



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Sabeeha F. Baqui</b>	<b>Project Number</b> <b>S0605</b>
<b>Project Title</b> <b>Efficient Water Electrolysis to Fuel Our World</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Renewable energy is one of the major themes of research today; scientists are working on energy types such as solar energy, hydrogen fuel cells, and hydroelectric power, but the ultimate goal of renewable energy is to be able to create an efficient and constantly available source of power. An idea that has recently come up in scientists' search for renewable energy is the electrolysis of water. Scientists have long known that the separation of water and hydrogen molecules has the potential of creating high energy chemical energy, but they lacked an efficient catalyst for this reaction. The search led them to cobalt, used in the form of cobalt nitrate in the experiment. The purpose of this experiment is to test the change in efficiency that results due to the addition of a catalyst, and explores the potential of these added compounds to lead to a greener industry. It is hoped that this experiment and others like it will increase public awareness about the importance of this discovery to the renewable energy industry, and increase the possibility of this becoming a worldwide used power source.	
<b>Methods/Materials</b> I conducted this experiment with a simple circuit on a breadboard, consisting of a nine volt battery and a resistor, which is hooked up to an electrochemical cell. While conducting the experiment, I first began by taking a reading of the battery voltages only, and then connecting up the electrochemical cell with the phosphate buffer and measured again, before the addition of a catalyst. Afterwards, I added the catalyst and measured the voltage for each nitrate salt and each resistor value.	
<b>Results</b> Overall, I found that my hypothesis had been proved correct, and that the efficiency of the reaction was greatly increased after the addition of the catalyst. I also found that the better functioning resistor was the 10K ohm, and that silver nitrate is the best catalyst.	
<b>Conclusions/Discussion</b> The applications of this device are many, but the main concern of this experiment was improving the catalyst used to power hydrogen cars. This source of power can also eventually be utilized to power homes and industries.	
<b>Summary Statement</b> My project concerns finding effective catalysts for a new, efficient, and environmentally-clean form of energy.	
<b>Help Received</b> science teacher, Ms. Hajar Ibrahim	