



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Sneha S. Bhetanabhotla	Project Number J0201
Project Title Energy Generation Using Reverse Electrowetting	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Reverse electrowetting is the process in which conductive fluid drops generate electric potential when made to flow between electrodes. The purpose of this research is to generate electricity using reverse electrowetting and study how this is affected by these variables - the speed of solution drops, the electrode materials and solutes, and the channel lengths. My hypotheses were as follows:</p> <ul style="list-style-type: none">- The faster the conductive fluid drops move, the more energy will be generated.- If the conductivity of the fluid is more, then the amount of energy generated will be more.- If the electrode material has a higher conductivity, then the amount of energy generated will be more.- If the channel between the electrodes is longer, then the amount of energy generated will be more. <p>Methods/Materials In this project, water, sodium chloride, and potassium chloride solutions were used as conductive fluids, and brass and steel plates as electrodes. Plastic rods were kept between the electrodes to make a fluid channel for the solution to flow. The solution was poured into a balloon, and an NXT robot was used to compress the balloon at different speeds to make the solution flow into the channel. Voltage readings were taken as soon as the solution began flowing through the electrodes.</p> <p>Results My analyses for my hypotheses were as follows:</p> <ul style="list-style-type: none">- Less energy was produced when the speed of the conductive fluid drops increased, as at higher speeds, the fluid might have moved as a stream instead of as drops.- The energy generated was more when the conductivity of the fluid was more. The energy generated is higher for the Sodium Chloride and Potassium Chloride solutions than for water as those are electrolytic solutions with higher conductivity.- The electrode material with the higher conductivity, brass, produced lower voltages than the electrode material with the lower conductivity, steel, because electric charge accumulated more on less conductive material.- The energy generated became more when the length of the channel between the electrodes became more, because more drops could be present on the electrodes at one time. <p>Conclusions/Discussion Thus, my research proves that energy can be generated using reverse electrowetting, and more energy can be generated using more conductive fluids like metallic fluids and more number of drops in thin, long, fluid channels.</p>	
Summary Statement Using reverse electrowetting for generating electricity which can be used as energy source for portable electronic devices.	
Help Received My father helped in acquiring all the needed materials for the experimental set up. My mother reviewed my presentation and the project board.	