



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Rohan Chakicherla	Project Number J1201
Project Title Environmental Impact of Manipulation of Traffic Controller Algorithms	
Objectives/Goals My goal is to reduce the total number of stopped/idling vehicles at intersections, which should significantly reduce emissions. I propose that factoring in the ratio of the number of vehicles on an arterial street to the number of vehicles on secondary streets in existing traffic controller algorithm will reduce total number of idling vehicles at an intersection and therefore reduce emissions.	
Abstract Methods/Materials This project describes the design procedures of a real life application of a smart Traffic Light Controller. The changes that this design proposes allow the maximum usage of the existing controllers being used in the Tri-Valley with minimum capital investment. Numbers of primary and secondary cars per traffic-light change were counted at different intersections. Fuel consumption at intersection was computed using modified formula. Emissions of the CO, NOx, Voc for primary and secondary cars were calculated (Excel). Ratios of Primary/Secondary cars were calculated and graphed and threshold for optimal P/S ratio was computed. Hypothetical benefits of using the threshold were computed. Several scenarios were simulated using Visual Basic Programming. Threshold was applied in simulation.	
Results Real-life traffic measurements, and calculations using these measurements, show in this study that CO emissions per signal light change at suitable arterial-versus-side intersection in the Tri-Valley area is approximately 5.55 grams. Simulation of the implementation of my traffic algorithm reduced the ratio of P/S cars at suitable intersection from 6.05 to 1.4. This also reduced the CO emissions per signal light change at suitable intersections in the Tri-Valley area to approximately 1.51 grams.	
Conclusions/Discussion I conclude from these results that there is a potential of reducing up to 7% of CO emissions caused by idling of cars at all suitable intersections in the State of California by implementing my proposed algorithm. Implementation of my proposed Traffic Light Controller could have a significant economic and environmental impact on the Tri-Valley area.	
Summary Statement Factoring in the ratio of number of vehicles on an arterial street to number of vehicles on secondary streets in existing traffic controller algorithm reduced total number of idling vehicles at suitable intersections, reducing emissions.	
Help Received Dad drove me, taught me Excel. Dad's friend gave pointers on Visual Basic, Mentor gave industry formulas.	