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# CLEANER FUTURE? PLUG IN / Electric hybrid cars hold promise of slashing greenhouse gases; [FINAL Edition]

*Zachary Coile*. **San Francisco Chronicle**. San Francisco, Calif.: Jul 20, 2007. pg. A.1

**Abstract (Summary)**
"The studies finally give an environmental stamp of approval" to plug-in vehicles, said Felix Kramer, founder of CalCars.org, which promotes electric hybrids. "Scientist have confirmed that unlike gasoline cars, plug-ins will get cleaner as they get older -- because our power grid is getting cleaner."

The same forces that led many drivers to buy conventional hybrid cars, such as the Toyota Prius, are spurring new interest in this next generation of hybrids. The new vehicles are powered by batteries that can be charged at home but also carry a backup gas tank for longer trips beyond the range of most electric cars. In the Bay Area, consumers are starting to make the leap by buying electric vehicles or converting their hybrids into plug-ins.

Google's philanthropic arm, Google.org, announced last month that it will give $10 million to entrepreneurs to develop electric hybrids that can get the equivalent of 70 to 100 miles per gallon of gas. Google also is joining with PG&E to test vehicle-to-grid technology that allows consumers to charge their cars at night -- when power is cheap -- then drive them to work or a BART station and plug in again, feeding power back into the electricity grid during the day when it's needed most.

**Full Text** (1383 words)



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Only a handful of plug-in hybrid electric cars are driving around the Bay Area today. But the vehicles -- with fuel economy that can exceed 100 miles per gallon -- could play a crucial role in fighting global warming and America's addiction to foreign oil.

A study released Thursday by the Palo Alto-based Electric Power Research Institute and the Natural Resources Defense Council confirmed what advocates of plug-in vehicles had long suspected: Hybrid electric cars, if widely adopted in the United States, would yield huge reductions in greenhouse gases over today's fleet of gas- fueled cars and hybrid vehicles.

"The studies finally give an environmental stamp of approval" to plug-in vehicles, said Felix Kramer, founder of CalCars.org, which promotes electric hybrids. "Scientist have confirmed that unlike gasoline cars, plug-ins will get cleaner as they get older -- because our power grid is getting cleaner."

If most Americans switched to electric hybrids by 2050, greenhouse gases would be slashed by 450 million metric tons annually -- the equivalent of taking 82.5 million cars, about one- third of the U.S. fleet, off the road, according to the study.

Despite the promise of plug-in hybrids, most consumers will have to wait years before they can buy one. Seven major automakers are talking about building them -- GM is already hyping its concept car, the Chevrolet Volt -- but no company has yet set a date to start mass production.

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The new study sought to answer a key question: Would switching American's fuel of choice from gasoline to electricity significantly reduce greenhouse gases? Or would a new fleet of electric hybrids increase the use of coal at power plants, producing emissions as bad or worse than gasoline?

Scientists from the Electric Power Research Institute -- a nonprofit think tank funded mainly by electric utilities -- and the Natural Resources Defense Council used computer models to simulate what would happen to emissions. They tested different scenarios based on how quickly Americans embraced the new hybrids and what type of energy -- clean or dirty -- was used by utilities.

The study found that if 60 percent of Americans shifted to plug- in hybrids by 2050, it would lead to an increase in electricity usage of 7 to 8 percent -- a relatively small increase, indicating that hybrids would not necessarily require a surge of new power plant construction. Plug-in hybrids are charged mostly at night, when demand for electricity is low.

At the same time, the report estimates that electric hybrids would displace the need for 3 million to 4 million barrels of oil per

day by 2050, more than twice what the United States imports each day from Saudi Arabia.

Researchers also found that plug-in hybrids reduced greenhouse gases no matter what energy source was used to produce the electricity, whether coal, nuclear, hydroelectric, wind or solar. Electric hybrids generated 40 to 65 percent less greenhouse gas than gas-fueled vehicles and 7 to 46 percent less than conventional hybrids.

Plug-in hybrids also would slightly lower air pollutants such as nitrogen oxide, sulfur dioxide and smog-forming ozone in most regions, the study found.But emissions of particulate matter could rise because of the increased burning of coal.

"It shows the next generation of hybrid vehicle technology will reduce both global warming pollution and conventional air pollution in most parts of the United States ... particularly if we are conscientiously taking steps to clean up the power grid," said Dan Lashof, science director at the Natural Resources Defense Council's climate center.

The study was funded by a broad range of groups, including many electric utilities, such as American Electric Power, Pacific Gas & Electric and Edison International. Utilities have a clear interest in plug-in hybrids, which could drive up electricity usage and, possibly, their profits.

But John Bryson, chairman and CEO of Edison International, parent company of Southern California Edison, who attended the announcement of the study in Washington, noted that California has had rules on the books since the early 1980s that prevent utilities from making more profit based on how much power they sell -- an effort, at the time, to boost conservation.

Bryson, whose family owns three conventional hybrids, said he sees huge environmental benefits from plug-in hybrids, especially in California, where 40 percent of greenhouse gases are emitted by cars and trucks.

"What we are talking about here is potentially a very, very, large effect" on emissions, Bryson said.

Electric cars driven in California would boast even cleaner emissions because the state's power plants run mostly on low-emission natural gas, nuclear and renewables -- not coal.

California has long been known as the research hub for electric hybrids.UC Davis Professor Andrew Frank, whose vehicle design center has produced nine different plug-in concept vehicles, is seen as one of the founders of the movement. The first Prius conversion into a plug-in took place in Corte Madera, said CalCar.org's Kramer.

Bay Area startups, such as Tesla Motors of San Carlos and Santa Rosa's Zap, have been pioneering low-emission electric vehicles.

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"If we have a high demand day ... rather than the air conditioning being powered by the grid, it would be powered by your car," said Sven Thesen, supervisor of PG&E's clean air transportation group. The technology is still being fine-tuned but could be in widespread use within the next 10 or 20 years, he said.

Some electric car buyers are still angry over General Motors' decision to pull the plug on the EV1, an electric car that was beloved by its owners in the 1990s, prompting the 2006 documentary, "Who Killed the Electric Car?"

But GM's Tony Posawatz, who heads the vehicle line for the Chevy Volt and attended the announcement of the study, said his bosses are committed to producing the Volt and other electric hybrids on a mass scale. But he would not commit to a firm date or say how much the car would cost.

"We believe that this is the future," he said. "The potential for plug-ins is tremendous."----------

COMPARING THE HYBRIDS

The plug-in hybrid

The Chevrolet Volt's gasoline engine does not drive the wheels; it only charges the batteries. The electric motor powers the car at all speeds, and the Volt can travel 40 miles on batteries alone.

The standard hybrid

Hybrid cars are essentially gasoline-powered vehicles. All the electricity they use comes ultimately from the gasoline engine. But the gas engine in a hybrid vehicle is smaller, and it is turned off when the vehicle is stopped or cruising at low speeds.

Comparing the Hybrids

CHEVROLET VOLT

Range: 640 miles with batteries and on-board generator; 40 miles on batteries only

Weight: 3,200 pounds

Recharge time: 6.5 hours

TOYOTA PRIUS

Mileage: 55 combined; 60 city / 51 highway

Weight: 2,932 pounds

Recharge time: None

Sources: Automobile Quarterly; Henry Ford Museum; Ward's AutoInfoBank; Toyota Motor Corporation; American Honda Motor Company, General Motors, New York Times

**[Illustration]**
PHOTO (2): GRAPHIC (2); Caption: GRAPHICS: (1) / Lance Jackson / The Chronicle, PHOTOS: (1) Ron Gremban installs plug-in technology -- consisting of 20 rechargeable 12-volt electric-bicycle batteries -- in a Toyota Prius. / Chris Stewart / The Chronicle, (2) Felix Kramer, founder of CalCars.org, converted his Toyota Prius with plug-in technology and doubled his normal gas mileage. / Mark Costantini / The Chronicle

Credit: Chronicle Washington Bureau

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