



## NUTS AND BOLTS OF PLUG-IN HYBRID ELECTRIC VEHICLES

For drivers with long commutes or who take frequent trips, a battery electric vehicle (BEV) may not provide the desired range, but a plug-in hybrid electric vehicle (PHEV) offers an alternative. PHEVs use an electric motor and a battery to drive about 12-50 miles on electricity but also have a gas-powered engine to increase driving range.

### What are the advantages of PHEVs?

- They offer the benefits of electric power, but the gasoline engine can help out when needed.
- Compared to gasoline vehicles, they offer better fuel economy (less gas burned) and lower fuel costs (because electricity is cheaper than gas).
- Because less gas is burned, PHEVs reduce our dependence on oil and emit fewer greenhouse gases than gasoline vehicles.
- PHEVs may qualify for the federal tax credit of up to \$7,500. The amount depends on the vehicle, manufacturer and your tax liability. There may be additional benefits offered by your state, city or cooperative, such as rebates, cheaper electric rates, and special parking spots and driving lanes.



## What are the disadvantages of PHEVs?

- Because they have both electric and gasoline components, PHEVs have a more complex design than BEVs.
- Maintenance is required on both systems. Gas engines require oil changes and the same checks that conventional gas engines need. And while the electric components (battery, electric motor and electronics) require less maintenance than gas-powered engines, some is required.
- Having both a combustion engine and battery pack takes up space and adds weight.

## How are PHEVs charged?

Just as with a BEV, the battery in a PHEV needs to be charged. There are several levels of charging. How often you charge and where you plug in depend on how far you drive and the charging method.

- Level 1: A standard 120-volt home receptacle on a dedicated circuit will provide three to five miles of driving range for every hour of charging.
- Level 2: A 240-volt connection will provide 10 to 20 miles of range for every hour of charging. Note that this connection must be installed by an electrician who understands PHEVs. Some public areas and workplaces also offer Level 2 charging stations.
- DC Fast Charge: DC fast charging, the quickest level of charging, can be used by many BEVs but is not compatible with most PHEVs.

## How safe is charging electric vehicles?

Safety features are built into PHEVs and charging equipment. The charging cable is not live while you handle it, but only when it is connected to the vehicle. The charger senses that the connection is properly made before the electric current is turned on. Also, the charger has a ground-fault interrupter (GFI). To prevent shocks, charging stops immediately if leakage of even a few milliamps of current occurs.

## What is next?

With technology improving rapidly, the future of all types of electric vehicles is bright. Look for:

- Batteries that provide extended driving ranges, which should decrease the amount of gas used by PHEVs.
- Faster charging stations in more locations, including workplaces, shopping areas and gas stations.
- More competition between auto manufacturers to produce electric vehicles, possibly at lower prices.

## How can my electric cooperative help me?

- When considering an electric vehicle, reach out to your electric cooperative to talk with them about your purchase and any rebates or programs they offer.
- Because utilities, including your cooperative, often have excess capacity at night and during other periods of lower electricity demand, electricity is cheaper at those times, and some cooperatives offer special electric rates.
- Some cooperatives offer incentives for or assistance with installing a home charger to ensure the process is done correctly and safely.

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