



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Adeline M. Longstreth</b>	<b>Project Number</b> <b>J0913</b>
<b>Project Title</b> <b>Zoom Zoom: Which LEV Is the Best Spark for You?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> With gas prices at an all-time high this past summer, many people want to be green and reduce their transportation cost. This project is testing whether an electric bike can be built for the same cost as an electric scooter and be more energy efficient.</p> <p><b>Methods/Materials</b> Materials for making an electric bike included a bike with 26 inch wheels, steel forks, and at least 3 3/4 inch dropouts, a go hub front wheel motor, speed controller, thumb throttle, split lock washers, Velcro belts, two 16 gage wire series connectors, and three seal lead acid 12 volt batteries. Materials for testing included a Digital Volt Meter, radar detector gun, plastic cones, measuring tape, and an I-ZIP 650 electric scooter. Riders of the same weight rode the electric bike or electric scooter the same distance uphill, downhill, around the block, and around two cones in a figure eight pattern. After each test the battery capacity was measured with a Digital Volt Meter and the results were recorded. Ten trials were done for each type of test.</p> <p><b>Results</b> The electric bike was more energy efficient in the Downhill Test, Around the Block Test, and Turning Test. The electric scooter was more energy efficient in the Uphill Test. On average the electric bike used 0.078 volts for the Around the Block Test, 0.006 volts for the Downhill Test, and +0.003 volts were gained for the Turning Test. The electric scooter used 0.104 volts for the Around the Block Test, 0.043 volts for the Downhill Test, and 0.006 volts for the Turning Test. The electric scooter only used 0.016 volts for the Uphill Test while the electric bike used 0.045 volts.</p> <p><b>Conclusions/Discussion</b> My project could be used for everyday commuting needs. The electric bike is better for turning, going around the block and downhill, but the electric scooter is better for going uphill. The electric bike has more mass because it is heavier therefore making it harder to go uphill. Use of an LEV may depend on the type of commute. The reason the electric bike was more efficient could have been because the electric go hub motor is brushless, which is more energy efficient. While the electric scooter has a brushed motor that is also on a chain drive which uses energy too. The researcher found the cost of both Light Electric Vehicles "LEVs" were close to each other, therefore more people should build electric bikes.</p>	
<b>Summary Statement</b> This project is testing whether an electric bike can be built for the same cost as an electric scooter and be more energy efficient.	
<b>Help Received</b> Mother drove me to pick up parts; Neighbor taught me how to crimp battery wires and attach connectors; Danny Ray, the founder of Ampedbikes, lent me his wife's electric bike as a model, and answered my email questions; Users on ampedbikes.com forum helped me in problem solving.	