URBAN CONCEPT ELECTRIC PLUG-IN VEHICLE
SHELL ECO-MARATHON COMPETITION

Team 6: Josanne Batson, Gina Chin Fatt, Mike Wolff

The Shell Eco-Marathon, held by the global group Shell, is an international competition that provides both high school and college students the opportunity to "design, build and test" energy efficient cars. There are two main categories, whereby our team will be participating in the one that focuses on a roadworthy four-wheel car: The urban-concept plug-in battery category.

The research for alternative fuels has accelerated in recent years has increased due to the 2009 changes in the Corporate Average Fuel Economy (CAFE) regulations and the Energy Independence and Security Act of 2007. This has propelled the electric car industry into higher production rates and new technologies. The electric car offers a reduction in the world’s carbon footprint and CO₂ emissions. The plug-in electric vehicle reduces the international dependence for an energy source and a 60%-70% cheaper price than gasoline.

The proposed design will closely resemble a conventional car with four wheels, brake and indicator lights, windshield wipers and tires for wet-weather running as well as a hydraulic disc-brake system. It will be driven on the 6 miles road track at an average speed of 15 miles per hour, with designated stopping points, simulating a real world driving scenario.

With given restrictions on size and weight of the vehicle, the type of battery and maximum voltage, wheel and tire size and braking system, the goals of the proposed design will be geared towards metrics that will exceed the standards of commercial electric vehicles. These restrictions and goals will fuel creativity to come up with the most efficient model for the given specifications.

The focus in this design will include producing a drag coefficient to less than 0.2, reducing the rolling resistance coefficient to less than 0.007, reducing the weight of the vehicle with innovative designs and materials and attempting to gain a motor and drive train efficiency greater than 80%.

This design looks to incorporate a global perspective into our research and design. The CAFE regulation is not the only motivation for the expansion of the electric vehicle industry, but also the policies and incentives of the European Union, Japan and India. China and South Korea are also expanding their car manufacturers and battery companies. For this reason, the final report will incorporate the use both SI and English units as well as universal warning labels in the
documentation for domestic and international markets. Additionally, the design will comply with international electric vehicle (EV) standards and be competitive in all markets.

The ultimate goal of the project will be to add innovation to the alternative energy field, through the channel of the Shell-Eco Marathon competition. The design is expected to demonstrate an improvement in the efficiency of plug-in electric cars and compete in the urban concept category of the 2012 Shell Eco-marathon.