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Water-Powered Cars: Hydrogen Electrolyzer Mod Can't Up MPGs

After batting down the hype over startups and DIYers claiming they could run a car on water, PM's senior automotive editor installs a hand-built HHO kit—only to find he was right the first time. Can bad chemistry keep the myth of the water car alive? More heavy testing in the PM garage will tell.

BY MIKE ALLEN

Water-powered cars continue to be the largest single topic taking over my in box--and the Comments section of this Web site. And it's not just my recent column on the truth about water-chugging prototypes. This trend has become an obsession with many backyard inventors, and some of them have become quite strident, insisting that if I knew anything at all about cars, I'd be embracing this technology. They say it could help change the world as we know it. They even say it could eliminate the energy crisis altogether. For this sentiment, I applaud them. And honestly, I hope it's all true.

Unfortunately, I have to indict their physics. The entire concept of running your car on water is based on bad science. The idea is to use electricity from the car's alternator to electrolyze water into HHO, a mixture of pure hydrogen and oxygen. This mix is fed into the intake air, where it is burned along with gasoline, thereby increasing your fuel economy anywhere from 15 to 100 percent--depending on which Web site you're visiting. Believe the hype, and those 1 to 2 liters of HHO streamed into the engine will double the fuel economy, clean the engine out, and maybe even grow hair. Plenty of these budget sites even claim their devices are efficient enough for a version that would run a car entirely on water--no gasoline at all.

If this sounds like it's too good to be true, it is. And I've discussed it in this column too many times to go over again, so I won't. I've tested way too many bogus gas savers and miracle fuel-saving gadgets over the years to buy in to this one. So it's time to put up or shut up, and do what we do best around here--test drive, generate real-world numbers, and come up with realistic answers.

So, last month I received an electrolyzer, fabricated by my old Monster Garage partner, Steve Rumore at Avalanche Engineering out in Colorado. Steve cleverly designed the device into a steel toolbox, making it portable--just the ticket for someone tinkering with HHO/water/hydrogen/Brown's GasÂpowered conveyances. Steve isn't a gadget geek--his company fabricates championship off-road vehicles. But he was talked into making a couple of HHO units by one of his customers. And why not? The plans are all over the Internet, and the tech isn't very complicated. The unit consists of eight plastic bottles with stainless-steel electrodes, connected up in series--parallel to the vehicle's battery. The cells are filled with plain ol' water and a small amount of potassium hydroxide electrolyte to conduct electricity. A hose conveys the HHO output to the engine.

It took me a few days of puttering around in my shop to get the electrolyzer up and running. I'm using an HKS Camp 2 onboard computer, hooked into an LCD monitor that's suction-cupped to the windscreen, to check things like mass airflow, fuel-injector pulse width, battery voltage and, of course, fuel economy. The Camp 2 took a little debugging, but now I've got the whole science-fiction mess installed in one of our long-term test cars, complete with wires and hoses everywhere and a back-flash trap/flow meter bubbling away on the dash like Dr. Frankenstein's hookah. This fiendish device prevents any backfire-related explosion in the HHO line from propagating back into the electrolyzer. It also provides instant visual feedback of HHO delivery to the intake, as bubbles scurry from the bottom to the top of the water column. Yes, I have it mounted inside the car.

But guess what? My fuel economy is exactly the same, whether the HHO generator is turned on or not. And that's exactly what I expected. This isn't anecdotal evidence from several tankfuls of gasoline. It's steady-state, flat-road testing, and I don't even pretend to have actual economy numbers. I'm using fuel-injector pulse widths directly from the OBD II port. That means I'm measuring the actual time the injectors are open and delivering fuel. When the HHO generator is toggled on, there's no change. And when it's turned back off, there's no change. Well, the computer's system voltage sags a couple of tenths of a volt, indicating the current drain to run the electrolyzer.

Before you HHO proponents start bombarding me with hate mail, chill. You may have some amazing anecdotal evidence that these systems work. But I'm not swayed by over-the-road proof unless the conditions are constant--the variables are too, well, variable. And that includes my own testing. There's too much noise in the data collection, statistically speaking, and quite a bit of room for experimenter bias. From considerable experience with other gas savers, I know even the subtlest change in driving habits can influence the results. I won't be convinced of any fuel savings until I see results on a dynamometer, where I can control everything except the HHO.

I spent a good hour on the phone yesterday with Fran Giroux of hydrogen-boost.com. He tells me that the HHO injection is only an enabler for other devices and changes. The fuel savings doesn't come from the energy contained in the hydrogen as it's burned, which is what I've asserted all along was implausible. Giroux sells a system of modifications that disables the engine management's computer and makes the engine run extremely lean--as lean as 20:1. That's far from the normal 14.7:1. The hydrogen is necessary to let the ultralean mix burn completely, he claims. There's also a heater for the fuel to promote complete vaporization, and some additives for the fuel and oil to complete his system.

Interesting? Why, yes. But there's a catch.

These mods come under the category of tampering with a federally-mandated emissions control system, making it impossible to pass the underhood visual inspection component of many state smog inspections. To pass this underhood check, no part of the emissions control system can appear to have been modified or disabled. Add in the OBD II pass-fail to the smog check, and odds are these modifications will keep you from getting a smog sticker. That means you might have to disable--and perhaps remove--the system to pass the annual test. Just don't get caught in between.

I had another long talk yesterday with Steve Rumore, my off-road buddy turned HHO donater. He's experimenting with several vehicles, and actually getting some consistent results--fuel-economy

improvements to the tune of 10 to 12 percent on diesel trucks pulling trailers. He's tinkering with some of the same things Giroux is suggesting. We're looking into ways to refine both his and my experimental methods. But I'm convinced there's a lot of placebo effect. I also think that these mods may be increasing fuel economy independently of the HHO injection. So stay tuned, because we're still testing. Once we get some more data onboard, we'll be dyno testing.

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