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## Giving Hybrids A Real Jolt

**A plug-in gas-electric vehicle may be key in saving fuel and cutting pollution**

Is there a car that can cut America's oil imports to a trickle, dramatically reduce pollution, and do it all with currently available technology? Greg Hanssen thinks so. His company has already built one such car -- a converted Toyota Prius that gets 100 to 180 mpg in a typical commute. Andrew A. Frank thinks so, too. The University of California at Davis professor has constructed a handful of such vehicles. His latest: a converted 325-horsepower Ford Explorer that goes 50 miles using no gas at all, then gets 30 mpg. "It goes like a rocket," he says.

These vehicles are quickly becoming the darlings of strange bedfellows: both conservative hawks and environmentalists, who see such fuel efficiency as key to ensuring national security and fighting climate change. Reducing dependence on the turbulent Middle East "is a war issue," says former CIA Chief R. James Woolsey, who calls the cars' potential "phenomenal."

What's the secret? It's as simple as adding more batteries and a plug to hybrids such as the Prius. That way, the batteries can be charged up at any electrical outlet -- letting this so-called plug-in hybrid travel 20 to 60 miles under electric power alone. Since most Americans drive fewer than 30 miles a day, such a car could go months without visiting the filling station. "The only time you would have to gas up is when you go out of town," says Felix Kramer, who founded the nonprofit California Cars Initiative to promote plug-ins. Run the internal combustion engine on a blend of gasoline and biofuels like ethanol, and it would use almost no oil products at all. "That changes the world," says Frank J. Gaffney Jr., president of the Center for Security Policy.

### "TRIVIAL MATTER"

Professor Frank, 72, first began thinking about a plug-in hybrid electric vehicle (PHEV) years ago. "But now all the pieces are here," he says. Toyota Motor Corp. (TM) has solved the big engineering problems with the Prius, so "it's a trivial matter to make a plug-in," says Joseph J. Romm, a former Energy Dept official. Greg Hanssen and his colleagues at EnergyCS, for example, replaced the Prius' existing 1.3-kilowatt-hour nickel metal hydride battery with an advanced 9-kWh lithium ion battery pack. They hope to offer a conversion kit to Prius owners. The weight penalty? About 170 pounds.

Car owners might not want to try this at home. Such a conversion will probably void Toyota's warranty. But big companies are building their own vehicles. In a project sponsored by the Electric Power Research Institute (EPRI), several utilities, government agencies, and DaimlerChrysler (DCX), the carmaker is building a fleet of up to 40 PHEV delivery vans.

Four will be coming to U.S. cities for tests starting in June. Research at EPRI predicts that the plug-in vehicles, based on DaimlerChrysler's popular Sprinter van, will get a gas mileage boost of at least 50% over conventional vans.

EPRI Program Manager Robert Graham is convinced that Toyota already has prototype plug-ins running. Toyota says no. "We keep looking at the concept, and at some point it might be feasible, but it isn't there yet," says David Hermance, Toyota's executive engineer for environmental engineering. For its part, DaimlerChrysler sees its van project "as a great opportunity to develop the vehicles we foresee in the future," says technology spokesman Nick Cappa. The company's first hybrid offerings will be conventional, but plug-ins might eventually be an option, he says.

Auto makers' reluctance to plunge in quickly frustrates evangelists like Professor Frank. "If it is such a

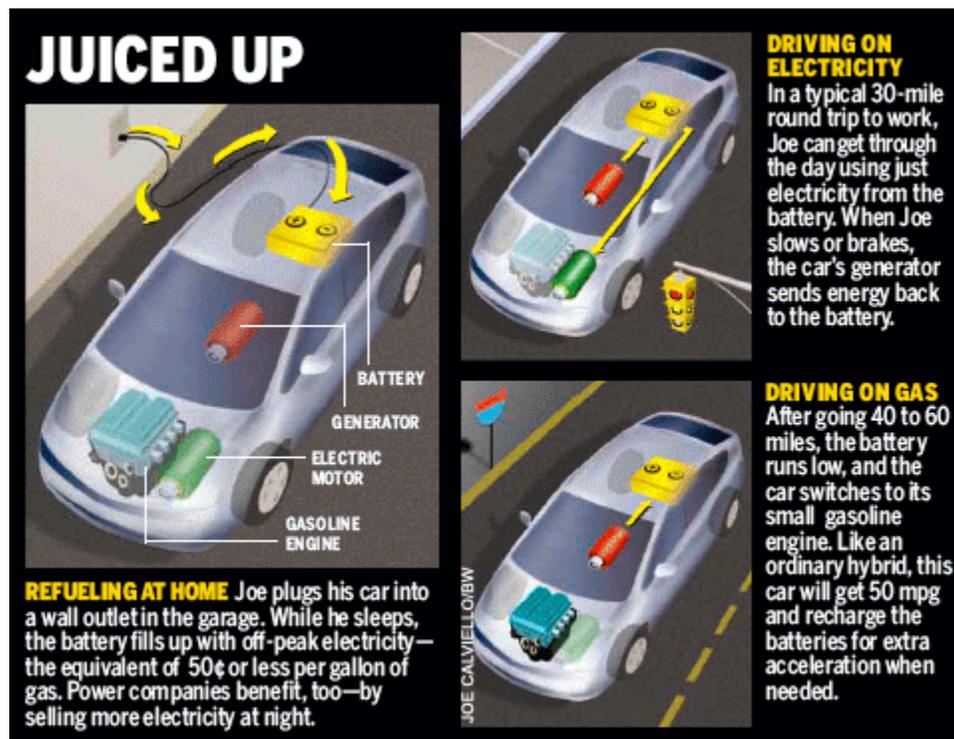
damn good idea, why are the car companies not adopting plug-ins?" he asks. "The simple answer is that they don't want to change what they are making." But it's also not clear how much more people will pay for the cars. Hybrids are estimated to cost \$2,000 to \$5,000 more than conventional cars to make, and the larger batteries for plug-ins would add several thousands dollars more.

## "UNCERTAINTY"

Proponents predict costs will drop with high-volume production. But making the investment to build hundreds of thousands of PHEVs is a giant risk, especially since there are competing approaches to higher fuel efficiency, such as advanced diesels or upgraded gasoline or hydrogen engines. Plus, no one knows if gas prices will rise enough to spur demand for high mileage cars. "All these technologies are great. But there is a tremendous amount of uncertainty," says David E. Cole, chairman of the Center for Automotive Research.

That's why some plug-in advocates are striving to create a market for auto makers. On Mar. 3, the city of Austin, Tex., passed a resolution calling for rebates for plug-in purchases and asking local businesses and governments to buy the vehicles. "We can reduce costs [of driving] to consumers, improve the air quality, and increase revenues to the city," says Roger Duncan, deputy general manager of city-owned Austin Energy.

Ordinary hybrids such as the Prius are already popular. Moving to plug-ins is the next logical step -- and the idea is getting high-level endorsements. Last December, the bipartisan National Commission on Energy Policy tapped plug-ins as a key part of its energy strategy. The Set America Free coalition, a group of conservatives and enviros, is pushing for \$2 billion in incentives, pointing out that "if all cars on the road are hybrids and half are plug-in hybrid vehicles, U.S. oil imports would drop by 8 million barrels per day." Americans will be "gassing up" their cars with electrons, predicts Romm: "I would bet the mortgage on it." But not quite the whole house.



By John Carey in Washington

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