EcoCAR Teams Roll Out Architectures for 'Green' Vehicle of the Future

Students Provide Glimpse into the Future of Clean Vehicle Technology Solutions as they Reveal Cutting-Edge EcoCAR Designs

WASHINGTON (February 3, 2009) Today, student engineers participating in *EcoCAR: The NeXt Challenge*, completed a major milestone in their three-year quest to win the competition by unveiling their vehicle architectures at the Washington Auto Show. The 17 unique designs provide a glimpse into the future of green vehicle technology solutions and embrace innovations ranging from on-board hydrogen fuel cells to all electric vehicles.

EcoCAR, which is sponsored by the U.S. Department of Energy (DOE) and General Motors (GM), as well as the Government of Canada, the California Air Resources Board and other government and industry leaders, provides invaluable experience and training to the next generation of engineers developing future clean vehicle technology solutions.

 "These students represent the future in automotive engineering, and the *EcoCAR* Challenge is providing them with the hands-on training and experience they need to prepare for advanced technology vehicle engineering," said David Rodgers, Deputy Assistant Secretary for Energy Efficiency at the DOE. "These student designs are innovative and ingenuous. Rarely do we have the opportunity to compare such a diverse range of advanced technology vehicles with so much promise."

The student teams have worked tirelessly to develop the architectural concepts that will not only meet the competition criteria, but also represent their vision for their '*EcoCAR*' of the future. Students were encouraged to explore a variety of solutions including hybrid, plug-in hybrid, fuel cell, electric, and extended range electric vehicles.   Each design is unique, and will take on a life of its own over the next few years. The 17 *EcoCAR* designs announced today were as follows:

- **Extended Range Electric Vehicles (EREV)** - Eight of the *EcoCAR* teams, including Embry Riddle Aeronautical University, Mississippi State University, North Carolina State University, Ohio State University, Pennsylvania State University, University of Wisconsin, University of Victoria and Virginia Tech chose to design Extended Range Electric Vehicles, which, like GM's Chevy Volt, demonstrate full performance with an electric powertrain for all electric driving and an optimized combustion engine that can extend the range of the vehicle with its on-board fuel storage. The *EcoCAR* Challenge teams that selected an EREV as their architecture will use either B20 or E85 to extend the range of their electric vehicles. B20 is a blend of 20% biodiesel and 80% petroleum diesel and E85 is a blend of 85% ethanol and 15% gasoline.

- **Plug-In Hybrid Electric Vehicles (PHEV)** - Six of the seventeen *EcoCAR* teams, including Georgia Tech, Howard University, Michigan Tech University, Rose-Hulman Institute of Technology, Texas Tech, and West Virginia University, have designed Plug-In Hybrid Electric Vehicles which are constructed with a large lithium ion battery. The battery can be recharged by plugging into the wall and the vehicle may operate without using the engine at all. Once the plug-in range of the battery is depleted the vehicle can still operate as a regular hybrid. The architectures will use either B20 or E85 to extend the range of the vehicles.

- **Full Function Electric Vehicle (FFEV)** - Only one team, University of Ontario Institute of Technology (UOIT) chose to design a Full Function Electric Vehicle, which has an all-electric motor powering its drive train and has over 100 miles of range. It stores energy in batteries that can be charged using a home electrical outlet.

- **Fuel Cell Plug-in Hybrid Electric Vehicle (FCPHV) -** Two of the seventeen *EcoCAR* teams, including University of Waterloo and Missouri University of Science and Technology, have designed a Fuel Cell Plug-in Hybrid Vehicle which uses an onboard hydrogen fuel cell to either propel the vehicle or recharge a battery pack. The battery pack can be charged using a home electrical outlet. The FCPHEV uses significant battery energy before relying on the fuel cell to extend the range of the vehicle.

While each of the 17 *EcoCAR* designs is unique, there are common attributes including:

- All of the vehicles have plug-in capability, which can significantly reduce on-road petroleum consumption.
- All of the designs use state-of-the-art lithium ion battery technology, so the vehicles are able to store more electric energy in smaller, lighter packages.
- All of the vehicles use a renewable energy source that displaces petroleum consumption, which significantly reduces the amount of greenhouse gases emitted from the vehicle's tailpipes.
- All of the *EcoCAR* team architectures must retain the safety and real-world performance characteristics of production vehicles that consumers demand.

For more information on the announcement, please visit: http://www.green-garage.org.

At the end of the competition *EcoCAR* vehicles will be judged on a number of criteria including efficiency, environmental impacts, performance, consumer appeal, safety, quality of workmanship, ride quality, noise and vibration. They will also present numerous aspects of their *EcoCAR* work such as mechanical, control, and electric engineering accomplishments to judging panels consisting of industry and government subject matter experts.

"Working with these bright young engineers as they grapple with the trade-offs between performance, efficiency, emissions and utility is very valuable for GM because it helps prepare them for real careers in the industry," said Britta Gross, manager, Hydrogen and Electrical Infrastructure Commercialization for General Motors. "This isn't a just a contest; this is about 17 extremely innovative teams of students across North America making a difference for generations to come."

"The designs of these students remind us of the depth and creativity of the human resources that we can count on as we drive toward a new generation of green vehicle technologies," said the Honourable Lisa Raitt, Canada's Minister of Natural Resources. "Competitions like *EcoCAR* are a wonderful showcase for the talent and ingenuity of these students, and they take us another step closer to realizing the economic and environmental potential of these technologies."

Background:

EcoCAR is a three-year competition that builds on the 19-year history of DOE advanced vehicle technology competitions by giving engineering students the chance to design and build advanced vehicles that demonstrate leading-edge automotive technologies. During the program, General Motors will provide production vehicles, vehicle components, seed money, technical mentoring and operational support. The U.S. Department of Energy and its research and development facility, Argonne National Laboratory, will provide competition management, team evaluation and technical and logistical support. Through this important partnership between government and industry, *EcoCAR* aims to inspire and support the next generation of scientists and engineers to unite around the common goal of sustainable mobility.