CORRECTION TO THIS ARTICLE
A Jan. 9 article that said General Motors Corp. hopes to be able to build 1 million hydrogen-powered vehicles by 2010 should have added that the company would do so only if there is enough demand for such cars.

Automakers Put Hydrogen Power On the Fast Track

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The brakes are controlled by a computer, so the car can stop a full length shorter than most. Each rear wheel has its own motor and can turn by itself, which not only improves traction but also makes parallel parking a snap. And the only thing this car emits is water vapor.

But for all the exotic gizmos on the Sequel, an experimental hydrogen-powered car to be shown today by General Motors Corp., the biggest breakthrough is that it is designed to drive as far and accelerate as quickly as the cars in most driveways.

The Sequel uses fuel-cell technology that until now has not matched the overall performance of gasoline engines. GM is introducing the car at the North American International Auto Show in Detroit as rival companies make similar announcements.

Passengers at Dallas-Fort Worth International Airport will soon ride on buses with hydrogen-powered engines, Ford Motor Co. chief executive William Clay Ford Jr. is to announce today. Ford also is to announce plans to create three gasoline-electric hybrid vehicles for retail sale, and to rush the hybrid Mercury Mariner sport-utility vehicle to showrooms later this year -- a year ahead of schedule to capitalize on consumer interest in hybrids.

Honda is showing off a new-generation hydrogen-fuel-cell car called the FCX for the first time this week. While the car is not intended for retail sale, it will show up in municipal fleets in New York, California and elsewhere in the coming year.

After a century of dependence on oil-based fuel, the auto industry is finally giving consumers a serious look at a future with little or no gasoline power. The products showing up this week in Detroit have far more corporate support than recent electricity-powered vehicles, and are advanced beyond the demonstration vehicles shown by car companies over the last few years. The fleet of fuel-cell minivans that GM maintains in Washington, for example, has limited range and must be operated by company employees.

By contrast, Honda lets almost anyone drive its FCX. In a recent feature on the automotive research online site Edmunds.com, a reviewer described picking up the FCX from a valet-parking attendant.

Hydrogen is still years away from reducing the nation's dependence on foreign oil. No one has yet figured out how to generate large amounts of hydrogen without causing as much pollution as internal-combustion engines now create, or how to pay for a nationwide distribution network. And the vehicles are prohibitively expensive; if GM's Sequel were for sale, it would cost as much as a warehouse full of Corvettes.
Still, auto industry executives say their business is on the verge of a fundamental change.

"It's a frenzy" to get out front with new technology, said Mary Ann Wright, director of such efforts at Ford. "What you're seeing is a groundswell, not really of industry pushing as much as everybody demanding that we really get serious about these solutions. . . . The market's telling us something -- they're ready for this kind of stuff. The public is aware that we can't continue to consume oil like we do."

People have sent that message in the way car companies understand best: by buying products such as the Toyota Prius, the Honda Civic Hybrid and the Ford Escape Hybrid. Rising fuel prices, instability in the Middle East and concerns about global warming have helped sustain the hybrid phenomenon, and U.S. car buyers have even turned away from the biggest SUVs in favor of smaller models.

Most automakers consider hybrids to be a step toward the ultimate solution -- hydrogen fuel cells. Fuel cells work by combining hydrogen with oxygen to create heat and electricity, with water the only byproduct. Though many people associate hydrogen with disasters -- the hydrogen bomb, or the Hindenburg zeppelin explosion in 1937 -- scientists say the gas is in many ways safer than gasoline. Hydrogen is the lightest element, so leaks dissipate quickly and are difficult to concentrate enough to ignite. Hydrogen is stable, so it will not explode just from an impact.

But those same properties make it challenging to store hydrogen in a large-enough quantity to power a vehicle. The Bush administration has pledged $1.2 billion over five years to sustain a government-industry research partnership on hydrogen power, with many auto and energy companies cooperating to develop the technology.

One thing, though, seems to have changed the tenor of the otherwise polite hydrogen effort: Toyota's success with the Prius.

That car's unexpected popularity helped influence public policy, with the federal government offering tax breaks to hybrid buyers and state governments offering express-lane exemptions. The Prius gave Toyota a "halo" of technological virtue, said Lindsay Brooke of the auto consulting firm CSM Worldwide Inc. Now other companies want a piece of the action.

GM, which has been slow to roll out hybrid products, is using the Sequel to try to win some of the attention for hydrogen, Brooke said.

"We're reaching out to show that this is truly doable," GM technology chief Lawrence D. Burns said. "We're talking about a real car. It's not affordable yet, but I can assure you it's doable."

In 2002, GM showed a fuel-cell concept car called the Hy-Wire that consisted of an 11-inch thick "skateboard" chassis that contained all the working parts -- one-tenth as many as in a conventional car -- with a body simply bolted on top. But the Hy-Wire was rickety to drive and could never have met federal highway standards, let alone satisfied demanding buyers.

The Sequel's biggest single advance, Burns said, is a compressed-hydrogen storage tank that can hold enough fuel to give the car a range of 300 miles. That is twice as far as the range of older versions of fuel-cell cars, and is considered the threshold distance to be marketable. With liquid hydrogen, the range could extend to 450 miles, Burns said.

The Sequel also has a more powerful stack of fuel cells than previously possible, cutting 0-to-60 mph acceleration time to fewer than 10 seconds, comparable to most conventional cars.
GM is also working on the technology to produce and assemble the Sequel, hoping to be able to build 1 million a year by 2010, Burns said.

Not many in the industry agree with such a close date. "The goal is to make it a practical technology, and it's going to be after 2010," said Ben Knight, vice president for research and development at Honda USA. His company's fuel-cell car has a range of about 190 miles, and is the only such vehicle certified by U.S. regulators for public use.

But while they disagree on specifics, virtually all automakers are pushing to get more attention for hydrogen so that society, the government and other industries will get ready for the eventual change, Brooke said. "They're starting to force the public to look at it and now the fuel industry needs to step up and develop the infrastructure and develop the means to produce the hydrogen," he said.

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