North America's Premier Collegiate Automotive Engineering Competition

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EcoCAR2 PLUGGING IN TO THE FUTURE

EcoCAR 2: Plugging In to the Future

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

GM

EcoCAR 2 is North America's Premier Collegiate Automotive Engineering Competition and the only program of its kind. The competition's mission is a vital one: offer an unparalleled hands-on, real-world experience to educate the next generation of automotive engineers. The three-year competition challenges 15 universities across North America to reduce the environmental impact of a 2013 Chevrolet Malibu without compromising performance, safety and consumer acceptability.

Established by the U.S. Department of Energy (DOE) and General Motors (GM), EcoCAR 2 builds upon a successful 24-year history of DOE Advanced Vehicle Technology Competitions (AVTC) that exemplify the power of public/private partnerships in providing invaluable experience and training to promising, young minds entering the North American job market. EcoCAR 2 follows the widely acclaimed competition series *EcoCAR: The NeXt Challenge.*

EcoCAR 2 requires students to explore a variety of plug-in hybrid electric vehicle powertrain architectures, which deplete an on-board battery to displace vehicle fuel.

The powertrain components are configured to drive the vehicle in five unique combinations:

» Split-Parallel
» Series-Parallel
» Parallel through the Road
» Series
» Hydrogen Fuel Cell Series

Technical Goals

EcoCAR 2 technical goals are to design and integrate vehicle powertrains that, when compared to the production gasoline vehicle:

» Reduce petroleum energy consumption on the basis of a total fuel cycle analysis, or well-to-wheel (WTW);
» Reduce fuel consumption;
» Reduce WTW greenhouse gas (GHG) emissions;
» Reduce regulated criteria tailpipe emissions;
» Maintain consumer acceptability in the areas of performance, utility, and safety.

Participating universities will use electric powertrains, next generation control systems, and advanced battery technologies to reduce fuel consumption and greenhouse gas emissions (GHG). Student designs will consider the well-to-wheel (WTW) impact of fuel use and select renewable fuels such as hydrogen, E85 (85 percent ethanol), or B20 (20 percent biodiesel).

During the three-year program EcoCAR 2 teams will follow a real-world Vehicle Development Process (VDP) modeled after GM's VDP . Using the VDP enables students to design, build and refine their advanced technology vehicles. Year One begins with modeling and simulation to develop their vehicle architecture. In Year Two, teams incorporate their new powertrains, and in the final year, teams refine their vehicles to near-showroom quality. At the end of each academic year, teams compete in more than two dozen static and dynamic events for top honors and $100,000 in cash prizes.

EcoCAR 2's unique combination of cutting edge engineering practices, hands-on experience, exposure to world-class organizations and knowledge sharing in a competitive and team-oriented environment makes it the perfect preamble to future job success and a catalyst for growing the North American automotive industry's competitiveness in the global marketplace.

AVTC History

For more than two decades, the U.S. Department of Energy has sponsored Advanced Vehicle Technology Competitions (AVTC) through Argonne National Laboratory. These competitions represent a unique coalition of government, industry and academic partners who join forces to explore sustainable vehicle solutions. Argonne manages these competitions to educate the next generation of automotive engineers and accelerate the development and demonstration of technologies of interest to the DOE and the automotive industry.

EcoCAR 2 Teams

California State University, Los Angeles
Colorado State University
Embry-Riddle Aeronautical University
Mississippi State University
North Carolina State University
The Ohio State University
Pennsylvania State University
Purdue University
Rose-Hulman Institute of Technology
University of Tennessee, Knoxville
University of Victoria
University of Washington
University of Waterloo
Virginia Tech
Wayne State University

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AVTC ADVANCED VEHICLE TECHNOLOGY COMPETITION

Managed by Argonne NATIONAL LABORATORY

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