An Analysis of the Viability for the H2O Powered Car

Alternative fuels for cars have long been theorized and attempted from Biomass to Solar, the new trend seems to be that of the “hydrogen economy”, the idea of generating energy through the combustion of hydrogen gas (Clark, 2012). Followers of the hydrogen economy movement espouse it for its promise of low carbon emissions and the relative abundance of hydrogen gas. The current proposal from Unomax is a car that, “splits the supplied water (H2O) into its components, hydrogen and oxygen, through a chemical reaction” and then combusts the hydrogen gas to create energy (Lonhak, 2003). This design if possible seems like an excellent idea with nearly no flaws and a perfect alternative to the current model which uses expensive fuel and generates relatively large amounts of carbon emissions. It is possible for hydrogen fuel cell cars to exist and in fact there are some hydrogen fuel cell cars that drive around, and it is growing, in California there are “35 currently operating hydrogen fueling stations” (Thompson, 2018). Despite the growing market for hydrogen fueled vehicles the proposed design for this H2O car by Unomax is a thermodynamically impossible and incredibly inefficient machine.

This design is completely unfeasible as it needs to break the laws of thermodynamics to produce any net energy. The process of generating this energy according to Unomax is through two steps, first the electrolysis of the water and then the recombination through combustion of the hydrogen gas into water as can be seen in Equation 2 and Equation 3. Hess’s law states that “The enthalpy change of a physical or chemical process depends only on the initial and final conditions of a process” thus the enthalpy change can be simplified as the conversion from water as a liquid into water vapour as a gas as seen in Equation 1 (Clancy, et al., 2011). This conversion from a liquid to a gas is known as evaporation and when measuring enthalpy change it is known as the enthalpy of vaporization, and the enthalpy of vaporization must always be positive as energy is absorbed when a substance changes from a liquid to a gas. Therefore, since the total enthalpy change of these two reactions must be greater then zero and thus this process requires more energy to occur then is generated from it and the net energy produced is less then zero. If this design were to be functional and Unomax had a prototype it would be breaking one of the most fundamental laws of the universe, the first law of thermodynamics which states that “energy is neither created nor destroyed” (Clancy, et al., 2011). For this reaction to work it requires that somehow the system releases more energy then it puts in causing it to be more then 100% efficient, which breaks this first law of thermodynamics. Another large flaw in the design of this car is the claim that the car “does not use batteries to split the water molecule into its components” (Lonhak, 2003). To split the hydrogen and oxygen gas from the water molecule requires some sort of energy to break the bonds and the modern method of doing that is through a process known as electrolysis using batteries. It is impossible to break the bonds of water without an external energy source according to the first law of thermodynamics which restricts us from creating energy. Thus, there must be some sort of finite energy source on board to initiate the reaction or else there would be no energy to break the bonds of the water molecules. Overall this entire process and design is completely impossible and if any prototype were to be created it would break the laws of thermodynamics and all of modern physics and chemistry would have to be rethought if somehow energy could be created out of nothing.

Equation 1. Liquid water into Gaseous Water

Equation 2. Production of water through combustion(Enthalpy given)

Equation 3. Production of hydrogen gas and oxygen gas through the electrolysis of water(Enthalpy found through calculations)

# Bibliography

Clancy, C., Farrow, K., Finkle, T., Francis, L., Heimbecker, B., Nixon-Ewing, B., . . . Thomas, T. (2011). *Chemistry 12.* Whitby: McGraw-Hill Ryerson.

Clark, D. (2012, October 11). What's the 'hydrogen economy'? *The Guardian*.

Lonhak, K. (2003, March 18). BREAKTHROUGH: H2-O-CAR IS THE FUTURE OF TRANSPORTATION. *Evening Times*.

Thompson, A. (2018, August 10). *Where Are All the Hydrogen Cars?* Retrieved from Popular Mechanics: https://www.popularmechanics.com/cars/hybrid-electric/a22688627/hydrogen-fuel-cell-cars/