the first 17-42 miles of travel and then automatically switch over to the gasoline engine. PHEVs offer gasoline refueling for longer trips, with the environmental and cost saving benefits of EVs for most in-town driving. Each Plug-in Hybrid offers a different mix of electric and gasoline ranges.



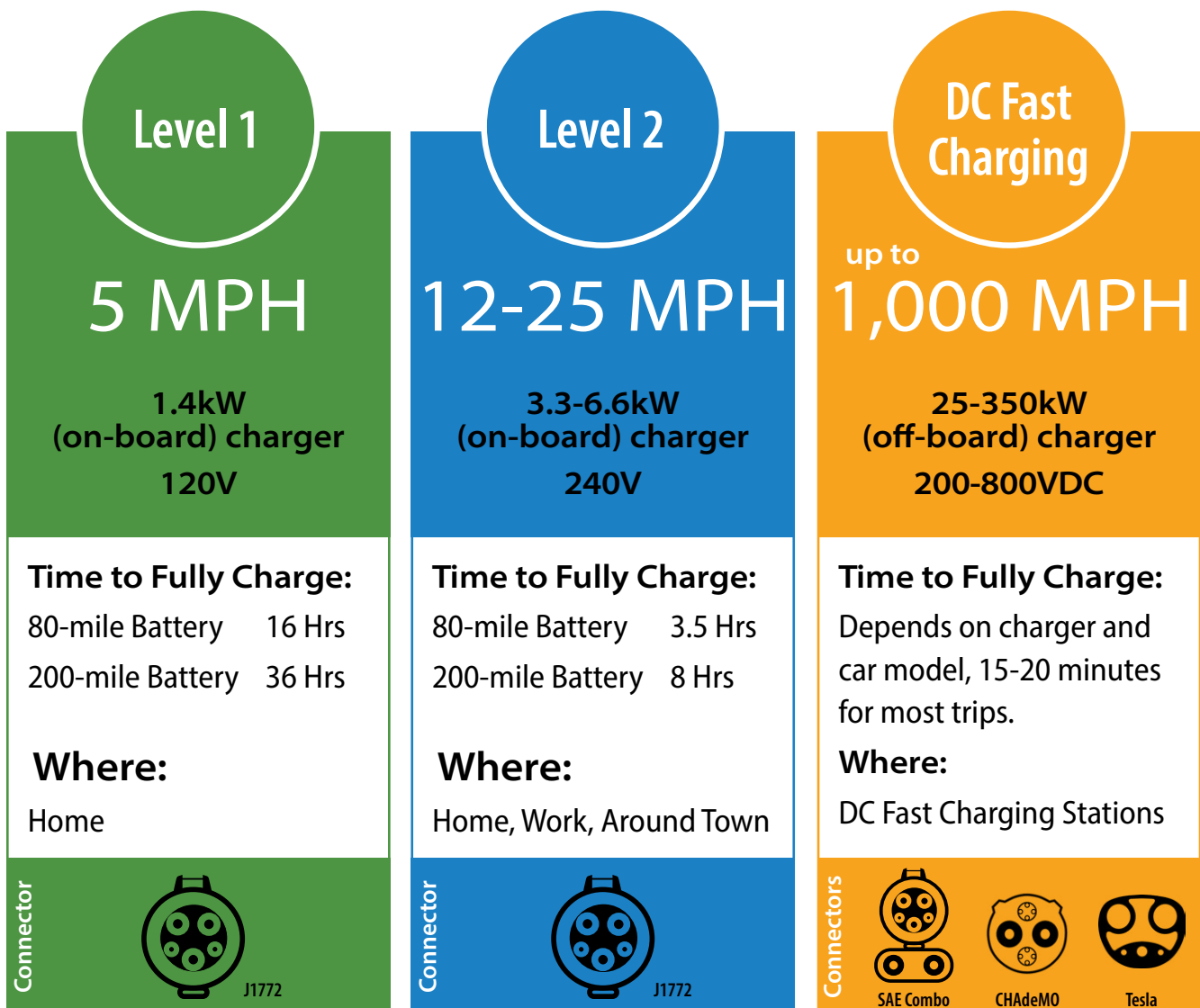
Each automaker offers a slightly different mix of electric and gasoline ranges.

# Charging Basics

## Charging Levels

Charging is subdivided into 3 levels based on the amount of power available in the circuit, which in turn affects how quickly your EV will recharge its batteries.

- Level 1 uses 120V ordinary house current.
- Level 2 uses a higher powered 240V circuit, like your clothes dryer.
- DC Fast Charge uses dedicated, high-powered 200-800VDC circuits. It is found exclusively at Fast Charging stations.



All ranges and times given are estimates and vary based on many factors including specific chargers and car models.



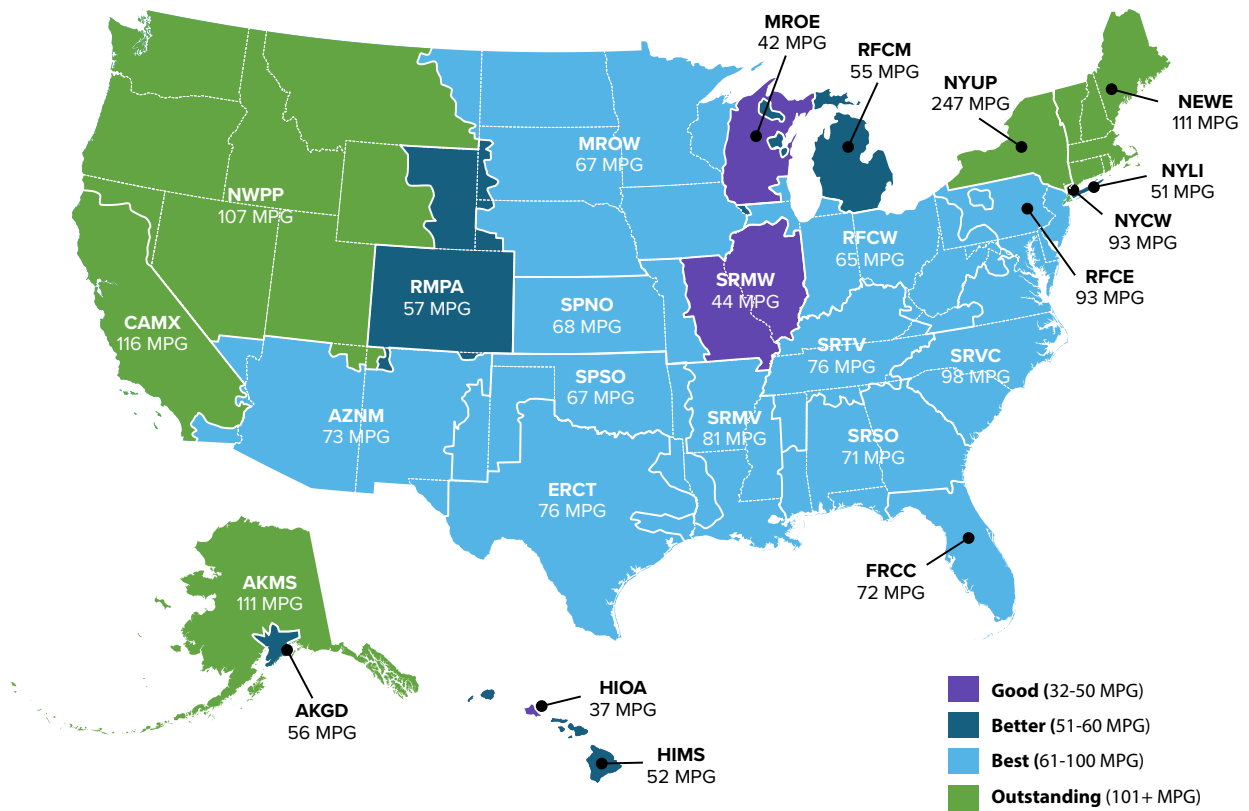
# MPH

**Miles Per Hour:** Miles of range a charging station provides

# How Green are Electric Cars?

## Environmental Impacts of EVs in the US

For 97% of drivers in the US, driving on electricity is cleaner than driving on a 50 MPG gasoline car. Data from the US EPA on power plant greenhouse gas emissions shows that on average, an EV is equivalent to a conventional gasoline car that gets 91 MPG.



US Average (EV sales-weighted): 91 MPG  
2022 Union of Concerned Scientists map

## Positive Impacts of EVs Include

- Zero tailpipe emissions
- More energy efficient
- On average, well-to-wheel emissions are half that of a conventional gas car
- As the electricity grid continues to reduce emissions, EVs that plug into the grid become cleaner too

Driving electric vehicles is part of the solution to address climate change.

\*Source: Union of Concerned Scientists Report, 2022



In the US, on average, an electric car is equivalent to a conventional gasoline car that gets 91 miles per gallon.

# Charging Basics

## Home and Public Charging Options

EV  
Basics

BY CHRISTOPHER ALAN

### EV Charging Options

Over 130,000 public charging stations are available nationwide to extend the range of EVs, but realistically, unless you drive more than 80 miles a day, your home is your fuel stop. Charge overnight, and your car is ready to go in the morning.

Although it's possible to charge EVs with the standard 120v cord that comes with the car, it takes longer than you sleep. At 120v, it will take longer than the time-of-use off-peak discount some utilities offer. The Kia Niro and Hyundai Kona, for example, take about 20 hours to charge from empty to full at 120v.

Most EV drivers purchase 240v charge stations, usually referred to as "Level 2" chargers, which can charge the Kia Niro or Hyundai Kona from empty to full in just 6-7 hours.

Almost all modern Battery Electric Vehicles, with the exception of older EVs and most PHEVs, can also use a DC Fast Charger that can fill the battery to 80% within 15-30 minutes. These are found only at retail and commercial sites that have 480v industrial power supplies.



### HOME CHARGING

There are a couple of things that can make the installation of a 240v home charger quicker, cheaper and more functional.

One of the things that will most influence the cost is whether your charger is a dedicated installation requiring an electrician and permit, or if it can be simply plugged into an available 240v outlet, like an unused washing machine or dryer receptacle.

Professional installations, which will run dedicated wiring to your charge port, generally run between \$500 - \$1,700. A electrical code compliance inspection typically ranges from \$10 to \$100. The cost of a permit for a 240v receptacle, used with a plug-style charge station, may be less expensive.

Cord lengths vary from 16-25 ft, be sure to check your requirements before ordering. Most chargers come with a holster that keeps the J1772 plug secure and the cable neat when not in use.

Evo Charge sells an electric vehicle charging station that has a retractable reel which helps keep the cable tidy.

### PUBLIC CHARGING

The appearance of orange pins on charge station software like PlugShare, signifying Fast Charge Stations, are the equivalent of being notified of range boost. The radius of travel just got larger. An EV driver can now easily drive from downtown to the edge of the metro area and back again with just a 30-minute stop at one of the fast charge stations, usually located at major malls. Charging sessions that would require a 2-4 hour stop at a Level 2 240v station can be done in 15-30 minutes at a DC Fast Charge station.

In Southern California, a resident of San Bernardino or Riverside county could easily drive to the LA city center and do whatever business or errands are on the agenda. With less time than it takes to eat lunch, they'll be charged and back on the road home. Even a weekend trip from LA to Santa Barbara can be negotiated with just a single stop in Thousand Oaks, Camarillo or Ventura.

When a charge session can be used to accomplish other tasks, the wait is no inconvenience.

# EV Educational Resources

Supporting EV Adoption from Awareness to Advocacy

## Electric Car INSIDER

### EV & EVSE Buyers Guides



Comprehensive, full page profiles of the best EVs and EV chargers.

### Electric Car Guest Drive



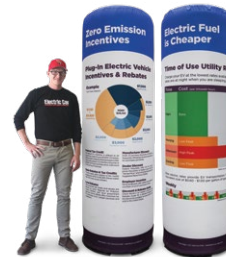
Test drive the latest electric cars and learn from EV owners at a no-pressure social event.

### Discount Pricing Guide



The app that can save you thousands of dollars on EV and EVSE purchases. Customizable for utilities and AQMDs.

### Educational Pillars



Large scale interactive exhibits for indoor and outdoor events.

### Mobile EVSE Classroom



Turn-key electric vehicle charger exhibit with commercial and residential demo units.

### EV Navigator



Online, interactive app to guide prospective EV drivers on the path to ownership and advocacy.

ECI creates electric vehicle educational resources for utilities, AQMDs, automakers and EVSE manufacturers, integrators and installers.