

# ELECTRIC



Electricity can be used to power plug-in electric vehicles (PEVs), including all-electric vehicles and plug-in hybrid electric vehicles. These vehicles can draw electricity directly from the grid and other off-board electrical power sources and store it in batteries. In contrast, hybrid electric vehicles are fueled with liquid fuels, like gasoline, but use batteries to recapture energy otherwise lost during braking (ultimately boosting fuel economy). Hybrid and plug-in electric vehicles can help increase energy security, improve fuel economy, lower fuel costs, and reduce emissions.

## ELECTRIC BASICS:

Electricity is considered an alternative fuel under the Energy Policy Act of 1992. Electricity can be produced from a variety of energy sources, including oil, coal, nuclear energy, hydropower, natural gas, wind energy, solar energy, and stored hydrogen. Plug-in electric vehicles (PEVs)—the collective term for plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs)—are capable of drawing electricity from off-board electrical power sources (generally the electricity grid) and storing it in batteries. Though not yet widely available, fuel cell vehicles use hydrogen to generate electricity onboard the vehicle.



## MORE INFORMATION ON ELECTRIC:

### Powering Vehicles with Electricity

Fueling PEVs with electricity is currently cost effective compared to using gasoline, but PEVs typically cost more to purchase. However, initial vehicle costs can be offset by fuel cost savings, a federal tax credit, and state incentives. Electricity for charging vehicles is especially cost effective if drivers are able to take advantage of off-peak residential rates offered by many utilities. Electricity costs can vary by region, type of generation, time of use, and access point.

### Electric Charging Stations

Many PEV owners choose to do the majority of their charging at home (or at fleet facilities, in the case of commercially owned fleets). Some employers offer access to charging at the workplace. In many cities, PEV drivers also have access to public charging stations in a variety of places, such as shopping centers, public parking garages and lots, hotels, and businesses. Charging infrastructure is rapidly expanding, providing drivers with the convenience, range, and confidence to meet more of their transportation needs with PEVs.

## ELECTRIC BENEFITS:

### Energy Security

- Supports the U.S. economy and helps diversify the U.S. transportation fleet, as well as reduce the impact of international supply disruption
- Hybrid electric vehicles (HEVs) typically use less fuel because they employ electric-drive technologies to boost efficiency
- Plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs) are both capable of being powered solely by electricity, which is produced in the U.S. from natural gas, coal, nuclear energy, and renewable resources

### Fuel Economy

- HEVs typically achieve better fuel economy and have lower fuel costs than similar conventional vehicles
- PHEVs and EVs can reduce fuel costs dramatically because of the high efficiency of electric-drive component
- The fuel economy of medium- and heavy-duty PHEVs and EVs is highly dependent on the load carried and the duty cycle, but they can maintain a strong fuel-to-cost advantage over their conventional counterparts

### Batteries

- The advanced batteries in plug-in electric vehicles are designed for extended life, but several manufacturers of plug-in vehicles are offering 8-year/100,000-mile battery warranties

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### Emissions

- EVs produce zero tailpipe emissions
- PHEVs produce no tailpipe emissions when in all-electric mode
- The life cycle emissions of an EV or PHEV depend on the sources of electricity used to charge it, which vary by region. In geographic areas that use relatively low-polluting energy sources for electricity production, plug-in vehicles typically have a life cycle emissions advantage over similar conventional vehicles running on gasoline or diesel

### Infrastructure Availability

- PHEVs and EVs have the benefit of flexible fueling
- PHEVs have added flexibility, because they can also refuel with gasoline or diesel (or possibly other fuels in the future) when necessary
- There is a national network of public charging stations



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