

**JOlson**

---

**From:** Harry Braun for President [hb@braunforpresident.us]  
**Sent:** Monday, August 02, 2004 2:33 PM  
**To:** communigraphics@cox.net  
**Subject:** Hydrogen Fueled Engines

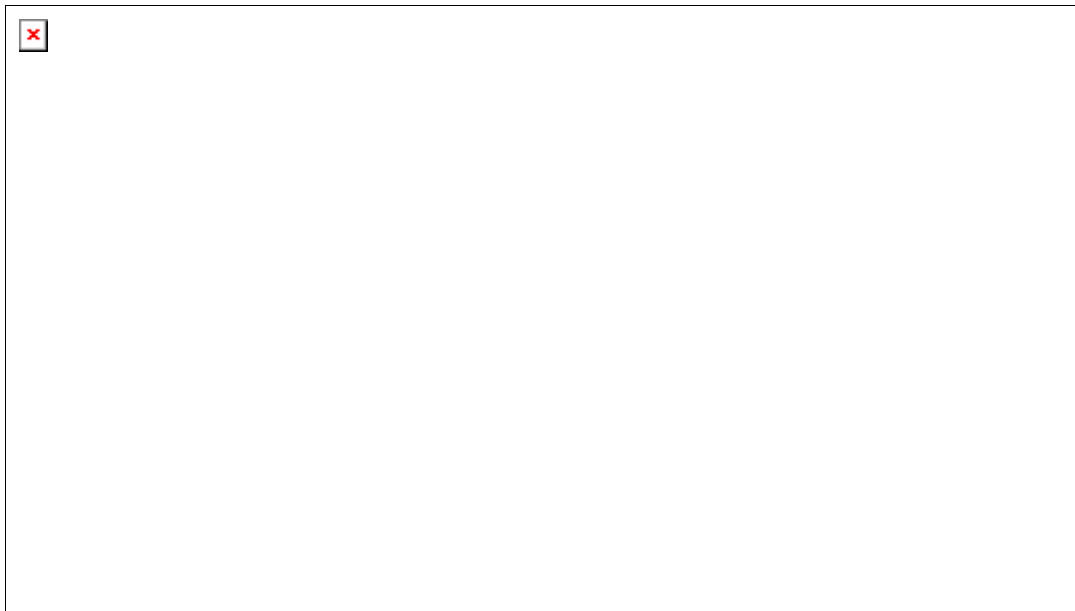


*BraunforPresident.US*

## Hydrogen-Fueled Engines

By Harry Braun

While Bush and Kerry want to wait decades for hydrogen fuel cells Harry Braun's Phoenix Project plan will simply modify all of the existing vehicles and engines to use solar hydrogen fuel.



**A Liquid Hydrogen-Fueled V-12 Engine Developed by BMW.**

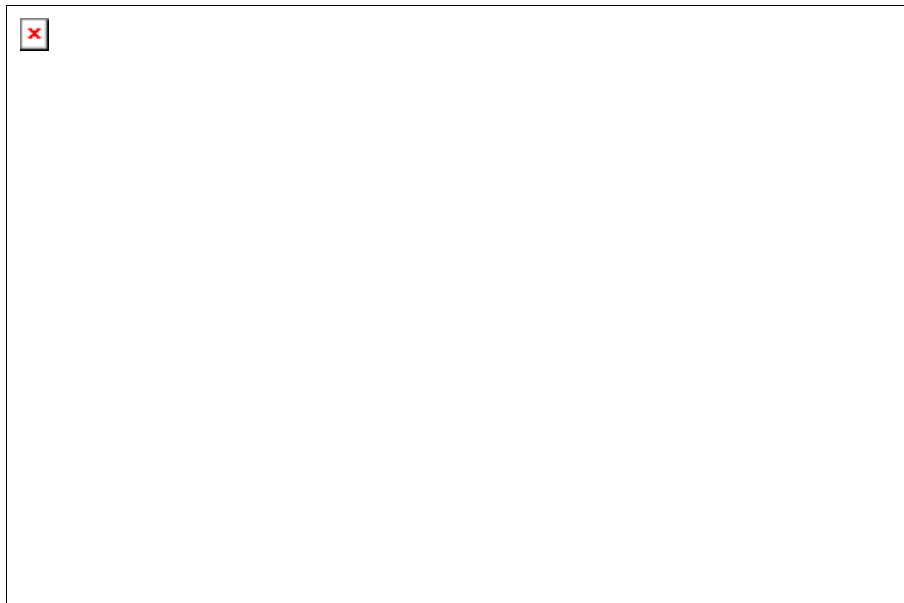
The engine also runs on gasoline with the flip of a switch.

### Modifying Engines

It is important to note that hydrogen is the only "universal fuel," that can power not only fuel cells, but virtually any existing internal or external combustion engine or appliance, including SUVs, hybrid electric vehicles, trucks, aircraft, ships, spacecraft, or a Coleman stove on a mountain-top. According to BMW and Ford, hydrogen-fueled internal combustion engines have been shown to be

25% more energy efficient than their gasoline-fueled counterparts, which form carbon deposits and organic acids that contaminate the engine oil and thereby increase wear and corrosion of the bearing surfaces. Since hydrogen-fueled engines produce no carbon deposits or acids, they will be clean machines that will require less maintenance and have a significantly longer operating life.

BMW has been modifying engines (including the V-12 shown above) to use hydrogen and developing cryogenic liquid hydrogen storage systems for vehicles since the 1970s. The only noticeable difference in the fifth generation cars is that they have two fuel caps, one for gasoline and one for liquid hydrogen. The BMW V-12 engines are able to operate on gasoline or hydrogen with the flip of a switch from inside the vehicle. BMW engineers point out that if liquid hydrogen fuel storage systems are used, which are similar to gasoline in terms of weight and volume, drivers will not have to give up vehicle size, performance or range.



**BMW located the liquid hydrogen fuel tank behind the rear seat.**

The conventional gasoline tank is still located below the vehicle's trunk

Liquid hydrogen is a low-temperature (-253 degrees C) cryogenic liquid, and even the most advanced vacuum jacketed double walled storage tanks allow heat to vaporize 1 to 2 percent of the hydrogen per day if the vehicle is not driven. This is because as the liquid vaporizes, it creates pressure on the tank, which must then vent the expanding gaseous hydrogen either to a small burner (so that a combustible gas is not released into an enclosed space); or to a fuel cell on board the vehicle which can then generate electricity. A more fundamental solution involves the use of a small cryocooler, which is a refrigeration device used by NASA and the U.S. Defense Department to eliminate the boil-off problem cryogenic liquids used by spacecraft and smart weapons systems.

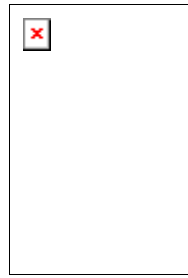
Engineers in Germany and England first began investigating the use of hydrogen as an automotive fuel in the early 1900s, and by the 1930's, literally thousands of

hydrogen-fueled vehicles were in operation in the two countries. One of the principal engineers that made this possible was Rudolf Erren, a German engineer who developed a fuel injection system that allowed the hydrogen to be fed directly into the cylinder, thereby eliminating the carburetor, which was poorly suited to inject a gaseous fuel. The remaining engine components were unchanged, thus the conversion cost was relatively small, and the vehicles were able to operate on either hydrogen or other hydrocarbon fuels while in operation with the flip of a switch from inside the vehicle. All major engines in use at the time were modified, including those manufactured by MAN, Daimler-Benz and Beardmore.

In World War II, the Allies captured a German submarine that used hydrogen to power both their Errenized "trackless" diesel engines and torpedoes. Conventional fuels leave tracks, which are a trail of exhaust bubbles, but when only hydrogen and oxygen were combusted in the engine, the resulting water vapor condensed into the seawater, thus no bubbles were formed that would drift to the surface for a giveaway trail. During surface operation, the submarine's diesel engines also powered an electrolyzer, which separated water into hydrogen and oxygen. These gases were then stored under pressure until needed when the submarine was diving or running submerged. The hydrogen-fueled submarine eliminated the need for large heavy batteries and electric motors needed for underwater operation. The weight and space savings allowed the submarines range to be extended by 15,000 miles and because the hull was strengthened, the vessel was able to dive deeper and faster.

In the 1980s, a self-service liquid hydrogen pump was used by Los Alamos National Laboratory investigators to refuel a modified 1979 Buick. After using this system for over a year, the Los Alamos investigators concluded in their final report that "liquid hydrogen storage and refueling of a vehicle can be accomplished over an extended period of time without any major difficulty." American engineer Roger Billings started modifying vehicles to operate on hydrogen when he was in high school. He eventually modified a wide-range of vehicles, including a Model A Ford and in the 1970's, he modified a Cadillac Seville and Jacobson tractor, as part of a Hydrogen Home that had all of its appliances using hydrogen, including a portable Coleman camping stove.

The national news media have yet to inform the American public about Harry Braun and his Phoenix Project Platform that will transform America into a Solar Hydrogen Superpower. Given the exponential nature of the global energy and environmental problems, we are all like passengers on the Titanic, and there is only a limited amount of time left to change course. While Bush wants to "stay the course," Kerry wants to rearrange deck chairs. Only Harry has the new heading for the solar hydrogen economy, which is why if the American public understands his vision for the future, he will be the next president of the United States.



Harry Braun  
Analyst and Author  
Independent Candidate for President  
6128 North 28th Street, Phoenix, Arizona 85016  
Telephone: 602-977-0888      Fax: 602-955-5444  
Email: [hb@BraunforPresident.US](mailto:hb@BraunforPresident.US)

[BraunforPresident.US](http://BraunforPresident.US)

Please Note: If you do not want to receive any more information  
from the Harry Braun for President campaign  
please click on reply and enter remove on the subject line.