

PATHWAY TO TOMORROW'S VEHICLE:

Results from

FUTURECAR



1998



Chrysler Technology Center ★ Oakland Community College

June 3 - 10



Auburn Hills, Michigan

FUTURECAR 1998

THE PATHWAY TO TOMORROW'S VEHICLE



In the FutureCar Challenge, college engineering students work together to design, build, and evaluate an advanced technology vehicle. This year, as in the previous two years of the competition, the goal was to convert a conventional midsize sedan into a super-efficient vehicle without sacrificing performance, utility, and safety. Student teams were challenged to meet goals paralleling those

of the Partnership for a New Generation of Vehicles (PNGV). One goal was improving the energy efficiency of cars currently available by a factor of three, or to 80 miles per gallon (mpg).

In essence, 9 of the 13 competing schools "started over" this year, having received new vehicles for the 1998 Challenge. Some of the schools had only four months to build a competitive entry.

As a result, some schools using the most advanced technologies in their vehicles were not ready for testing at this year's Challenge, proving that the pathway to tomorrow's vehicle isn't always smooth.

Nevertheless, the results from the 1998 Challenge were still impressive. The students teams demonstrated that it is possible to improve the energy efficiency of currently available cars by a factor of two by using "off-the-shelf" technology. Results from the emissions testing were encouraging, including those for the one alternative-fueled entry and the many diesel-fueled entries.

Also, each year the competition has attracted more attention from the news media. This year, *Popular Mechanics*, *Popular Science*, *Ward's Automotive*, *Automotive Industries*, *The Car Connection*, and *Automotive Engineer* covered the event. Several televised segments appeared on nightly news programs, and *USA Today* included two front-page placements on the Challenge.



Automotive stylists from GM judging vehicle appearance.

1998 CHALLENGE RESULTS

Fuel Efficiency

Teams demonstrated that the PNGV 80-mpg goal is achievable in the not-too-distant future. The top two schools in this category drove more than 174 miles at speeds between 25 and 55 miles per hour (mph) on an energy equivalent of 2.3 gallons of reformulated gasoline. That translates to *fuel economies of over 75 mpg!* In comparison, the stock Lumina control vehicle achieved 37 mpg over the same course, distance, and speeds.

Performance

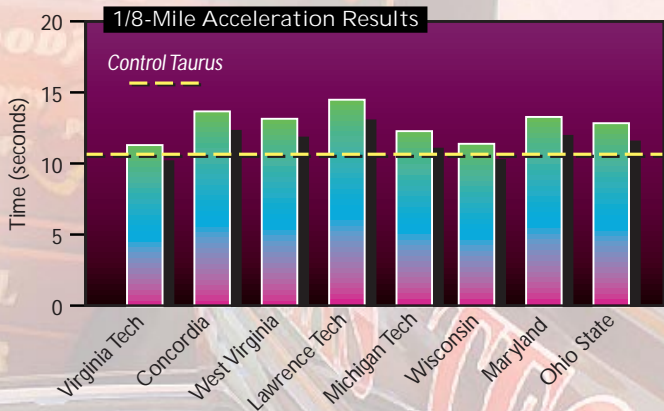
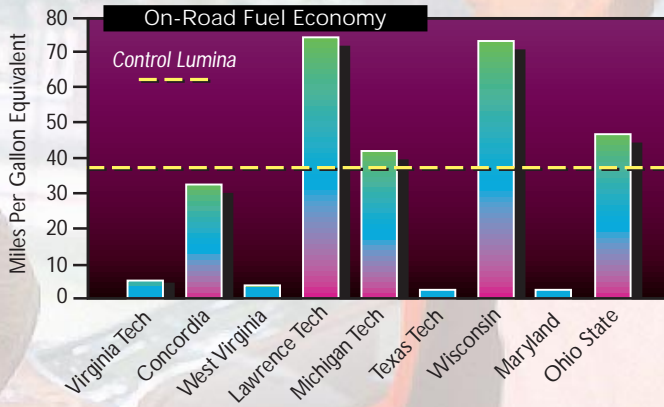
In most events, the vehicles' performance closely paralleled that of the stock control vehicle. In the handling event, the best time for a student-built vehicle was 30.61 seconds, while the best for the stock vehicle was 31.95 seconds. In the acceleration event, the best time for a student-built vehicle was 11.23 seconds, while the best for the stock Taurus was 10.98 seconds.

Emissions

Although many of the vehicles came close to meeting the Federal Tier 1 standard for emissions, none were successful in achieving this milestone. Five vehicles did meet the Federal Tier 0 standard, including one of the five diesel hybrids and the one ethanol-fueled hybrid.

Top and Special Awards

| | |
|---------------------------------------|---|
| 1st Place Overall (Tie) | Virginia Tech and University of Wisconsin |
| 3rd Place Overall | Lawrence Tech |
| 4th Place Overall | Michigan Tech |
| 5th Place Overall | University of Maryland |
| 6th Place Overall | Concordia University |
| Best Overall Engineering Design | Virginia Tech |
| Most Energy Efficient Vehicle | Ohio State |
| Best Acceleration | Virginia Tech |
| Best Dynamic Handling | Virginia Tech |
| Best Endurance (Tie) | Lawrence Tech and University of Wisconsin |
| Lowest Emissions | University of Maryland |
| Best Technical Report | University of Maryland |
| Best Vehicle Design Inspection | Virginia Tech |
| Best Oral Design Presentation | Lawrence Tech |
| Best Consumer Acceptability | Virginia Tech |
| Best Appearance | University of Illinois |
| Lowest Vehicle Driving Losses | University of Wisconsin |
| Best Safety | Texas Tech |
| Best Use of Alternative Fuels | University of Maryland |
| Best Use of Advanced Materials | University of Wisconsin |
| Innovations in Aluminum | University of Wisconsin |
| Best Workmanship | University of Illinois |
| Best Teamwork | University of Wisconsin |
| Sportsmanship Award | Michigan Tech |
| Spirit of Challenge Award | Texas Tech |
| Best Solo | Virginia Tech |



Consumer Acceptability

This year's vehicles were more refined and incorporated more "customer-friendly" features than those from the two previous years. Generally, the vehicles ran well, were visually pleasing inside and out, and close to mainstream acceptability. Judges also reported them to be fun to drive! This indicates that ultra-high-efficiency hybrid vehicles can achieve a high level of consumer acceptance and satisfaction.



University of Wisconsin and Virginia Tech tied for 1st Place Overall.

REAL-WORLD EXPERIENCE

Without a doubt, the competition is meeting its goal to help educate a new generation of leaders for the automotive industry. Experience they gain working with the new technologies – from lightweight materials to advanced direct-injection engines, from fuel cells to high-power batteries – is reason enough to continue the competition into future years.

LOOKING TO THE FUTURE

The U.S. Department of Energy's intent for the FutureCar Challenge was to have the competition follow the path of the PNGV program through its 10-year charter. Each year, the student vehicles are to incorporate the newest technologies as they come out of research sponsored by PNGV.



In 1998, the third year of the competition, the technologies incorporated into the student-built FutureCars reached new levels of technical sophistication. In many cases, the teams "starting over" with new cars need another year to fully optimize these advanced technologies into their vehicle.

Given the many accomplishments in 1998, the original mission and goals for FutureCar Challenge have been met. Nevertheless, it is apparent that there is still much to be learned about ultra-high-efficiency vehicles. Hybrid vehicle technology is just beginning to show its true promise. However, continuation of the competition will require a significant and ongoing effort on the part of the sponsors to keep the competition evolving to match the increasing sophistication of the technologies and vehicles.

The Department of Energy is committed to continuing the FutureCar Challenge in 1999, but questions remain about the auto industry's level of involvement and the location of future competitions. Facility access costs and disruption of work on current products limit the amount of direct support from PNGV partners. In addition, potential changes in the makeup or structure of the U.S. Council for Automotive Research could further limit support. Therefore, alternative funding sources and organizations willing to support the competition will have to be found to put the 1999 FutureCar Challenge on a solid foundation.

SPONSOR THE CHALLENGE

Don't miss the opportunities now available for your organization or company to be a part of the 1999 Challenge! Challenge sponsors recognize the value that supporting this event brings to their companies or organizations. It provides a high degree of visibility through a public demonstration of corporate commitment to the future of education, the U.S. economy, and the environment. It also gives them a "leg-up" over competitors – Challenge sponsors have immediate access to the new ideas, the technological innovations, and the gifted students who will become the outstanding employees of the future.

FUTURECAR 1998



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 Michigan Technological University
 Ohio State University
 Texas Tech University
 University of California, Davis
 University of Illinois - Urbana
 University of Maryland
 University of Michigan
 University of Tennessee
 University of Wisconsin-Madison
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For information about sponsoring the 1999 FUTURECAR CHALLENGE, contact:



FUTURECAR CHALLENGE
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