

# *Car of the Future*

## Fossil Fuels: Going the Way of the Dinosaur?

By Robert C. Stempel, Chairman,  
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(NASPA)—American engineers are on the road to improving transportation.

Better options are essential. Today there are more than six billion people on the planet. Only about 12 percent have powered vehicles. The math is sobering. What happens when even a fraction of the other 88 percent become mobilized?

Clearly, the energy needs of the future cannot be met long-term with only fossil fuels. As clean as today's low emission vehicle (LEV) and ultra-low emission vehicle (ULEV) cars and trucks have become, Mother Earth may not tolerate another 500 million gas-burning vehicles.

We need cleaner, renewable alternatives and we need them now. My company, Energy Conversion Devices (ECD Ovonic), and other alternative-energy companies are working hard to bring them to the market—and the progress has been amazing. The new technologies that will be changing your experiences of energy for transportation, homes, entertainment, and communications include:

**Rechargeable nickel-metal-hydride (NiMH) batteries used in billions of consumer products**—a technology that ECD Ovonic pioneered. The batteries can be found in tens of millions of laptops, cell phones and countless other portable electronic products. The hydride in NiMH batteries stores hydrogen. NiMH batteries provide more than twice the energy and life cycle of conventional lead-acid batteries. They're



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maintenance-free and they're environmentally much more benign. Happily, hydrogen is the Earth's most plentiful element, present in water, petroleum, natural gas products...just about everywhere.

**Hydrogen and fuel cells today**—Virtually every major automaker is in the process of bringing hybrid vehicles to market. They combine a small internal-combustion engine with a rechargeable electric drive system. Energy from the engine and braking system is used to charge the battery system, which powers the electric drive.

Soon you'll have the option of powering the internal combustion engines in these hybrid vehicles with hydrogen, which is safe and exceptionally clean. By the end of the decade, you may be able to purchase fuel cell vehicles, which won't require an internal-combustion engine at all. They, too, will be powered by hydrogen. The only emissions will be water vapor—

your tailpipe will be turned into a drainpipe.

**Not Just for Cars**—Fuel cell products will also include portable energy generation devices. These could be used at construction sites, as primary power sources for remote homes and business not connected to the main power lines, as backup power sources for businesses, in homes and hospitals to provide uninterrupted service when the power lines go down and more.

**Harvesting the Sun**—A number of places use photovoltaics (PV)—systems that convert sunlight into electricity—to provide primary or supplemental power for many homes and businesses. It's possible for PV systems to provide homes and businesses with what is in essence an electric roof, which not only protects the home/building from the elements but also generates electricity. Many navigational buoys you've seen out on the water are powered by photovoltaics (PV). In Operation Desert Storm, field radios were powered by lightweight PV packs. PV can even be used to generate power to extrude crude oil from the ground, instead of using oil-burning steam generators. This helps conserve resources, reduces emissions and noise pollution.

The problems technology has helped create, technology is now cleaning up, many agree. Because each time we use these products in our everyday lives, we are one step closer to a clean, energy independent future. The battery, hydrogen, fuel cell, and PV products we use today help pave the way to a true clean renewable hydrogen economy.

*Mr. Stempel is former chairman of General Motors Corporation.*