

Our cars can get more than **1000** miles per gallon *(plus electricity)*

What's a plug-in hybrid? (PHEV)

Regular hybrids are efficient vehicles, but they're still 100% gas-fueled. To get a plug-in hybrid (PHEV), add bigger batteries and an extension cord. You get a second cleaner, cheaper, domestic energy source: **electricity**.

It's like having a second fuel tank that you always use first—only you fill up at home from a standard socket at an equivalent cost of under \$1/gallon. Your local driving is powered by electricity, and you still get unlimited range from the gasoline engine.

For more:
www.calcars.org/vehicles.html

What are PHEVs' benefits?

- Fueling by domestic electricity can reduce our dependence on imported oil
- They produce lower greenhouse gas emissions, even on the national (half-coal) power grid
- Lifetime service costs are lower, and the lifetime costs of ownership are lower than with standard gasoline vehicles (even using an outdated \$1.75/gallon benchmark)
- When these cars are built by auto-makers, if your driving is mostly local you'll need to visit the gas station only a few times a year
- PHEVs combined with E85 (cellulosic ethanol) are the way to get the domestically-fueled, nearly carbon- and oil-free cars we need—**now**

For more:
Download our "10 Talking Points" flyer at
www.calcars.org/downloads.html

What are PHEV conversions?

CalCars' Toyota Prius was converted into a PHEV in April 2006 by for-profit companies EnergyCS/EDrive (www.edrivesystems.com) in Monrovia, CA. Its lithium-ion battery pack and charger are located in the rear tool storage compartment. It plugs into a 120-volt outlet.

About half of its first 60 daily miles are fueled by electricity, and it exceeds 100 MPG (plus electricity). The result is that commuting costs 2–4 cents a mile instead of a standard car's 8–20 cents a mile.

For more:
Download our Conversions Fact Sheet at
www.calcars.org/downloads.html
See how to get a PHEV at
www.calcars.org/howtoget.html

What's CalCars.org?

The California Cars Initiative is a "nonprofit startup" of entrepreneurs, engineers, environmentalists and consumers. We combine technology with advocacy. We built the world's first plug-in Prius in 2004 and we're working on others.

We partner strategically with groups from "neo-conservatives" to "geo-greens," from evangelicals to former US Cabinet members. Our objectives: to get out the word about PHEVs and prove what's possible with **today's technology**. Our biggest goal: **get auto-makers to build plug-in hybrids**.

Find out more about us and how to get involved at www.calcars.org.



10 TALKING POINTS FOR PLUG-IN HYBRIDS

1. Why plug-in hybrids? Today's hybrids are efficient because they don't idle, they recapture braking energy into a battery, and they use smaller engines. They're a great step forward—but they're still 100% gas-fueled. **Use a larger, rechargeable battery and you add a second cleaner, cheaper, domestic energy source: electricity.**

2. Spend less time—and money—at the pump. A plug-in hybrid (PHEV) is like having a second fuel tank you always use first. Fill up at home from an ordinary socket, at a cost equivalent to less than \$1/gallon. *[See box]*

3. Use no gas for short trips, still have unlimited range. If your batteries have a longer range than your commute, you'll almost never need gas. But if you forget to plug in, or take a longer trip, you have the same range as always from a gas engine—but in a clean, efficient hybrid.

4. Neo-cons and greens agree. PHEVs have been endorsed by an alliance of environmentalists and conservatives who see it as **the best way to cut our foreign "oil addiction."** Republicans and Democrats, endorsing the DRIVE Act, former cabinet members Shultz and Woolsey, and President Bush in his Advanced Energy Initiative have endorsed PHEVs. Mayors, Governors, Members of Congress, companies like **Google, AutoNation** and **Enterprise Rent-A-Car** want PHEVs.

5. Keep the earth cool. Even though coal powers half the nation's electricity, driving electrically produces **50+ % lower greenhouse gases** than a gas-only car. This will only improve as utilities use cleaner, renewable energy.

6. Lead car-makers out of the wilderness. Ten car-makers are interested. **GM finally says it will build them, but not til 2010-2011.** Toyota, Ford, smaller companies might. But waiting makes the perfect the enemy of the good.

PHEVs offer carmakers the chance to leapfrog their competitors. We need commitments to production. Today's batteries are "good enough;" for PHEVs; they will improve and get cheaper by the time car-makers are ready for mass-production of Version 2.0-3.0 PHEVs.

7. PHEVs are already here. For 15 years, Dr. Andy Frank at **UC Davis** has converted **Ford/GM** cars and SUVs. **Daimler** is testing PHEV versions of the **Mercedes Sprinter** van. In 2004, non-profit **CalCars.org** converted the first **Prius** PHEV; individuals and companies have since built 150. Not-yet-available conversions for consumers will cost \$10-\$20,000. So help get carmakers to sell them!

8. Save money in the long run. In high volumes, car-makers could sell PHEVs for under \$2,000-\$5,000 more than current hybrids. Just as car buyers pay for large engines or leather seats without expecting a return on investment, early adopters will pay extra for the PHEV "green feature." A bonus: projections based on experience from electric car fleets show **PHEVs have a lower lifetime cost of ownership than any other vehicle.**

9. Send car battery power the other way. Recharged at night, PHEVs can send power to utilities in what's called "vehicle to grid" (V2G). PHEVs can be mobile generators to emergency centers after disasters. Your car can give your **home backup power** for outages; paired with rooftop solar, it will be far cleaner and go for days!

10. Deploy the fleet. Fleet buyers are leading the way on many fronts. **Plug-In Partners is a national campaign for a large fleet buy.** Incentive programs can help buy down initial costs and additional warranties can reduce battery risk factors. **CalCars** is working to find ways to get demonstration fleets of "good enough to start" PHEVs on the road—followed by mass production.

Assumptions for Point #2:

Here's another way to think about it: At \$3/gallon of gas, driving a non-hybrid car costs 8-20 cents/mile (depending on your miles/gallon). With a PHEV, local travel and commuting can drop to 2-4 cents/mile.

Toyota Prius: 260 Watt-hours/electric mile at "off-peak" (overnight) electricity rate (8.8 cents/kiloWatt hour) equals a cost of 2.3 cents/mile. Multiply this by the 45 MPG of a typical Prius to get the equivalent of \$1.03/gallon.

Typical Non-Hybrid SUV: 400 Watt-hours/electric-mile at the off-peak rate equals a cost of 3.5 cents/mile. Multiply this by the less efficient SUV's average of 18 miles/gallon to get an even better \$0.63/gallon. (SUVs get low mileage, so they improve even more!)

100+ MPG of gasoline: On roads and highways, our cars use gasoline plus about \$0.01/mile of electricity=80+ MPG equivalent.

The California Cars Initiative is a non-profit startup of entrepreneurs, engineers, environmentalists and consumers that combines technology development and advocacy. Support our goal: to get car companies to build PHEVs. [More at www.calcars.org](http://www.calcars.org).