



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Azad Doulat	Project Number J0910
Project Title The Effects of Voltage on the Efficiency of a Hydrogen Cell	
Abstract Objectives/Goals The objective is to determine if altering the input voltage to a standard electrolyzing fuel cell alters the efficiency of that cell. Methods/Materials The cell was hooked up to a power supply, and the input voltage and amperage was carefully monitored by multimeters, until enough units of hydrogen had been produced. The same measurements were taken with a wattmeter with regards to output voltage and amperage, and the data was calculated to find energy, power, and efficiency. Results Increasing the input voltage increased the overall efficiency of the hydrogen cell/electrolyzer, with the increase lessening slowly as the input voltage approached maximum, eventually causing the efficiency to dramatically decrease when voltage reached 95% of the maximum possible input for the cell. Conclusions/Discussion Manipulating the voltage in a hydrogen fuel cell can allow for far more efficient hydrogen and energy production, but increasing input voltage too much can damage the cell's efficiency, resulting in a drop in energy output. As such, careful management of voltage can make an already clean fuel far more energy efficient, as long as it is managed carefully.	
Summary Statement Can hydrogen fuel cells be made more efficient by manipulating input voltage and amperage?	
Help Received Parents helped format display; Resources from school laboratory; Theoretical and tutoring help from J. Shirajian and J. Nuttall	