

**Thinking of
Converting a Car
to Burn Water
and Gas?**

Read this first!

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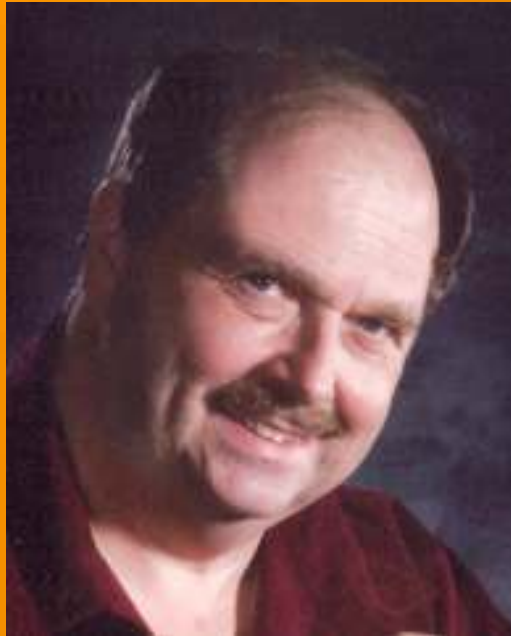


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Featuring



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Entropy

- *a measure of the unavailable energy in a closed thermodynamic system that is also usually considered to be a measure of the system's disorder*

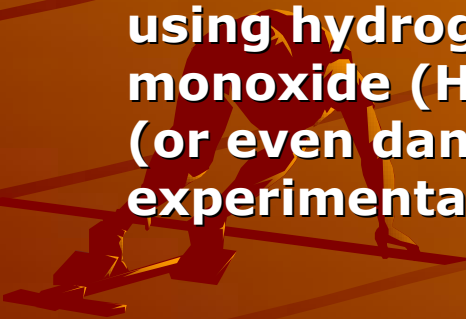
– Merriam-Webster Dictionary



HHO – Dihydrogen monoxide

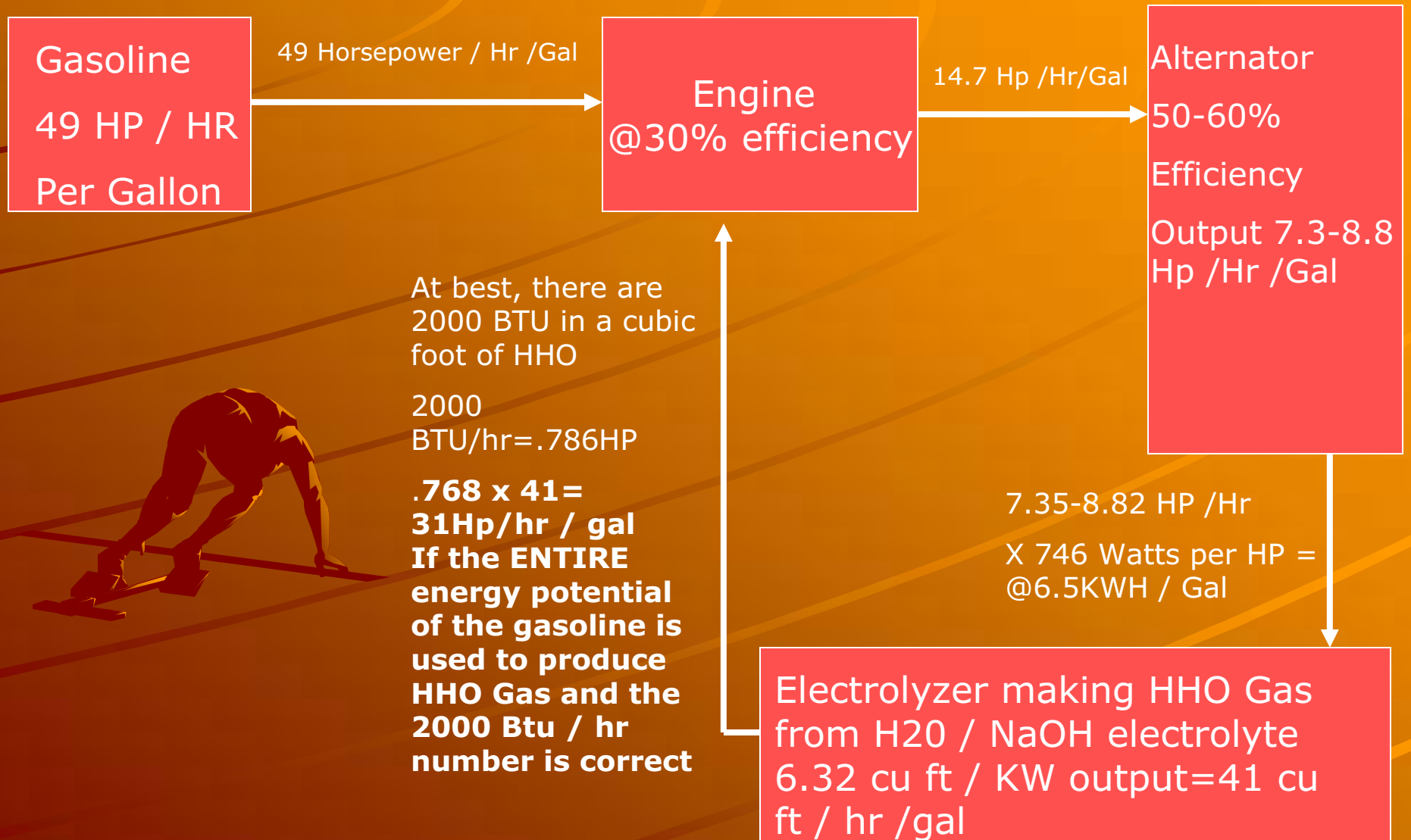
- *a reconfiguration of water molecules into a string of hydrogen-hydrogen-oxygen atoms*
- *Also called Brown's Gas, Knall Gas, Aquygen, or Klein's gas, after various people who use it in energy saving systems and felt they needed to rename it for marketing purposes.*
- **VERY EXPLOSIVE AND DANGEROUS TO STORE IN ANY QUANTITY WHEN USING HOMEMADE CONTAINERS!**



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- **Recently there has been great interest in HHO systems for gasoline engines. The promises of “Run your car on water” and “Free fuel” are enticing but do they actually deliver?**
 - **The short answer is no. The claims violate the laws of thermodynamics and are not supportable.**
 - **It helps to understand why the HHO approach is not feasible, while keeping in mind that hydrogen, the main component of the system IS a viable energy storage medium, when used properly.**
 - **Understanding the difference between energy storage using hydrogen and “free energy” from dihydrogen monoxide (HHO) is essential to avoiding a disappointing (or even dangerous) misadventure into hydrogen fuel experimentation.**

All opinions expressed in this presentation are supported by facts available on Google or Wikipedia. As of composition date, the authors are expanding the data through experimentation but are relying herein upon commonly accepted facts and the numbers claimed by the HHO system manufacturers

Energy losses in the HHO "Fuel Saver" Cycle



Entropy is a bummer!

- Running at full potential it is clear that even with highly optimized assumptions (such as 2000 BTU per cubic foot (More likely around 700)) the previous slide shows that, at best, full HHO conversion is a dandy way to turn 49 horsepower of energy potential into 31 horsepower of realized energy. That is a 36.8% loss!
- That is not the whole story however, because the cycle, as shown, uses ALL of the energy in the gasoline and ALL of the alternator's capacity in the HHO production effort and assumes an electrolyzer capable of using this level of energy, leaving no alternator output to continue firing the engine, recharging the battery or powering the vehicle accessories.

The hard truth

- **If we return to the world of proven numbers, and use a more realistic 783 BTU / Cu Ft for the energy in the hydrogen and assume we use a more realistic 10% of the alternator output for HHO production, we see that, per hour, we get 1.26 horsepower of HHO energy for the 10% loading on the system.**

The Bottom Line

- **In a perfect world, the HHO conversion process diminishes total throughput by 37%(using optimistic numbers used to market the system)**
- **Using realistic numbers the system reduces throughput by 85%**
- **A gasoline engine diminishes throughput by 70% which is why it needs a cooling system to dissipate the wasted energy**



The Bottom Line (continued)

- **In a real world system assessed using commonly obtained rather than highly optimistic data, the system delivers a maximum possible 2% gain but that is only if there is 10% excess energy available from the alternator that would otherwise dissipate as heat without being returned to power production.**
- **At best, a 2% savings (1/2 MPG average) COULD be seen but it is unlikely. The electrolyzer would have to possess enough electrode area to utilize the input energy and produce 4.1 cubic feet per hour of HHO gas. That is 116 liters per hour of gas production. One popular system sold online boasts "Produces 30 liters per hour!" That's .32 HP per hour from HHO gas!**

Why some claim a better result

- Some claim 25% or better fuel savings. When challenged, it becomes clear that they have adjusted the mixture set point of their engine computer on the recommendation of the HHO system manufacturer. This adjustment (and not the HHO system itself) results in the mileage gain (but also increases engine exhaust gas temperatures and shortens engine life).
- Diesel engines may experience a real savings with the HHO system because diesel oil is injected in the liquid rather than gaseous state resulting in a slower burn rate. The HHO is theorized to burn quickly and atomize the droplets speeding up combustion and lessening waste. This is the one application where the HHO system may be useful. More research is needed to confirm this theory.

Conclusion

*There is no free lunch but
condiments CAN be
combined to enhance
flavor and value.*

Bottom line...

DON'T DRINK THE WATER!