



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Brenden J. Geary</b>	<b>Project Number</b> <b>S0617</b>
<b>Project Title</b> <b>Fuel on Tap: H(2)O Energy. How to Power an Engine with Water</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The need to create a clean burning fuel is unquestionable, scientists all around the world are scrambling to find one. My project was designed to solve this problem with hydrogen and oxygen gas derived from water mixed with an electrolyte. The concept is to build a scale model of a system that can be placed in an automobile or any other device powered by an internal combustion engine.</p> <p><b>Methods/Materials</b> A hydrogen dry cell, powered by one 12v deep cycle battery, breaks the chemical bonds of water as shown here: <math>2H_2O \rightarrow 2H_2 + O_2</math> this is achieved by the process of electrolysis. The hydrogen and oxygen gas mixture will then bubble up a column of water in the bubbler. This does two things; first it filters out sodium hydroxide fumes created by the electrolyte. Secondly in the event of an ignition of the gas, it prevents the explosion from reaching the hydrogen dry cell and the water tank. The output of the bubbler is connected to the fuel line of a 212cc four-stroke gasoline engine. The motor burns the hydrogen and oxygen gas in place of gasoline. The engine then turns an alternator producing DC current which charges the 12v deep cycle battery.</p> <p><b>Results</b> The hydrogen dry cell and its counter parts worked beyond expectation in terms of the amount of hydrogen and oxygen gas that was produced. The hydrogen dry cell produced 3 liter of gas in 43.6 sec. This was achieved with a half-gallon of water and ten tablespoons of sodium hydroxide drawing 23 amps of electric current.</p> <p><b>Conclusions/Discussion</b> I was able to start the engine on hydrogen and oxygen gas derived from water. The engine ran for a total of three hours and it could have run longer, but that was when I had collected enough data. The system operated just as I had designed it and met all of my design requirements. I believe with some refinements, my project can be scaled up and implemented into a full scale automobile.</p>	
<b>Summary Statement</b> Powering an engine with Hydrogen and Oxygen gas, derived from water.	
<b>Help Received</b> JLMC, Inc., a Sheet metal shop cut, formed and welded the parts I designed.	