A FUTURE OF E-HYBRIDS, NOT FUEL CELLS

by Joseph J. Romm

VOICES

We urgently need action to make our vehicles far less polluting. The scientific consensus is growing increasingly strong that the business-as-usual growth path in global warming pollution will lead to serious if not catastrophic climate change.

Hybrid gasoline-electric vehicles are the best near-term strategy. Absent tough fuel economy regulations, however, hybrid technology will increasingly be used to boost horsepower. So the current energy bill, which provides subsidies for hybrids but no fuel economy or carbon dioxide regulations, represents a major embarrassing failure of political leadership.

Ultimately, we will need to replace gasoline with a zero-carbon fuel. Hydrogen is the least likely such fuel, and hydrogen fuel cell cars increasingly appear to be an environmental dead end.

Bill Reinert, U.S. manager of Toyota's advanced technologies group, was asked in January 2005 when fuel cell cars would replace gasoline-powered cars or hybrids, and he replied, "If I told you 'never,' would you be upset?" The National Academy of Sciences noted this summer that "using hydrogen as a transportation fuel would necessitate several significant breakthroughs." The Director of MIT's Sloan Automotive Lab told Congress in July 2005, "the total time to noticeable impact" for hydrogen fuel-cell cars "is likely to be more than 50 years."

Hydrogen simply offers very little prospect of helping to reduce greenhouse gas emissions for four or more decades. As many analyses have shown, hydrogen won't be close to a cost-effective climate solution until we have almost completely eliminated carbon dioxide emissions from electricity generation. We just can't wait that many decades. Worse, a 2004 report from the European Union found that hydrogen cars deployed anytime soon could well increase greenhouse gas emissions.

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So what will we be driving in the future to reduce greenhouse gas emissions and oil consumption? The most promising pathway is the e-hybrid, a hybrid that can be plugged into the electric grid, and run in an all-electric mode for a limited range before it reverts to being a regular gasoline-powered hybrid (discussed at length in the new paperback edition of *The Hype about Hydrogen*). Since most vehicle use is for relatively short trips such as commuting, followed by an extended period of time during which the vehicle is not being driven and could be charged, even a relatively modest all-electric range of 20 or 40 miles could allow these vehicles to replace a substantial portion of gasoline consumption and tailpipe emissions.

Whereas hydrogen fuel cell vehicles would likely have at least three times the annual fuel bill of regular hybrids, e-hybrids would have one half to one third the fuel bill of regular hybrids.

The potential greenhouse gas benefits of e-hybrids are also huge. They have an enormous advantage over hydrogen fuel cell vehicles in utilizing zero-carbon electricity. That is because of the inherent inefficiency (and cost) of generating hydrogen from electricity, transporting hydrogen, storing it on-board the vehicle, and then running it through the fuel cell. So e-hybrids will likely travel three to four times as far on a kilowatt-hour of renewable electricity as fuel cell vehicles.

Ideally, these advanced hybrids would also be flexible fuel vehicles capable of running on a blend of biofuels and gasoline. Such a car could travel 500 miles on one gallon of gasoline (and five gallons of cellulosic ethanol) and have under one-tenth the greenhouse gas emissions of current hybrids.

Long-term research into hydrogen cars makes sense. But for the sake of the global climate, most of the near-term development and deployment money now being spent on hydrogen should be shifted over to e-hybrids and biofuels.

— Dr. Romm is executive director and founder of the Center for Energy and Climate Solutions (www.cool-companies.org) and a former Acting Assistant Secretary of Energy. Romm is also author of "The Hype About Hydrogen: Fact and Fiction in the Race to Save the Climate."