U.S. Department of Energy

General Motors Corporation

Natural Resources Canada

May 25-June 2, 1998

Seeking Solutions to Energy Concerns

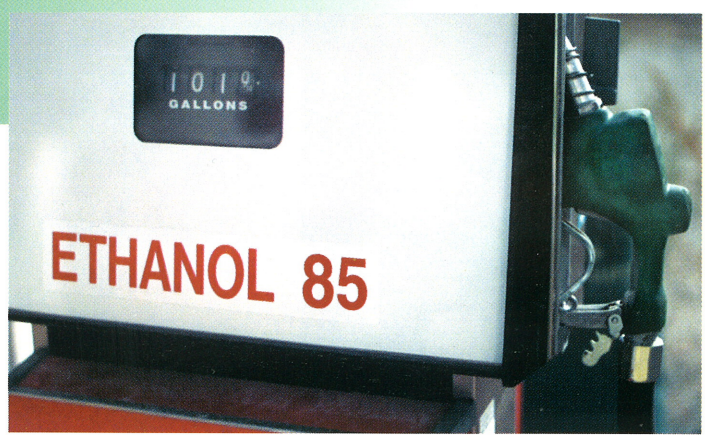
Global warming, ozone alerts, air pollution, a diminishing petroleum supply — we hear about these issues every day. Tailpipe emissions from millions of cars and trucks produce a significant amount of the air pollution in North America. U.S. automakers have made tremendous progress toward reducing automotive emissions, but more vehicles on the road and more miles traveled have offset some of these gains. Transportation accounts for about two-thirds of total petroleum use. More than half of our oil is imported — and the percentage is growing steadily each year. What can we do about it?

One part of the solution is alternative-fuel vehicles (AFVs): automobiles and trucks that use fuels other than gasoline, such as ethanol. The U.S. Department of Energy (DOE) is working on strategies for building energy-efficient AFVs that will help reduce greenhouse emissions, other atmospheric pollutants, and dependence on imported oil. As part of its efforts, DOE, together with Natural Resources Canada, automakers, and other industrial partners, sponsors advanced vehicle technology competitions. In 1998, a new competition will debut: the *Ethanol Vehicle Challenge*.

The 1998 Ethanol Vehicle Challenge

In these competitions, college engineering students work together to design, build, and evaluate a state-of-the-art AFV. For the Ethanol Vehicle Challenge, the goal is to convert an award-winning Malibu sedan into an optimized vehicle fueled solely by E85 (a blend of 85% denatured ethanol and 15% gasoline-like hydrocarbon primer). The competition vehicle should have improved fuel economy, low exhaust emissions, and excellent cold-startability, without sacrificing driveability and performance.

Selected schools receive a 1997 Chevrolet Malibu powered by a 3.1-L V6 engine plus a spare engine for development purposes. Student teams replace or upgrade major engine and fuel system components for ethanol operation. As they work on their vehicles, the students solve real-life engineering problems and make complex decisions by applying creative, innovative thinking.



1998 Ethanol Vehicle Challenge Teams

Cedarville College, Ohio

Crowder College, Missouri

GMI Engineering & Management Institute, Michigan

Idaho State University

Illinois Institute of Technology

Mankato State University, Minnesota

University of California, Riverside

University of Illinois at Chicago

University of Kansas

University of Nebraska-Lincoln

University of Texas at Austin

University of Texas at El Paso

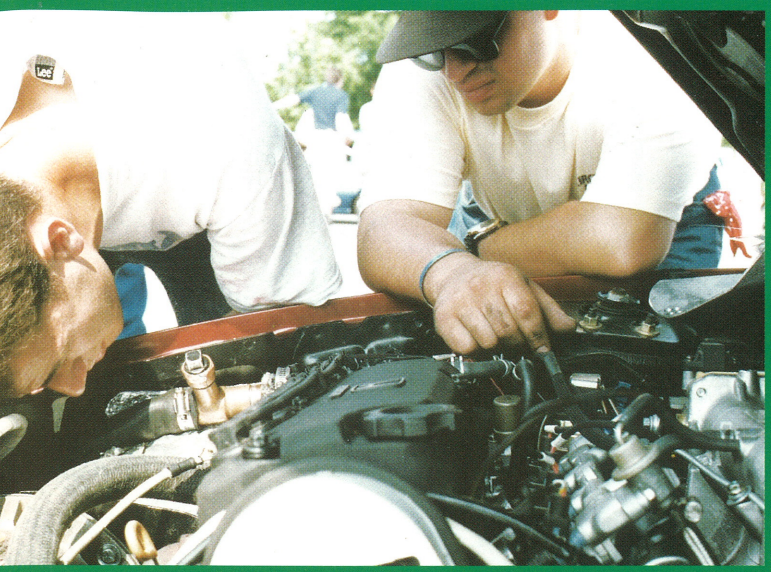
University of Waterloo, Ontario

Wayne State University, Michigan

Road Trip!

After five days of testing at the General Motors Proving Grounds in Milford, Michigan, the Ethanol Vehicle Challenge teams will embark on a two-day, 600-mile caravan that ends with a ceremony at DOE Headquarters in Washington, D.C. Along the way, the cars will stop at events in Ohio and Maryland to promote the use of AFVs and awaken public interest in this developing technology. At journey's end, the teams will join the Clean Cities Conference parade through downtown Washington, participate in the opening reception for the conference, and exhibit their vehicles both at the conference and on Capitol Hill.

Vehicles are tested and scored on exhaust emissions, fuel economy, acceleration, driveability, handling, range, and cold-starting performance. Teams also receive points for a written design report and an oral technical design presentation. Winners receive cash awards, and the best oral reports are scheduled to be presented at the 1998 Clean Cities Conference.



Get Involved!

Want to become a part of this exciting venture? Benefits to organizational sponsors and supporters of the 1998 Ethanol Vehicle Challenge include

- Visibility and recognition from both the public and the automotive community by demonstrating commitment to the future of education, transportation, the environment, and the national economy.

- Firsthand experience with new technologies and innovative uses of existing products.

- Opportunity to recruit an enthusiastic new generation of creative young engineers who have hands-on experience in solving technical problems with teamwork.

- Media focus at the 1998 Clean Cities Conference, which is attended by influential representatives of federal, state, and local governments as well as private organizations concerned with environmental and transportation issues.

Your organization's name and logo can appear on
- Sponsored competition events
- Awards presented by your organization
- Vehicle stickers, media releases, and competition literature
- Signage at competition events
- Giveaways, such as caps, t-shirts, flags, and other memorabilia.

You can support the Ethanol Vehicle Challenge in three ways:
- Major Sponsor, providing support for the overall execution of the competition
- Associate Sponsor, providing resources at the event level, benefitting all teams
- Local Sponsor, providing resources to specific teams.

Financial contributions are appreciated, but that's not the only way you can help. The Ethanol Vehicle Challenge is based on state-of-the art automotive and alternative-energy technologies that require equipment ranging from basic mechanical necessities to advanced testing equipment and instrumentation. Supplies, logistical support, and volunteer services are also welcome.

Ethanol: An American Fuel for American Cars

Ethanol (also called ethyl or grain alcohol) is based on sugars derived from starches and cellulose in plants. It has several advantages as a vehicle fuel:

- It's made from renewable resources - agricultural crops grown right here in North America. It can also be created from agricultural waste (biomass) that would otherwise be thrown away.

- It burns more cleanly than conventional fuels, which results in fewer tailpipe emissions: as much as 30% less carbon monoxide; 12% less volatile organic compounds; 30% less toxic components, such as benzene and toluene; and 3% less nitrogen oxides.

- It can reduce greenhouse emissions. Ethanol cars emit less carbon dioxide than gasoline cars. In turn, the plants used to make ethanol transform the carbon dioxide into oxygen as they grow in the fields.

Although 100% denatured ethanol can be used in vehicles, most ethanol fuel available today is blended with unleaded gasoline. Most conventional vehicles can run on E10 (10% ethanol, 90% gasoline) without modifications, and auto manufacturers are producing vehicles that can run on fuel with a high percentage of ethanol, such as E85. A gallon of ethanol contains about 66% of the energy content of one gallon of gasoline; because of added hydrocarbons, E85 has about 75% of the energy content of gasoline. Dedicated ethanol vehicles make up their range deficit with slightly larger fuel tanks. Americans have driven more than 1.86 trillion miles on ethanol-blended fuels since 1979.

Ethanol vehicles have received high marks in performance, driveability, and reliability tests. Power, acceleration, payload, and cruise speed are all comparable to those for equivalent gasoline-fueled vehicles. The outlook for ethanol-fueled vehicles is bright — U.S. automakers have committed to producing significantly more ethanol vehicles in upcoming model years.

For more information about sponsorship, contact your local university team or

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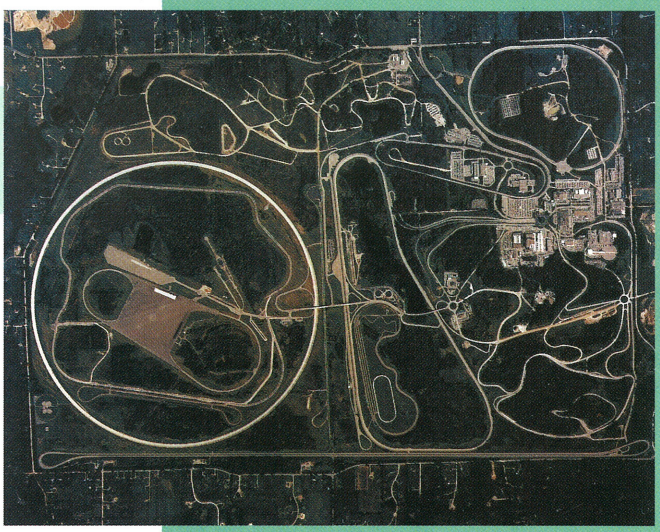

General Motors Proving Grounds, Milford, Michigan

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Howell Hydrocarbons and Chemicals

Delphi Automotive Systems

GROWMARK

Host

General Motors Proving Grounds, Milford, Michigan

Competition Administrator

Center for Transportation Research, Argonne National Laboratory, operated by The University of Chicago as part of the U.S. Department of Energy's national laboratory system.

1998 ETHANOL VEHICLE CHALLENGE

To subscribe to *FutureDrive*, a free newsletter that focuses on advanced transportation technology competitions sponsored by the U.S. Department of Energy and its partners, send e-mail to ckaicher@anl.gov.