EcoCAR: The NeXt Challenge

Energy Savers Blog

While most college students' experience with vehicles goes no further than the beater they picked up for a few thousand dollars, students participating in the EcoCAR: The NeXT Challenge [1] competition get to experience the cutting-edge of driving technology. The competition, which was established by the U.S. Department of Energy and General Motors, is a three year advanced vehicle engineering contest. Yesterday, May 17, was the first day of their Year 2 judging sessions.

In EcoCAR, students from 16 universities across North America are competing against each other to build the most environmentally sustainable and practical vehicle. This year's teams [2] have adopted a number of advanced technologies, including plug-in hybrid electric [3], extended-range hybrid electric, all-electric [4], and fuel cell [5] plug-in hybrid electric drives. The teams using plug-in hybrid electric and extended-range electric drives have also adapted their vehicles to run on either E85 [6] (85% ethanol, 15% gasoline) or B20 [7] (20% biodiesel, 80% diesel).

EcoCAR is part of a decade-long tradition of student vehicle competitions [8] sponsored by the U.S. Department of Energy. Previous participants have gone on to work at major automobile companies, refining the same technologies that they first worked with in their student vehicles.

Beyond the use of advanced technology, EcoCAR is unique among student competitions in that it provides students with access to and training on the tools used in the industry. Last year, teams used math-based design and modeling software [9] developed by Argonne National Laboratory [10] to create their own advanced powertrains. The Ohio State University [11] team took first place in this leg of the event.

This year, the teams took their designs to the next level, integrating these powertrains into Saturn Vue vehicles. Although they didn't build vehicles from the ground-up, they faced the huge challenge of incorporating new technology into existing vehicles. They rebuilt the vehicles around entirely different engines and designed electric controls to sync the many different computerized systems.

These next two weeks will demonstrate how well the teams have carried out this demanding task. The competition begins in Yuma, Arizona at the GM Desert Testing Ground. There, teams will run their creations through the same tests run on mass-market vehicles, including safety inspections, highway stability, braking, acceleration, emissions, towing ability, visual design, and energy consumption. The desert temperatures, which are expected to reach 100°F, will also provide an additional challenge! Download the competition program (PDF 5.86 MB [12]). Download Adobe Reader [13].

Following the driving tests is an even scarier prospect: public speaking. During the next stage, which runs from May 23 to May 27 in San Diego, teams will explain how and why they designed their cars. The impressive set of judges includes officials from the U.S. Department of Energy's Vehicle Technologies Program, GM senior researchers, and engineers from the DOE's National Laboratories. In fact, many of these judges helped develop the first versions of the machinery students are using in their cars! In addition to engineering, the students also must explain how they educated their community about advanced technology vehicles through community workshops, media relations, websites, and social media.

Once students complete the rigors of this year's competition, they will continue to refine their vehicles until they meet near-production quality prototypes. Next year, they will run these vehicles through an even more grueling set of tests to determine the final EcoCAR winner! To follow the action, check out the EcoCAR Web site [1] and the competition's Green Garage [14].

The EcoCAR teams are:

- Embry Riddle Aeronautical University [15] (Daytona Beach, FL)
- Georgia Tech [16] (Atlanta, GA)
- Michigan Technological University [17] (Houghton, MI)
- Mississippi State University [18] (Starkville, MS)
- Missouri University of Science and Technology [19] (Rolla, MO)
- North Carolina State University [20] (Raleigh, NC)
- Ohio State University [21] (Columbus, OH)
- Pennsylvania State University [22] (University Park, PA)
- Rose-Hulman Institute of Technology [23] (Terre Haute, IN)
- Texas Tech University [24] (Lubbock, TX)
- University of Ontario Institute of Technology [25] Oshawa, Ontario, Canada
- University of Victoria [26] (Victoria, British Columbia, Canada)
- University of Waterloo [27] (Waterloo, Ontario, Canada)
- University of Wisconsin [28] (Madison, WI)
- Virginia Tech [29] (Blacksburg, VA)
- West Virginia University [30] (Morgantown, WV)

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Links:
[1] http://www.ecocarchallenge.org/
[2] http://www.ecocarchallenge.org/meet_the_teams.html
[3] http://www.afdc.energy.gov/afdc/vehicles/plugin_hybrids.html
[4] http://www.afdc.energy.gov/afdc/vehicles/electric.html
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