



# NUTS AND BOLTS OF PLUG-IN HYBRID ELECTRIC VEHICLES



*As your Touchstone Energy® cooperative, we want to be your source for energy and information. Since electric vehicles (EVs) are becoming more mainstream, we put together a variety of fact sheets and information to help answer questions you might have.*

*Contact us for more information about EVs.*

For drivers with long commutes or who take frequent road trips, a battery electric vehicle (BEV) may not provide the desired range. A plug-in hybrid electric vehicle (PHEV) offers an alternative. PHEVs use an electric motor and a battery to drive about 20-50 miles on electricity but also have a gasoline engine that can be used as backup.

## **Is a PHEV more expensive than a gas-powered vehicle?**

The answer is both “yes” and “no.” The initial purchase price of a PHEV may be higher than a similar gasoline vehicle (though look out for tax credits, rebates and other incentives), but PHEVs cost less to operate because driving on electricity is cheaper than driving on gasoline.

## **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).
- With less gas 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 you'll receive depends on several factors, including how the vehicle is built, its cost, your income and more. There is an additional federal tax credit worth up to \$4,000 for used PHEVs. There may be other 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. Although the electric elements (battery, electric motor and electronics) demand minimal maintenance, gas engines require oil changes and the same checks that conventional gas engines need.
- 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:** Level 2 charging, which can be installed at home or found in public settings, will provide 12 to 60 miles of range for every hour of charging.
- **DC Fast Charge:** DC Fast Charging, the quickest level of charging, is not compatible with most PHEVs.



## How safe is charging a PHEV?

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 popular destinations.
- More competition between auto manufacturers to produce electric models, possibly at lower prices.

## How can my electric cooperative help me?

- When considering a PHEV, reach out to your electric cooperative to talk 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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