



# CLEAN CARS FOR ALL



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## ELECTRIC VEHICLES

This resource includes information about

1. Hybrid Electric Vehicles (HEVs)
2. Plug-in Hybrid Electric Vehicles (PHEVs)
3. Battery Electric Vehicles (BEVs)
4. Hydrogen Fuel Cell Electric Vehicle (FCEVs)

### Hybrid Electric



Gas



Battery

### Plug-in Hybrid



Gas



Battery



Plug-in

### Battery Electric



Battery



Plug-in

### Hydrogen Fuel Cell



Battery



Hydrogen  
Fuel



# HYBRID ELECTRIC VEHICLES

Hybrid electric vehicles (HEVs) are powered by a gasoline engine and an electric motor, which runs on energy stored in batteries. Together, these features result in better fuel economy and high performing vehicles.



## Do I need to charge a hybrid?

Conventional HEVs do not need to be plugged in to recharge. Instead, the vehicle uses regenerative braking and the internal combustion engine to charge the battery.

## What is the fuel mileage?

Although fuel economy will vary depending on make and model, HEVs typically get better fuel economy than comparable gas-powered vehicles.

## What should I know about HEV maintenance?

HEVs require the same general maintenance as conventional vehicles.

## Do HEVs come with a battery warranty?

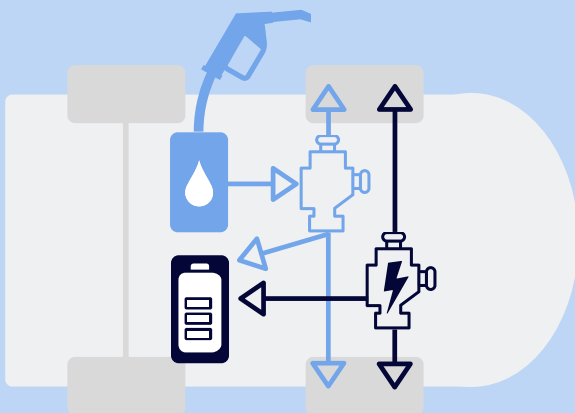
Just like a BEVs, HEV batteries are designed to last the expected lifetime of the vehicle. Make sure you compare battery warranties, so you can select a vehicle that meets your needs.

## How many models are there to choose from?

There are numerous types of HEV models available in the marketplace today. To find out more on what types are available, visit [www.hybridcars.com/top-hybrid-cars-list/](http://www.hybridcars.com/top-hybrid-cars-list/).

\*HEVs are only available for residents in some zip codes.

## HOW DOES A HYBRID RECHARGE?



HEVs capture energy normally lost during braking by using the electric motor as a generator and storing the captured energy in the battery. The energy from the battery provides extra power during acceleration. Most HEVs are much quieter and feel less strained than their equivalent gas-only models in most situations. To find out more, visit: [https://afdc.energy.gov/vehicles/electric\\_basics\\_hev.html](https://afdc.energy.gov/vehicles/electric_basics_hev.html)

# PLUG-IN HYBRID ELECTRIC VEHICLES

Plug-in Hybrid Electric Vehicles (PHEV) combine the benefits of a gasoline-powered engine and an electric motor. You can charge a plug-in hybrid's battery by connecting it to an outlet and you can fill up with gasoline. PHEVs run in the all-electric mode until the battery is depleted, then converts over to the gas engine.



## What is the driving range and cost of PHEVs?

PHEVs can have a total range of up to 500+ miles. The battery can have a range of up to 50 miles, with an extended range that runs on powered by gas.

PHEV charging costs depend on the vehicle's battery size, which is generally much smaller than a BEV battery. The cost to charge an electric vehicle can be calculated by multiplying the kWh battery size by the number of cents per kWh you are charged. To learn more about vehicle charging costs, programs and special time-of-use (TOU) rates, please contact your local utility.

## What should I know about PHEV Vehicle Maintenance?

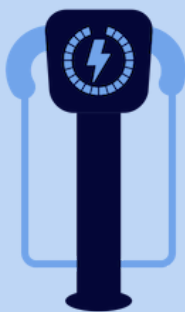
PHEVs require the same general maintenance as conventional vehicles. PHEVs also offer regenerative braking that uses the motor to slow the vehicle rather than only using the brake pads, extending the brake system lifespan and significantly reducing brake wear. Braking energy is also transferred to the battery to extend the driving range.

## Do PHEVs come with a Battery Warranty?

Yes, most PHEV manufacturers offer warranty options that cover the battery.

## How many models are there to choose from?

There are numerous types of PHEVs, ranging from sedans to SUVs. To explore available PHEVs, please visit: [pluginamerica.org/vehicles/](https://pluginamerica.org/vehicles/).



You can charge a plug-in hybrid's battery by connecting it to an outlet and you can fill up with gasoline.



# BATTERY ELECTRIC VEHICLES

Battery electric vehicles (BEVs) are all electric and have no tailpipe emissions, which helps our air quality and promotes better health. In California, it costs roughly one-half the price to charge a BEV compared to fueling a standard gasoline-powered vehicle to drive the same distance.\*



## What is the driving range and cost of BEVs?

Driving range is determined by vehicle battery size and individual driving patterns. In general, BEVs have an average driving range between 60-200+ miles.

Electric vehicle charging costs depend on the vehicle's battery size. The cost to charge an electric vehicle can be calculated by multiplying the kWh battery size by the number of cents per kWh you are charged. To learn more about vehicle charging costs, programs and special time-of-use (TOU) rates, contact your local utility.

## Do BEVs come with a Battery Warranty?

Typically, BEVs come with a manufacturer's battery warranty of 8 years/100,000 miles.\*\*

## What should I know about BEV Vehicle Maintenance?

BEVs do not require oil changes, smog checks, or upkeep of the transmission, filters and belts. They have simpler mechanics than a gas vehicle and maintenance usually consists of basic tire rotations. BEVs also offer regenerative braking that uses the motor to slow the vehicle rather than only using the brake pads, extending the brake system lifespan and significantly reducing brake wear. Braking energy is also transferred to the battery to extend the driving range.

## How many models are there to choose from?

There are numerous types of battery electric vehicles, ranging from sedans to SUVs. To explore available BEVs, please visit: [pluginamerica.org/vehicles/](http://pluginamerica.org/vehicles/).

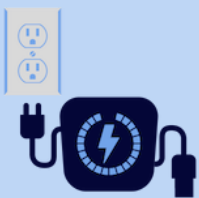
\* Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, Saving on Fuel and Vehicle Costs

\*\* Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, Fact #913

## HOW DO I CHARGE A BEV?

### Level 1

Provides power using a standard 120-volt household outlet. Most plug-in hybrids and battery electric vehicles come with a level 1 charging cord.



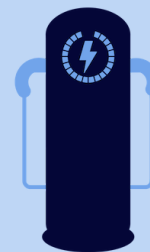
### Level 2

Uses 208-240 volts, found at public charging stations, or you can install a level 2 charging station in your garage or outside your home.



### DC Fast

Is much faster and can charge up to 80% of battery capacity in about 30 minutes. Charging locations tend to be close to major highways.



# HYDROGEN FUEL CELL VEHICLES

Hydrogen Fuel Cell Electric Vehicles (FCEVs) are similar to EVs in that they use an electric motor instead of an internal combustion engine. However, while EVs run on batteries that must be plugged in to recharge, FCEVs effectively have their own efficient power plant on board: the hydrogen fuel cell.



## What is the driving range and price of a FCEV?

A full hydrogen tank will last over 300 miles, depending on the make and model.

## How many FCEVs are available in California?

There are currently three FCEVs models of available in 2020: Honda Clarity, Hyundai Nexu, and Toyota Mirai.

## How much does it cost to fuel a FCEV?

Currently, a kg of hydrogen costs between \$10 and \$17 at California hydrogen stations, which equals about \$5 to \$8.50 per gallon of gasoline, however, most manufacturers include free hydrogen fuel for several years when selling FCVs.

## How are FCEVs better for the environment?

Like BEVs, FCEVs are zero-emission vehicles – they have no smog-related or greenhouse gas tailpipe emissions. Emissions are created in the process of producing and transporting hydrogen fuel.

## How renewable is hydrogen gas?

All fuels create some form of pollution. In California, at least 33% of all hydrogen used for transportation is generated from renewable resources, since that is required as part of the fueling station development process.

## How do I refuel my FCEV?

Refueling a FCV is actually very similar to fueling a gasoline or diesel vehicle, with only slight differences.

You can fill your FCEV with hydrogen gas at one of the 15 hydrogen fueling stations in the Bay Area. However, outside of this region, the number of fueling stations decreases significantly.

Fueling station locations are available here:

[www.ca-fcp.org/stationmap](http://www.ca-fcp.org/stationmap)

