

# Toyota Brings Hydrogen Cars to Production

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Twelve years ago, **Toyota Motor Corp.** (NYSE: TM) began testing a unique — and outlandishly expensive — automobile in California: a car powered by hydrogen fuel cells. This so-called FCHV (fuel cell hybrid vehicle) was an electric car that didn't need to be plugged in. Its electricity was generated by a stack of fuel cells that ran on compressed gaseous hydrogen, a relatively cheap fuel that gives off no harmful emissions; its only byproduct was water vapor. The FCHV never made it to dealer lots, however. Production of plug-in electric cars proved more viable, partially because the FCHV technology was prohibitively expensive.

Fast-forward a decade, and things have changed. In 2015 Toyota will begin selling a production version of its hydrogen fuel-cell (HFC) car that can refuel in three minutes with enough hydrogen to drive more than 300 miles, the company says. Toyota won't be alone. Mercedes-Benz, Hyundai, Nissan, **Honda Motor Co.** (NYSE: HMC), **Ford Motor Co.** (NYSE: F) (in partnership with Renault), and Chevrolet at **General Motors** (NYSE: GM) are also all expected to begin producing HFC cars, beginning a new revolution in automobiles that, Toyota estimates, should result in "tens of thousands" of HFC cars on American roads by 2020.

"We think this is the only alternative-fuel technology right now that comes close to gasoline," says Craig Scott, advanced technology manager for Toyota — and someone who's been working on fuel-cell cars for the company since the program's onset. "There are no compromises, unlike with other alternatives." Scott also works on plug-in electric cars, and loves them, but notes that they are limited by current battery technology; batteries are heavy and expensive, and you just can't drive very far using them as a power source. An HFC car,

however, “looks and drives like a gasoline-powered car” with no range limitations. That is critical, Scott notes. Consumers want to be good environmental stewards — if they can do it without being inconvenienced. “You have to be able to let people drive it like a normal car,” Scott says.

Scott says that politics helped push EVs to the forefront, while relegating HFCs to the back burner, but he also admits that the cars weren’t ready, technologically, for the mass market. “We hadn’t solved durability, or cold weather. These were major engineering hurdles that we spent the past eight years cracking.”

Once Toyota cleared those hurdles, the next challenge arose: making the HFC car affordable for mass production. The original prototypes were valued at \$1 million or more per car. “For the last four years or so we’ve been steadily working on how to get the cost out,” Scott says. “That’s what Toyota does best.”

Toyota welcomes competition, Scott says, because HFCs can only be viable if there’s an infrastructure to support them. And convincing the business world to invest in hydrogen filling stations will require volume — enough cars to make those stations profitable.

He understands that consumers are naturally hesitant to take a risk on anything new, but he’s confident that they’ll come around. After all, when Toyota introduced the Prius, now America’s best-selling hybrid, sales were sluggish. “Fuel-cell cars will probably be polarizing at first,” he says. But over time, people will see that a HFC car has the range and convenience of a gasoline-powered car, with absolutely no emissions. “Then they’ll realize, ‘Why wouldn’t I buy this?’”