



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Ryan Bogie; Robert Larsen; Michael Yoshimura	Project Number S0502
Project Title Fuel Go Boom	
Abstract Objectives/Goals To measure the energy output during the combustion of biodiesel- petrodiesel fuel blends To determine which fuel/fuel blend will optimize energy output Methods/Materials 0.250 L of biodiesel 0.250 L of commercial-grade petrodiesel Benzoic acid tablet Iron fuse wire Bomb calorimeter XLinX Software 1)Place sample in crucible 2)Twist fuse wire onto both ends of calorimeter to allow a current to pass 3)Place wire so it comes in contact with sample 4)Assemble calorimeter 5)Detonate bomb 6)Record temperature change using software 7)When temperature graph asymptotes, remove and clean bomb. 8)Repeat steps 1-7 for other samples. Results Biodiesel yielded 8556.90 kilocalories per liter of fuel combusted. 50-50 biodiesel to petrodiesel blend yielded 8415.01 kilocalories per liter of fuel combusted. Petrodiesel yielded 8324.81 kilocalories per liter of fuel combusted. Conclusions/Discussion The hypothesis of the experiment was correct. As the percentage of biodiesel increased in a biodiesel-petrodiesel fuel blend, the energy output increased in a somewhat proportional manner. This helps to demonstrate the feasibility of biodiesel as a mass-produced alternative fuel. In order to better model this relationship, a greater variety of fuel blends should have been used. This was unable to be accomplished due to time-restraints in the lab. Overall, project was valid. Little systematic error, and the errors caused by uncertainties in lab equipment would only yield a $\pm 0.6039\%$ change in the worst-case scenario.	
Summary Statement This project measured the average energy output during the combustion of biodiesel, commercial-grade petrodiesel, and a 50-50 mixture of the two	
Help Received Used lab equipment at University of California RIverside under the supervision of Dr. Zhang and two graduate students; Mr. Larsen, father of partner, helped in the construction of the board; Mr. Bernard Ramey helped attain biodiesel sample	