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GENERATOR



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TECH:
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LOW-DOLLAR
TRAILER BUILDUP

STORY AND PHOTOS BY DAN DELASANTOS

Contributing Sources: Umpqua Energy's
& H&M Transmission Services

In my quest to find fuel economy alternatives for sand sports enthusiasts, I began searching for a hydrogen gas assist solution. I have been hearing about hydrogen fuel alternatives becoming more accessible. The rumors of exceptional fuel mileage have been circling the globe for years. Recently, I explored the internet only to find "HHO" systems everywhere I turned. After some extensive research and reference checks, I had the good fortune to find Umpqua Energy of Medford, Oregon. Unlike so many companies I ran into, Umpqua's description of "Brown Gas" technology combined with their extensive knowledge of all the components intrigued me. Further investigation set this high tech company a cut above the rest.

Umpqua has a long history of providing HHO technology to the commercial diesel truck industry and has recently produced an HHO system for personal diesel vehicles. They shipped one of their Hydrogen generators and installation kits to us to be installed by our ASE trained technician Paul Harris of H&M Transmission. Paul has



HYDROGEN POWER

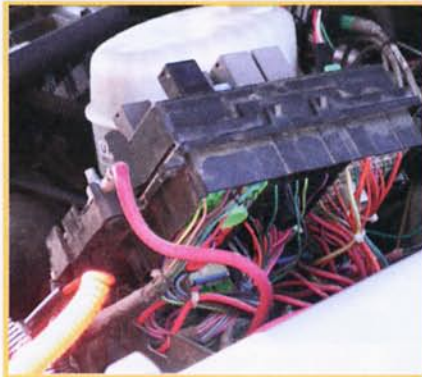
Using hydrogen gas to save a buck makes sense

extensive knowledge of early and late model diesel trucks which made him the perfect candidate for the installation. While there was some intricate installation required by a trained professional to get the system up and running, our testing took place the next day as scheduled.

Once again, we used our used 2003 GMC 3500 4X4 dually crew cab with automatic transmission and air conditioning as our test vehicle. All facets of the installation were approved by Dan Wells of Umpqua.

HERE ARE THE RULES WE FOLLOWED FOR TESTING:

1. Conduct three tests with and without the use of the module and controller
2. 1st test — 35 miles of freeway driving without a trailer
3. 2nd test — 25 miles of freeway driving with a trailer
4. 3rd test — 25 miles of steep mountainous driving without a trailer
5. Maximize lowest volume of traffic (time of day) during each test
6. Use the exact same starting point and destination as planned for each test
7. Use the same fuel station and level platform before and after each fill-up
8. Top off tank after every test
9. No drafting behind any type of vehicle



There was very little room in our GM truck for a HHO generator. So, to avoid the heat of the engine and to accommodate the size of the generator, the unit was installed just behind the grill, in front of the radiator. Wiring was spliced into stock relay panel.

- (drafting can increase fuel mileage)
10. Eliminate human error by using cruise control whenever possible
11. Never exceed the speed limit
12. Use odometer, speedometer and a GPS as a source of speed verification
13. Use a certified mechanic for all installations
14. Work directly with Umpqua technical support during installation and testing of the HHO system.
15. Start with a clean air filter, new engine oil, new transmission oil and proper air pressure in the tires.

16. Use a 6,500-lb Hallmark trailer for testing

TESTS & RESULTS

The following information is a brief rundown describing the results that we obtained from the different tests performed.

FIRST TEST: HIGHWAY MILES WITHOUT TRAILER

This test took us from Castle Rock to Lakewood, near Bandimere Raceway, without a trailer on Interstate 25 and C-470.



Both highways are considered to be basic freeway driving, having standard inclines and descents.

Results without the HHO system:
Miles: 35.5
Fuel Usage: 2.31 gal.
Mileage: 15.3 mpg

Results with the HHO system:
Miles: 35.7
Fuel Usage: 1.71 gal.
Mileage: 20.8 mpg
The first test shows we obtained an increase of 5.5 mpg.

SECOND TEST: HIGHWAY MILES WITH TRAILER

The next test took us from Lakewood to Littleton, pulling a trailer weighing 6,500-lbs. on Highway C-470. Again, this highway includes basic freeway driving conditions, with some standard inclines and descents.

Results without the HHO system:
Miles: 26.2
Fuel Usage: 3.01 gal.
Mileage: 8.7 mpg

Results with the HHO system:
Miles: 26.4
Fuel Usage: 2.16 gal.
Mileage: 12.2 mpg
The second test shows we obtained an increase of 3.5 mpg.

THIRD TEST: STEEP MOUNTAINOUS MILES W/O TRAILER

The last test took us from Castle Rock to Rampart Range, above Sedalia, on Highway 85 to Highway 67. These driving

conditions were considered steep with switchbacks. Our final destination increased our altitude by 1,000 feet in 26.3 miles.

Results without the HHO system:
Miles: 31.3
Fuel Usage: 2.01 gal.
Mileage: 15.5 mpg

Results with the HHO system:
Miles: 30.7
Fuel Usage: 1.56 gal.

Mileage: 19.6 mpg
The third test shown we obtained an increase of 4.1 mpg.

Unlike a module and controller system, the vehicle computer did not readjust while we were testing the HHO system. Different vehicle makes, model, year, engine size, tire size, air pressure, weather, etc. may also produce variable results. Excessive turbo boost with this system can reduce fuel mileage. The purpose of the test was to use basic driving skills with this hydrogen system to produce better gas mileage between fill ups.

Here are some installation tips to remember when using a hydrogen gas system.

- Hydrogen gas is easily ignited. Caution should always be taken when working with this type of alternative fuel. When connecting the hydrogen generator to 12 volts, we advise using a vehicle power source that utilizes either a time delay shut off or the primary power position on the ignition key. This will prevent the generator from producing hydrogen gas before the engine is started, which can possibly cause a safety concern.

- Hydrogen hates heat. High temperatures can break down the gas and produce vapor rather than hydrogen. Where you install your generator is crucial. We installed ours in front of the radiator where it has plenty of room and receives plenty of cool air. Insulating the hydrogen host feeding the air intake will further maintain the hydrogen's temperature.

Continued on page 96



TOP, after the system is first installed, the generator requires a pre-burn "cocktail" of Pellegrino sparkling water mixed with Aquafina bottled water. This helps the system with the pre-burn procedure. After that, all that's necessary is regular bottled drinking water added to the generator tank every 800 to 1,000 miles. ABOVE, hydrogen is an extremely thin gas that can cause microscopic cracks or fractures in the engine block. So, to prevent this from happening, Xado is added to the engine oil. Xado is an additive that will coat the engine block and eliminate the corrosive effects of hydrogen gas. The result is better performance and extended longevity of the engine block.

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• The system comes with an amp meter to monitor the draw from your battery. Don't let your system draw more than 20 amps or you may blow the inline fuse.

• Some electrolysis plates require a pre-burn before they produce the optimum amount of hydrogen. This process can take a few hours before they are adequately burned and ready for service. May we recommend the prescribed one-time water cocktail of 2 ounces of Pellegrino sparkling water and the remaining volume of Aquafina (or similar) drinking water? After the burn, all you will need is Aquafina (or another brand of drinking water) every 800 to 1,000 miles.

• One of the reasons generic hydrogen generators don't provide fuel saving effects is due to the mismatch of electrolysis plates to the size of the engine. These plates need to be the right size to match the number of liters the displaced by the engine. Slightly larger or smaller plates can result in a deficiency of fuel economy. Make sure to install the right size generator for your engine.

• Hydrogen is an extremely thin gas which can cause microscopic cracks or fractures in the engine block. To prevent this from happening, Xado (an engine block coating) is added to the engine oil in order to coat the block, preventing this destructive effect from occurring. The result is better performance and the extended longevity of your engine block. The application will last approximately 100,000 miles.

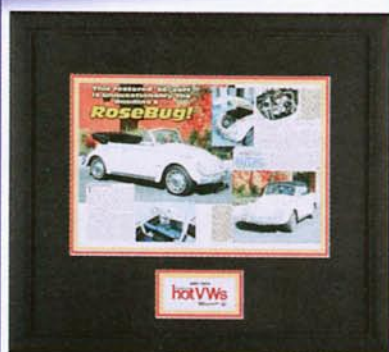
It is my opinion that Umpqua Energy produces one of the few efficient hydrogen generators on the market today and, by installing their system, recreationists can expect gas saving results shortly after the installation is complete. Their research in this technology and understanding electrolysis, hydrogen and the resulting impact to the engine is exceptional.

Using this system in conjunction with a module and controller can potentially produce increased fuel mileage results. What this means to the sand sports enthusiast is a reduced use of fuel. Although we experienced better results without towing, it is noted that there was still a recognizable increase in mileage while pulling a trailer. Beyond the fuel economy, we experienced an increase of approximately 15% in engine power. With the introduction of hydrogen to the engine, fuel emissions become virtually nonexistent. Every little bit counts when you're trying to get to the dunes!

For more information on Umpqua Energy, visit <www.umpquaenergy.com> or call (541) 225-2493. To contact H&M Transmission, either visit them on-line at <www.hmtransmission.com>, or call (303) 663-5578.

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