



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

<b>Name(s)</b> <b>Khush M. Kharidia</b>	<b>Project Number</b> <b>J1016</b>
<b>Project Title</b> <b>Power Your Gadgets Using a Green Outlet All the Time</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Climate change and controlling greenhouse emissions has become a major issue. The U.S. has a goal of getting 25% of the country's energy from renewable resources by 2025. Energy usage in households has increased 15% due to the exponential growth of electronic gadgets. I am motivated to address the energy issue by providing a low cost solution for generating clean energy for every household. My project demonstrates that you can charge and operate electronic gadgets used in a household without using an electric outlet. <b>Methods/Materials</b> I used a 10W solar panel, a 5W wind mill, and a 1W human powered bicycle to convert renewable energy and store it in the battery. I used a two battery system. The energy from renewable resources is stored in one battery while the other battery is used to charge and operate the electronic gadgets. Each battery's function is switched daily. The two battery system allows an uninterrupted operation under all weather conditions. The regulator converts the battery voltage into 3V-8V needed by the appliances. <b>Results</b> The daily power required to operate the electronic gadgets in my house is 8 Wh. The average daily power generated using solar, wind, and human power is 22.5 Wh. This shows that the power from renewable resources is sufficient to operate the electronic gadgets and keep the backup battery charged. I charged and operated all 3V-9V electronic gadgets for two weeks using the clean energy adapter. The time it took to charge the electronic gadgets using the green outlet was similar to the time it took to charge them using an electric outlet. <b>Conclusions/Discussion</b> I was able to charge my electronic gadgets using the clean energy adapter under all weather conditions. If every household in the U.S. uses the green outlet, 2,750 mega watts of energy can be saved every day. More importantly, a different electric adapter for each gadget is no longer needed. My adapter design has multiple terminals which allow simultaneous charging of multiple gadgets. I learned about the parameters that can affect wind power and about series and parallel connections.	
<b>Summary Statement</b> Operating all electronic gadgets using renewable energy generated at home at a low cost.	
<b>Help Received</b> Father helped get material and make adapter; Mrs. Castagna and Mrs. Makhijani helped correct papers	