


connected to electric vehicles



The ABCs of plug-in EVs

Whether you want to go green for money or Mother Nature, plug-in electric vehicles can help you do both.

They cost less to drive, reduce harmful emissions and tap a growing renewable energy network. No wonder plug-in vehicles are gaining ground on cars that run on gasoline.

When you're in the market to buy a vehicle for yourself or your business, here are some of the basics and benefits to consider. 

Two types of plug-in vehicles

Plug-in vehicles - both fully electric and hybrid models - are made by most major auto manufacturers.

- **All-electric vehicles, often called EVs,** run on electricity only. The motor is powered by electric energy that is stored in a battery. EVs plug into standard outlets or special charging units. EVs are considered to be zero-emission vehicles because they don't have exhaust pipes.
- **Plug-in hybrid electric vehicles, called PHEVs,** generally have smaller batteries than those in fully electric vehicles because the electric motor is assisted by an internal combustion engine that uses gasoline. Like all-electric vehicles, PHEVs plug into standard outlets or special charging units. By contrast, conventional hybrids *don't* plug in.



No more trips to the gas station. Just plug in, charge up and go.

Saving money

Incentives and tax credits may be available to lower the initial cost of a plug-in vehicle. To compare models, incentives and savings, check out:

- **GoElectricDrive.com,** hosted by the Electric Drive Transportation Association.
- **California's "DriveClean Buying Guide"** at *DriveClean.ca.gov*.
- **Alternative Fuels and Advanced Vehicles Data Center,** U.S. Department of Energy, at *AFDC.energy.gov/afdc/vehicles*.
- **Fuel economy comparisons** for all types of cars posted by the U.S. government at *fuelconomy.gov*.

By using electricity instead of gasoline, you can save about 75% in fuel costs with the help of SDG&E's **residential electric vehicle time-of-use (TOU) electric rates.** These rates (EV-TOU and EV-TOU-2) are lower when you program your plug-in vehicle to charge during off-peak hours.¹ Demand for electricity is typically low during these off-peak periods late at night and early in the morning. If your plug-in vehicle uses 0.25 kilowatt-hours (kWh) of electricity per mile, for example, it costs about 3 to 4 cents per mile with off-peak charging. For a comparable car that runs only on gasoline and gets 25 to 33 mpg, it costs 12 to 16 cents per mile at \$4.00 per gallon.

You can chart such price differences in the U.S. Department of Energy graph titled "Comparing Energy Costs per Mile for Electric and Gasoline-Fueled Vehicles" at *AVT.inel.gov/pdf/fsev/costs.pdf*. Actual fuel costs vary with the number of miles you drive, how aggressively you drive and your plug-in vehicle's efficiency, which the manufacturer estimates in miles per kWh.

By using electricity instead of gasoline, you can save about 75% in fuel costs with the help of SDG&E's residential electric vehicle time-of-use (TOU) electric rates.

Maintenance costs are lower as well since electric motors have fewer moving parts than their internal combustion counterparts. Plug-in electric vehicles don't have mufflers or catalytic converters and don't need engine oil, transmission fluid or fuel and oil filters.

Driving ranges in your comfort zone

When comparing plug-in vehicles, consider how far you usually drive each day. For example, about 450 SDG&E® customers participating in an EV rate study use their plug-in electric vehicles an average of 25 miles (6 to 8 kWh) per day. Yet the most commonly available all-electric vehicles can go about 80 to 120 miles before recharging is required. In addition, plug-in hybrid electric vehicles typically have an electric range of 10 to 40 miles and an overall driving range of 300 to 400 miles with gasoline.²

In short, a daily vehicle charge at home is more than enough to meet most needs. It's also getting easier to "top off" the battery as charging stations become more commonplace in public, commercial, municipal and workplace locations.

Set up to charge at your convenience

Knowing your driving needs will help you choose charging options that work best for you. At a minimum, you'll be able to plug your vehicle into a standard 120-volt outlet, usually overnight. Today's plug-in vehicles get 2 to 5 miles of range per hour of charging on a common 120-volt household outlet. They get 10 to 20 miles of range per hour of charging on a 240-volt system on a dedicated circuit - like the dedicated circuit for an electric dryer.³ Your vehicle manufacturer will have information on rates of charging at different voltages for your particular vehicle.

Your car's manufacturer or dealer can recommend electricians or **electric vehicle supply equipment** installers who are qualified to complete any work needed on electric panels, wiring and plug-in EV charging equipment for your home, business or multi-family residential community.

SDG&E can advise you regarding meter installation options that are available to you in line with the residential electric vehicle rate you prefer.

More places to charge when you're out and about

The largest transportation electrification project in U.S. history is taking place locally, as San Diego and 15 other cities participate in The EV Project (see *TheEVProject.com*). With the collaboration of SDG&E and others, the project is helping to put more plug-in electric vehicles on the road and bringing to the San Diego region more than 1,000 home chargers (240-volt), 1,000 public access chargers (240-volt), and 30 direct current (DC) fast-charge (480-volt) units.

Continued on back ▶



On a standard 120-volt household outlet, today's plug-in vehicles get

2-5

miles of range per hour of charging.

On a 240-volt charging unit, today's plug-in vehicles get

10-20

miles of range per hour of charging.

» **Your clean-air connection:
A greener, smart grid**

As an SDG&E customer, you're plugging into a power grid that's on track to deliver 33% of electricity from renewable energy sources by 2020. We also generate electricity from natural gas in highly efficient power plants to minimize emissions, including smog-forming pollutants, pollutants harmful to human health, and greenhouse gases, primarily carbon dioxide, associated with climate change. If you look at the total carbon footprint, including emissions from power plants to generate electricity, vehicles in electric drive are cleaner than vehicles running on gasoline or diesel.

With nearly 40% of California's greenhouse gas emissions coming from transportation, cleaner alternatives such as plug-in EVs are needed to achieve the state's goal of reducing transportation greenhouse gases by 13 million tons by 2020. By investing in system improvements and smart technology, SDG&E will be able to handle the growing need for electricity as more people plug in electric vehicles.

**Declare U.S. independence
from foreign oil**

In the U.S., we import more than 60% of our petroleum, much of it from politically volatile countries, and two-thirds of all the petroleum we consume goes to transportation.⁴ U.S. petroleum imports could be reduced significantly if all passenger vehicles were plug-in vehicles. Without building any



new power plants, the nation's existing electric grid has enough off-peak capacity to power 70% of commutes to and from work by cars, light trucks, SUVs and vans if people were driving plug-in hybrids.⁵

Electricity made in America is a more reliable, affordable fuel than foreign oil. It's better for the American economy and your pocketbook.

**Connect with more information about
plug-in electric vehicles by emailing
ev@sdge.com or visiting sdge.com/ev.**

¹ On both EV-TOU and EV-TOU-2 rates, electricity is cheapest during the "Super Off-Peak" period (midnight to 5 a.m.), followed by the "Off-Peak" periods (5 a.m. to noon on both rates, plus 6 p.m. to midnight on the EV-TOU-2 rate and 8 p.m. to midnight on the EV-TOU rate). The EV-TOU rate requires **separate** meters for your house and car so the time-of-use pricing applies only to your electric vehicle, while the EV-TOU-2 rate uses a **single** meter so that the time-of-use pricing applies to all the electricity you use for the house and car.

² Source: Electric Drive Transportation Association's "Top 10 Questions" at GoElectricDrive.com/GetStarted/Top10Questions.aspx.

³ Source: National Renewable Energy Laboratory, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, October 2011 article posted at AFDC.energy.gov/afdc/pdfs/52723.pdf. Check with your vehicle manufacturer for estimated charge times for different voltages for your plug-in vehicle.

⁴ Source: "Plug-in Electric Vehicle Handbook for Consumers," September 2011, at AFDC.energy.gov/afdc/pdfs/51226.pdf, prepared by the National Renewable Energy Laboratory (NREL) of the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy.

⁵ Source: A study for the U.S. Department of Energy by Pacific Northwest National Laboratory, "Mileage from Megawatts," Dec. 11, 2006, news release posted at www.PNL.gov/news/release.aspx?id=204.